APSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF Doc. 835

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May 1, 2024

Ms. Karen Shook, Secretary
Arkansas Public Service Commission
P.O. Box 400
1000 Center Street
Little Rock, Arkansas 72201

Re: Docket No. 07-085-TF
In the Matter of the Application of Entergy Arkansas, Inc. For Approval of Energy Efficiency Programs and Energy Efficiency Cost Rate Rider

Dear Ms. Shook:

Please find attached for filing with the Arkansas Public Service Commission, Entergy Arkansas, LLC's Energy Efficiency Program Portfolio Annual Report for the 2023 Program Year and the accompanying Program Portfolio Annual Report Excel Workbook. This Annual Report and Workbook are filed pursuant to the provisions of Section 9 of the Commission's Rules for Conservation and Energy Efficiency Programs approved in Docket No. 06-004-R.

If you have any questions or need anything additional concerning this filing, please call me at (501) 377-3571 or Judy Kay Lindholm at (501) 377-3526.

Sincerely,

/s/ J. David Palmer

JDP/jkl
Attachments

c: All parties of record w/ attachments



ENTERGY ARKANSAS, LLC

Arkansas Energy Efficiency

Program Portfolio Annual Report

Docket No. 07-085-TF

2023 PROGRAM YEAR

May 1, 2024

1

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1.0 Executive Summary

Entergy Arkansas, LLC ("Entergy Arkansas" or the "Company") submits its Energy Efficiency Program Annual Report for the 2023 program year. This Annual Report demonstrates that the Company has developed and offered cost-effective energy efficiency programs to all classes of its customers, as it has since the Arkansas Public Service Commission ("APSC" or the "Commission") adopted its Rules for Conservation and Energy Efficiency Programs ("C&EE Rules") and comprehensiveness guidance. The 2023 Annual Report provides information for the 2023 program year.

Overall, the Annual Report demonstrates:

- Entergy Arkansas' successful implementation of its energy efficiency programs continued for the 2023 program year, with the Company maintaining its overall energy efficiency savings through its portfolio of energy efficiency programs.
- Energy savings of 294,537 MWh (gross or *ex ante*[1]) for the 2023 program year, which is comparable to the 302,315 MWh energy savings achieved by the Company for the 2022 program year.[2]
- Entergy Arkansas achieved net savings[3] of 283,028 MWh which is comparable to the 292,926 MWh achieved in 2022 by effectively working with its program implementers and evaluation contractor to expand offerings to low-income households and identify deeper savings for commercial customers. The overall portfolio net-to-gross factor increased from 97 percent in 2022 to 99 percent in 2023.
- The 2023 program year was designed to achieve 120% of the Commission-established target for achieved savings of 1.2% of 2018 retail sales. Entergy Arkansas exceeded that goal with an overall achievement of 128% of the Commission-established goal, which allows the programs to meet the performance incentive thresholds established by the Commission in Docket No. 13-002-U.
- Entergy Arkansas' energy efficiency programs continue to receive national recognition. Below are the latest awards being issued to various programs:

[1] For purposes of this Annual Report, Entergy Arkansas uses the term "***ex ante***" to refer to the actual savings achieved by Entergy Arkansas prior to application of a number of adjustments that are applied to the Company's achieved savings figures.

[2] *See infra* Table 1.1.2 for additional details regarding the figures for this and other program years

[3] Net savings refers to the application of the EM&V researched net-to-gross ratio to *ex post* savings.

- Low Income Solutions – Alliance to Save Energy's Utilities Star of Energy Efficiency 2023
- Manufactured Homes – ACEEE Exemplary Program 2019.
- Agricultural Energy Solutions – ACEEE Exemplary Program 2019.
- Residential Lighting & Appliances – EPA ENERGY STAR® Partner of the Year Award 2019-2023.

In prior annual reports, Entergy Arkansas discussed the challenges inherent in running energy efficiency programs. In 2023, several steps were taken to overcome current challenges, while also exploring new avenues to lower the barriers facing customer adoption of the measures offered through the Company's energy efficiency programs. Those steps are enumerated below:

- Non-Energy Benefits ("NEBs")
  - 2023 saw the continued application of NEBs, per Order Nos. 7 and 30 in Docket No. 13-002-U.
  - Entergy Arkansas, in collaboration with the Parties Working Collaboratively ("PWC") and its evaluator, Tetra Tech, refined the presentation and application of NEBs in 2018 through a NEBs working group. The NEBs working group established consensus definitions, methodologies and protocols for the identification and calculation of avoided and deferred replacement costs across the Company's portfolio, including processes for efficiently identifying, estimating and/or verifying avoided or deferred replacement costs associated with custom projects. These protocols were followed for estimating the 2023 program year NEBs.
- Consistent Weatherization Act and Act 1102
  - Order No. 7 in Docket No.13-002-U requires all investor-owned utilities ("IOUs") to implement a consistent approach to providing weatherization services to eligible Arkansas residents. Order No. 7 identified key programmatic features that this consistent weatherization approach must include, features that were further developed and refined into a recommended framework – referred to as the Core Program – for implementation by the IOUs. The APSC approved the Consistent Weatherization Approach on December 9, 2014 with Order No. 22 in Docket No. 13-002-U. Beginning in 2016 and continuing through 2023, Entergy Arkansas' Home Energy Solutions, Manufactured Homes, Multifamily Homes and now (as

of 2020) Low-Income Solutions programs offered the "core" weatherization measures to residential customers.

- Act 1102 of 2017, concerning Ark. Code Ann. § 23-3-405(a) and the authority of the APSC over energy efficiency programs and measures provided by IOUs, states that the APSC is "permitted to order, require, promote, or engage in energy conservation programs and measures for the benefit of utility customers" that fall into one or both of two key segments:

    1. Utility customers who are 65 years of age or older, or
    2. Utility customers who meet the income eligibility qualifications for the Low-Income Home Energy Assistance Program ("LIHEAP") administered by the Department of Human Services (administration since transferred to the Arkansas Energy Office).

  Entergy Arkansas began offering a Low-Income Program in 2020 in accordance with Act 1102 guidelines.
- The PY2020 process evaluation found the new Low-Income Solutions successful, and this success continued in its third year of implementation, once again exceeding its energy savings filed goal. The program effectively served the intended customers with approximately 90% of customers LIHEAP eligible[4] and/or 65 years of age or older.

- In addition to the Low-Income Solutions program, other Entergy Arkansas residential programs also serve the Arkansas low-income and senior population. The Home Energy Solutions ("HES") Program, Manufactured Homes and Multifamily Homes are the other primary programs providing services to these customer segments. Across these three programs between 30.8% and 36.4% of participants are 65 or older (30.8% of Multi-family homes participants, 33.8% of HES participants, and 36.4% of Manufactured Homes participants). More than 70% of HES participants are LIHEAP eligible, while about half of Manufactured Homes and Multifamily Homes participants are LIHEAP eligible (46.4% of Manufactured Homes participants, 50.0% of Multi-family Homes). With a total of 12,403 unique participants enrolled, the four residential programs installed 56,758 energy-saving

[4] Combining data collected on household size and household income, the EM&V team generated an estimate of the number and share of survey respondents that were eligible for assistance under LIHEAP. The EM&V team utilized a table of LIHEAP eligibility cutoffs provided by the State of Arkansas, where LIHEAP eligibility is determined through a combination of household size and household income.

units. While the programs addressed multiple end-uses including lighting, HVAC, hot water, envelope and appliances, weatherization improvements continue to be one of the most popular measures, with duct sealing representing over half of savings in the programs, and ceiling insulation and air infiltration representing the next most energy saving measures.

- Common Commercial and Industrial ("C&I") Approach
    - On June 8, 2015, the Commission, in Order No. 27 in Docket No. 13-002-U, approved the Common C&I Approach. This order directed the utilities to report on the performance of the Common C&I approach within their respective annual reports as data becomes available.
    - On December 15, 2016, the Commission issued Order No. 49 in Docket No. 07-083-TF, finding that some questions remain regarding the reconciliation of the discrepancies noted by Staff in budgets and expenditures as between the Energy Efficiency Arkansas ("EEA") Annual Report and the Annual Reports submitted by the utilities for PY2015. On May 1, 2023, the Arkansas Energy Office filed direct testimony in accordance with Order No. 52 in Docket No. 07-083-TF, which provided data and demonstrated the performance of the Common C&I Approach.

- Evolving Retail LED Lighting Market and Regulatory Uncertainties
    - In 2023, the Energy Independence and Security Act ("EISA") continued to drive policy updates for General Service Lamps ("GSLs"). Implementation of these updates phased in throughout the year, prompting ongoing incentives for GSLs which ended in June 2023. The Department of Energy ("DOE") had initiated a Notice of Proposed Rulemaking ("NOPR") on December 13, 2021, to establish a "backstop" efficacy requirement of 45 lumens per watt for GSLs. This implementation led to a significant market transformation across major bulb shapes, including A-Line, Candle, Globe, and Reflector bulbs. The rulemaking process was completed in 2022, with the DOE issuing two Final Rules related to GSLs. One rule updated the definitions of GSLs and General Service Incandescent Lamps, while the second rule set the energy efficiency standard for GSLs to the aforementioned 45 lumens per watt requirement. Although the Final Rules came into effect in 2022, full compliance was phased in over the course of 2023. During this period, the Evaluation, Measurement, and Verification (EM&V) team conducted an analysis of

the impacts of the new baseline on Entergy Arkansas' portfolio savings. The analysis projects a significant potential decrease in residential lighting savings delivered through Entergy Arkansas' residential energy efficiency programs in future program years due to the EISA changes. However, opportunities for savings through commercial programs remained viable.

1.1 2023 Program Results and Achievements

For the 2023 program year, Entergy Arkansas achieved 88.6 MW[5] of evaluated net demand reduction and 283,028 MWh[4] of evaluated net energy savings.

In accordance with Order No. 17 in Docket No. 10-100-R, Entergy Arkansas' portfolio summary information, after independent EM&V and other adjustments are applied, is shown in Table 1.1.1:

Table 1.1.1

Portfolio Summary of 2023 Entergy Arkansas' energy efficiency Program Results[6]

2023 Portfolio Summary										
Net Energy Savings		Costs			Cost-Effectiveness			Goal Achievement		
Demand MW	Energy MWh	Actual Expenditures	LCFC	Performance Incentives	TRC Net Benefits (NPV)	TRC Ratio	PAC Ratio	Commission Established Target % of Baseline	Actual Savings Achieved % of Baseline	% of Target Achieved (%)
89	283,028	$ 58,224,011	$ -	$ 5,548,361	$ 95,556,037	2.36	2.58	1.20%	1.54%	128%

[5] Energy savings and Demand Reduction do not include line losses as calculated by Tetra Tech.

[6] Demand and Energy values do not include transmission and distribution line losses.

Applying the required adjustments to these savings estimates for the PY 2023, and comparing those net figures to Entergy Arkansas' targets (as adjusted to account for the loss of Self Direct ("SD") customers), the Company achieved savings of 128% of its savings target established by the Commission, as reflected in Table 1.1.2 below:

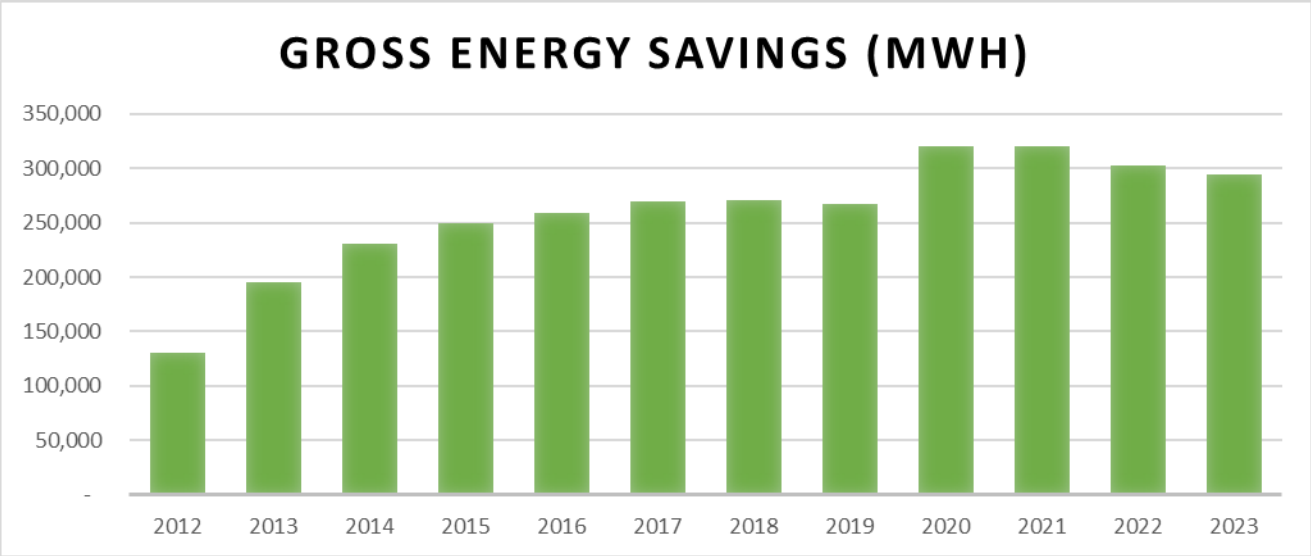
Table 1.1.2
Evaluated Savings and Goal Achievement

Entergy Arkansas' Gross Savings (*ex ante*)	**294,537 MWh[7]**
As adjusted by Tetra Tech for Realization Rate (*ex post*)	**285,330 MWh**
As adjusted for Net-To-Gross ("NTG") ratios	**283,028 MWh**
Entergy Arkansas MWh Target adjusted for SD	**220,845 MWh**
% of Target Achievement Based on Evaluated Energy Savings	**128%**

The Commission's initiatives have fostered significant growth in energy efficiency, as reflected in the unadjusted savings that Entergy Arkansas has realized for the program years 2011-2023. These initiatives have helped increase energy efficiency savings by approximately 581% over that 11-year time period.

[7] Unadjusted figures provide a good basis for comparing growth of Entergy Arkansas' Energy Efficiency programs because that was the basis upon which the IOUs were required to report their energy efficiency savings prior to the Annual Report for the 2011 Program Year filed April 2012.

Table 1.1.3 – Gross Energy Savings



For the 2023 Program Year, there were differences, as is normally the case, between budgeted and actual expenditures. These differences can be attributed to the following factors:

- The largest program in Entergy Arkansas' portfolio is the Large C&I Solutions Program, which also serves the class of the Company's customers who are eligible to self direct their energy efficiency efforts and opt out of the utility programs. This program is affected the most with respect to energy savings achievement because of the loss in the number and respective energy usage of the customers obtaining SD exemptions. In 2023, the number of Entergy Arkansas customer accounts approved to opt out of the programs remained consistent to that of 2022. The sales to SD customers represents approximately 17% of Entergy Arkansas' total retail sales. Additionally, approximately 54% of C&I customers eligible to self direct have done so, representing approximately 44% of MWh sales eligible to be exempted. These SD exemptions continue to have a negative impact upon the Large C&I Program's ability to meet targeted energy savings goals. Recognizing this difficulty, the Large C&I Program has focused on increasing the number of energy efficiency projects from smaller C&I customers, while continuing to reach the remaining large industrial customers in the program through account management and trade ally efforts. Due to levels of participation lower than anticipated, the Large C&I Program underspent its 2023 incentive budget.
- In general, the Company's energy efficiency portfolio benefited from economies of scale realized in the 2023 program year. As discussed throughout this Annual Report, Entergy

> Arkansas continually works to evaluate its programs and implementation plans to determine whether improvements can be made. Over the years, numerous innovations to program delivery have been implemented, the results of which are now being realized. Programs are operating more efficiently in many respects, as evidenced by customers implementing multiple measures through their participation in programs.

As was mentioned earlier, all of Entergy Arkansas' energy efficiency programs were cost-effective on a TRC basis in 2023, except the Agricultural Irrigation Load Control, Smart Direct Load Control, and Residential Direct Load Control programs. Further explanation of these results, including how Entergy Arkansas intends to manage these programs, will be addressed herein.

1.2 Entergy Arkansas' 2023 Program Year Results and 2023 Program Changes and Goals

With another full year of information available regarding implementation of Entergy Arkansas' comprehensive programs from its three-year plan approved by the Commission, the Company achieved a significant amount of demand and energy savings. The Company's overall results for program year 2023 are shown in Table 1.2.1 below:

Table 1.2.1

Entergy Arkansas 2023 Results

Entergy Arkansas' Gross Savings	294,537 MWh
As adjusted by Tetra Tech for RR (*ex post*)	285,330 MWh
As adjusted for NTG and RR ratios[8]	283,028 MWh

Tetra Tech's Evaluation Report recognized Entergy Arkansas' continued success in its 2023 program year report and EM&V processes, stating:

[8] Energy savings do not include transmission and distribution line losses.

Evaluation results are positive with EAL and its implementers, demonstrating continuous improvement in its program design and delivery processes, tracking system, documentation, and savings tools. Evidence of this continuous improvement is an improvement in net savings, as demonstrated through an increase in the portfolio's NTG from 90 percent in PY2020, 95 percent in PY2021, 97 percent in PY2022, and now 99 percent in BY2023 as EAL continues to effectively serve harder-to-reach segments. This increase resulted from specific outreach and expanded delivery to low-income households of energy-efficient products through downstream residential and upstream point-of-purchase programs as well as custom projects in the commercial sector.

Both EAL and its implementation contractors have been responsive to evaluation recommendations and engaged with the EM&V contractor throughout the bridge year. Continued technical assistance and collaboration between EAL, its program implementers, and the EM&V team supported the programs and facilitated healthier gross savings realization rates. The BY2023 evaluation effort identified additional recommendations to continue to stabilize realization rates in subsequent program years; increase the transparency, accuracy, and evaluability of program savings in the future; and develop process improvements to further program performance and satisfaction. EAL's status in completing prior PY2020, PY2021, and PY2022 evaluation recommendations are in each program-specific section. As mentioned above, a continuing portfolio-level recommendation is to better align energy savings and demand reduction goals.

The EM&V team calculates net-to-gross for all residential and C&I programs (outside of demand response, which are deemed from industry standard) at least once over the course of the program cycle. Net-to-gross remains strong across all programs with the majority of saving directly attributable its portfolio energy goals, achieving 99% of its filed goal and more than 100% of APSC targets. Entergy Arkansas fell short of its demand goals, meeting 55% of the demand goal. The performance difference between energy savings and demand goals is similar to prior years. While much of the difference is due to demand response programs not reaching their goals, investigations to better align energy savings and demand

savings continue per a recommendation from prior evaluations and is part of planning for the next program cycle.

Overall, evaluated savings were close to matching claimed energy savings with an overall portfolio gross realization rate of 97% for energy savings and 98% for demand reductions. Program-level gross realization rates ranged from 93% to 101% for energy savings and 88% to 101% for demand savings. NTG remains strong across all programs, with most savings directly attributable to the programs and an overall portfolio NTG ratio of 99%, an increase from last year's 97%. While the Point of Purchase Solutions, Public Institutions Solutions, and Agricultural Energy Solutions programs had NTG ratios slightly under 100%, the Large Commercial and Industrial Solutions program saw over a 100% NTG ratio due to reported spillover where participants installed additional energy efficiency measures because of the program.

Individual program performance relative to program savings and demand goals varied. Four of the ten programs[9] achieved or exceeded their megawatt-hour savings goals. Six programs did not reach their energy savings goals; these six programs ranged between 64% and 95% of energy savings goals. Three of twelve programs achieved their megawatt goals; one program met 90% or more of the demand savings goal; and eight met less than 90% of the demand savings goal. The performance of EAL's overall portfolio achieved 99% of goal savings.

The Smart Direct Load Control pilot continues to struggle to gain momentum, meeting 64% of its energy savings and 22% of its demand reduction goals. Residential program performance against the energy savings goal was stronger, with Energy Solutions for Multifamily Homes achieving 90% of its goal and all the other residential programs meeting or exceeding energy savings goals. In contrast, none of the downstream commercial programs met planned goals. The Agricultural Energy Solutions program continues to be the highest performer across demand reductions relative to goal as the program has seen large new construction horticulture projects in recent years.

[9] Residential Direct Load Control and Agricultural Irrigation Load Control programs had no megawatt-hour savings goals.

As discussed earlier, the SD option continues to impair Entergy Arkansas' ability to achieve savings with C&I customers. In 2023, there were 556 accounts that had been approved by the Commission to "opt out" of the Entergy Arkansas energy efficiency programs.

Accordingly, for 2023, the overall targets were reduced by 17% as a result of the SD accounts. Based upon Entergy Arkansas' assessment, and to preserve its ability to meet 2023 C&I program goals, Entergy Arkansas made minor adjustments to the C&I energy efficiency program budgets and the energy savings reductions for 2023.[10] Entergy Arkansas' 2020-2023 Energy Efficiency Plan forecasts higher participation in the upstream and midstream offerings for smaller commercial customers and an expanded measure mix to address the higher costs of C&I projects. The 2023 goals and the associated adjustments are shown in Table 1.2.2.

Table 1.2.2
Entergy Arkansas' 2023 Energy Savings Goals

Original 2023 Goal (MWh)	268,075
Adjustment due to SD (MWh)	47,230
New 2023 Goal (MWh)	220,845

Entergy Arkansas made changes to the commercial programs in 2023 based upon:

1) the number and magnitude of 2023 SD applications and approvals;[11]
2) the independent evaluation results; and
3) the impact of changes to lighting standards in the Arkansas markets.

The gross savings for all programs reported in this document were calculated using the Arkansas TRM 9.1 Deemed Savings and Protocols as adjusted by the Joint Recommendations of the Independent Evaluation Monitor ("IEM") and the PWC and approved by the Commission,[12] or where appropriate, utilizing an International Performance Measurement & Verification Protocol ("IPMVP") approved method.

As indicated earlier, Entergy Arkansas' reported net savings reflect the final results of the independent EM&V analysis performed by Tetra Tech. Tetra Tech's EM&V Report of Entergy Arkansas' 2023 Energy Efficiency programs is attached as Appendix A.

[10] Entergy Arkansas will need to continue to monitor SD impacts as a result of the SD Legislation passed and implemented in 2013.
[11] Legislation has increased the uncertainties regarding the magnitude of industrial customers that will choose to SD.
[12] Docket No. 10-100-R.

1.3 Cost Benefit Results

Entergy Arkansas performed a cost-benefit analysis in connection with the 2023 results, using the same modeling approaches that were used in prior annual reports and using the fixed avoided costs from the 2020-2023 program plan, in accordance with Order No. 7 in Docket No. 13-002-U,[13] as well as accounting for any reasonably quantifiable NEBs. The results of these analyses are included in the table below:

Table 1.3
Entergy Arkansas' 2023 Cost-Effectiveness Results

Including NEBs	Total Resource Cost (TRC)		TRC Levelized Cost	Participant Cost Test (PCT)		Ratepayer Impact Measure (RIM)		Program Administrator Cost (PAC)	
Program	NPV ($000's)	Ratio	$ / kWh	NPV ($000's)	Ratio	NPV ($000's)	Ratio	NPV ($000's)	Ratio
Home Energy Solutions	$ 23,632	3.4	$ 0.03	$ 41,877	6.1	$ (21,443)	0.5	$ 14,149	2.4
Multifamily Homes	$ 6,775	3.5	$ 0.02	$ 18,503	12.3	$ (9,900)	0.5	$ 5,923	3.2
Manufactured Homes	$ 3,316	4.0	$ 0.02	$ 8,515	13.4	$ (4,364)	0.5	$ 2,862	3.6
Low Income Solutions	$ 4,875	2.4	$ 0.04	$ 11,737	6.4	$ (7,452)	0.5	$ 2,531	1.7
Point of Purchase Solutions	$ 35,356	3.5	$ 0.02	$ 93,002	8.0	$ (54,520)	0.4	$ 35,592	5.3
Commercial & Industrial	$ 17,526	1.8	$ 0.03	$ 44,315	3.6	$ (27,347)	0.6	$ 24,299	2.7
Small Business	$ 4,211	2.8	$ 0.02	$ 10,500	6.9	$ (6,923)	0.5	$ 3,714	2.8
Public Institution Solutions	$ 3,770	1.6	$ 0.04	$ 8,052	2.7	$ (5,881)	0.6	$ 4,588	2.4
Agriculture Energy Solutions	$ 1,352	2.3	$ 0.02	$ 3,016	7.4	$ (1,617)	0.6	$ 1,419	2.5
Smart Direct Load Control Pilot	$ (235)	0.9	$ 0.07	$ 4,429	n/a	$ (4,607)	0.2	$ (1,741)	0.4
Direct Load Control	$ (1,849)	0.0	$ 90.30	$ 432	n/a	$ (2,281)	0.0	$ (2,281)	0.0
Agriculture Irrigation Load Control	$ (3,123)	0.0	$ 159.01	$ 379	n/a	$ (3,503)	0.0	$ (3,503)	0.0
Energy Efficiency Arkansas	$ -	n/a	n/a	$ -	n/a	$ -	n/a	$ -	n/a
Portfolio	$ 95,606	2.4	$ 0.03	$244,758	5.9	$ (149,837)	0.5	$ 87,551	2.58

Note: Total Portfolio for the PCT Test does not equal sum of the programs because the PCT uses a discount rate based on customer class.

As can be seen from Table 1.3, all of Entergy Arkansas' programs are cost-effective, except for the demand response programs. As anticipated in the 2020-2022 EE Plan Filing testimony,[14] Agricultural Irrigation Load Control, Smart Direct Load Control Pilot, and Residential Direct Load Control Programs were not cost effective. However, Entergy Arkansas currently has approximately 14,393 total installed end points for residential customers enrolled in the Res DLC program that provide capacity in the Midcontinent Independent Service Operator, Inc. ("MISO") for this program, as does the Agricultural Irrigation Load Control program with 1,605 participants. Further, Entergy Arkansas has invested substantially in the success of these programs and expects that, even under the APSC's methodology, they could be cost effective in the future. However, as noted in Entergy Arkansas' Plan for 2020-2022 filed in Docket No. 07-085-TF on June 17, 2019, Entergy Arkansas is proposing to phase out the Res DLC program in the coming

[13] Entergy Arkansas' cost-benefit analysis method involves an in-depth analysis of the hours (e.g., on peak vs. off peak) in which the expected energy savings likely would be realized.
[14] Docket No. 07-085-TF, Blankenship Direct Testimony at 19 (Document 566 filed June 17, 2019).

17

years. This overall cost-effectiveness for the portfolio is primarily due to two reasons. First, the 2023 program year was planned considering the directives set forth by the Commission in Order No. 7 of Docket No. 13-002-U, including the Real Economic Carrying Charge Method ("RECC") and market value capacity. The 2023 achieved results are evaluated based upon the directives in Order No. 150 in Docket No. 07-085-TF and Order No. 51 in Docket No. 13-002-U for the Three-Year Plan filing for the years 2020-2023. In addition, Entergy Arkansas included NEBs in the TRC test, as approved in the TRM 8.2. The NEBs had a Net Present Value of approximately $23M in the 2023 TRC. Compared to the TRC without NEBs, this was an increase of approximately 24% of the total Net Present Value in the portfolio's TRC.

1.4 2023 Budgets and Changes

The 2023 program year budget was originally approved by the Commission in Order No. 62 of Docket No. 13-002-U to replicate the PY 2022 budget approved in Order No. 51 of Docket No. 13-002-U. EAL's PY 2023 Energy Efficiency portfolio budget was $69,354,507. The Commission expanded their budget flexibility guidelines in Order No. 62 of Docket No. 13-002-U, allowing utilities to amend their approved budgets provided that no program may have more than 20% of its budget reduced with the exception of the Act 1102 or Low Income programs which maintain a 10% flexibility. The Order also allowed the total portfolio budget to be increased up to 10% without Commission approval. EAL's 2023 budget revisions were within the Commission's limits. In 2023, Entergy Arkansas revised the approved budget, transferring dollars from underachieving programs to programs seeing more positive market acceptance. The details of the revised budget are provided in Table 1.4.

Table 1.4

Revised 2023 Budgets[15]

Program Name	Revised Budget*	Initial Budget	Difference	Change	Explanation for the Change
Home Energy Solutions	$10,843,430	$ 11,303,430	-$460,000	-4%	Incentives in the amount of $460,000 were transferred from the HES program to the Manufactured Homes program in the amount of $55,000, and the Multi-family Program in the amount of $405,000. Measure costs have increased due to supply chain product price increases and inflation causing the Manufactured and Multi-family Homes programs to exceed incentive budget.
Multifamily Homes	$3,055,169	$ 2,650,169	$405,000	15%	Incentives in the amount of $405,000 were transferred from the Home Energy Solutions (HES) program to the Multifamily Homes (MF) program. Measure costs have increased due to product price increases and inflation causing the MF program to exceed its incentive budget.
Manufactured Homes	$1,316,021	$ 1,261,021	$55,000	4%	Incentives in the amount of $55,000 were transferred from the HES program to the Manufactured Homes program. Measure costs have increased due to product price increases and inflation causing the MA program to exceed its incentive budget.
Low-Income Solutions	$4,957,950	$ 4,957,950	$0	0%	N/A
Point of Purchase Solutions	$9,550,880	$ 7,888,520	$1,662,360	21%	Incentives and at-risk dollars were shifted into this program to cover overdrive.
Large Commercial & Industrial Solutions	$20,117,078	$ 21,779,439	-$1,662,360	-8%	Incentives and at-risk dollars were shifted out of this program to cover overdrive in Point of Purchase Solutions.
Small Business Solutions	$2,580,679	$ 2,580,679	$0	0%	N/A
Public Institutions Solutions	$3,805,633	$ 3,805,633	$0	0%	N/A
Agricultural Energy Solutions	$1,352,798	$ 1,352,798	$0	0%	N/A
Residential Direct Load Control	$3,547,988	$ 3,547,988	$0	0%	N/A
Smart Direct Load Control Pilot	$4,005,439	$ 4,005,439	$0	0%	N/A
Agricultural Irrigation Load Control	$3,918,060	$ 3,918,060	$0	0%	N/A
Energy Efficiency Arkansas	$303,382	$ 303,382	$0	0%	N/A
Regulatory	$ -	$ -	$ -	-	N/A
Total Portfolio:	**$ 69,354,507**	**$ 69,354,507**	**$ (0)**	**0%**	NA

Order # 150 approved the Initial Budget.

1.5 Planned Program Modifications for the 2024 Program Year

Entergy Arkansas continues to seek to achieve efficiencies and improve upon the various energy efficiency programs that it offers to its customers. Numerous examples of these efforts are discussed in the specific program descriptions contained herein.

Entergy Arkansas proposed its three-year 2024-2026 Program Plan ("Plan") in Docket No. 07-085-TF on August 1, 2023, which was approved by the Commission in Order No. 187 on November 11, 2023. Although the 2024-2026 program structures remain unchanged from the previous Plan, the enactment of multiple federal efficiency standards across the lighting and HVAC markets will require programs to adopt new measures to achieve savings in the most cost-effective manner.

[15] The APSC approved the Budget in Order No. 150 in Docket No. 07-085-TF and Order No. 51 in Docket No. 13-002-U.

The following three tables are from the tabular report workbook as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

- "EE Portfolio Summary by Program" from Workbook Table 2, Table 1.5.1 below
- "EE Portfolio Summary by Cost Type" from Workbook Table 3, Table 1.5.2 below
- "Company Statistics" from Workbook Table 4, Table 1.5.3 below

Table 1.5.1

EE Portfolio Summary Expenditures by Program

EE Portfolio Expenditures by Program

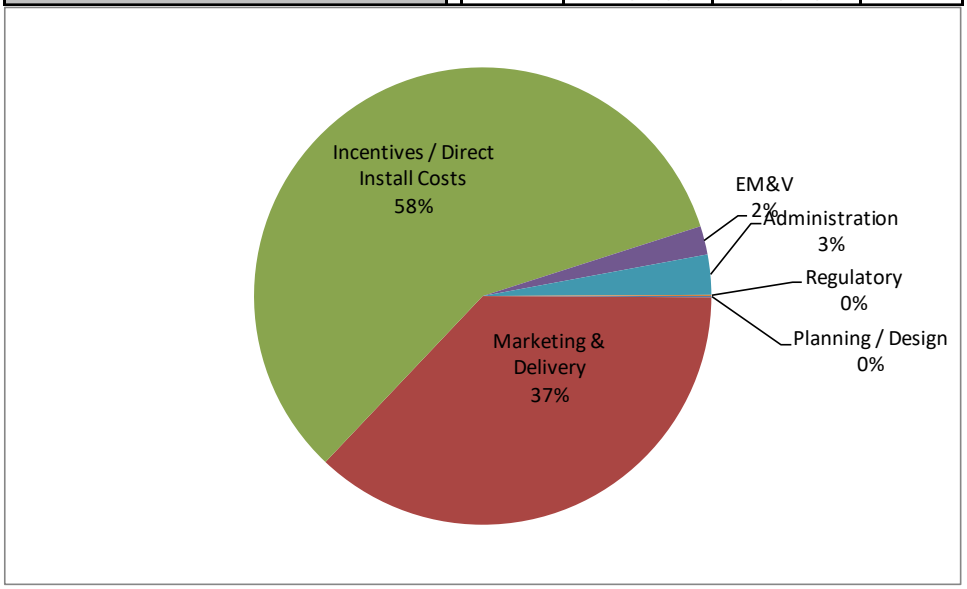
Program Name	Target Sector	Program Type	2023 Budget ($)	2023 Actual ($)	% of Budget
Home Energy Solutions	Residential	Whole Home	11,303,430	10,217,954	90%
Low-Income Solutions	Residential	Market Specific/Hard to Reach	4,957,950	3,796,363	77%
Manufactured Homes	Residential	Whole Home	1,261,021	1,215,375	96%
Multifamily Homes	Residential	Whole Home	2,650,169	2,896,000	109%
Residential Direct Load Control	Residential	Demand Response	3,547,988	2,595,874	73%
Small Business Solutions	Small Business	Market Specific/Hard to Reach	2,580,679	2,122,508	82%
Smart Direct Load Control Pilot	Res/Small Business	Demand Response	4,005,439	3,390,368	85%
Large Commercial & Industrial Solutions	Commercial & Industrial	Custom	21,779,439	15,016,623	69%
Public Institutions Solutions	Municipalities/Schools	Market Specific/Hard to Reach	3,805,633	3,572,008	94%
Agricultural Energy Solutions	Agriculture	Prescriptive/Standard Offer	1,352,798	1,033,381	76%
Agricultural Irrigation Load Control	Agriculture	Demand Response	3,918,060	3,869,623	99%
Point of Purchase Solutions	All Classes	Consumer Product Rebate	7,888,520	8,417,611	107%
Energy Efficiency Arkansas	All Classes	Other	303,382	30,323	10%
Regulatory	-	-	-	50,000	-
		Total	**69,354,507**	**58,224,011**	**84%**

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Table 1.5.2

EE Portfolio Expenditure Summary by Cost Type

EE Portfolio Expenditure Summary by Cost Type				
Cost Type	2023 Total Expenditures			
	% of Total	Budget ($)	Actual ($)	% of Total
Planning / Design	0%	175,000	55,262	0%
Marketing & Delivery	30%	20,913,783	21,528,807	37%
Incentives / Direct Install Costs	61%	42,290,724	33,765,540	58%
EM&V	5%	3,225,000	1,175,665	2%
Administration	4%	2,750,000	1,648,737	3%
Regulatory	0%	-	50,000	0%
	100%	**69,354,507**	**58,224,011**	100%



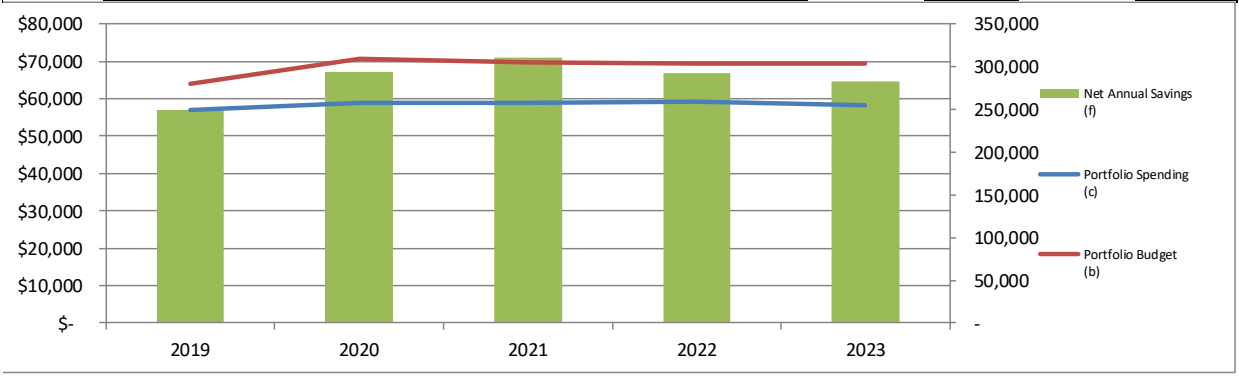
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Table 1.5.3

Company Statistics

Company Statistics

Program Year	Revenue and Expenditures					Energy				
		Budget		Actual			Plan		Evaluated	
	Total Revenue (a) ($000's)	Portfolio Budget (b) ($000's)	% of Revenue (%=b/a)	Portfolio Spending (c) ($000's)	% of Revenue (%=c/a)	Total Annual Energy Sales (d) (kWh)	Net Annual Savings (e) (kWh)	% of Energy Sales (%=e/d)	Net Annual Savings (f) (kWh)	% of Energy Sales (%=f/d)
2019	$ 1,861,403	$ 64,016	3.4%	$ 56,919	3.1%	21,818,158	239,488	1.10%	248,663	1.14%
2020	$ 1,787,352	$ 70,658	4.0%	$ 58,834	3.3%	20,748,190	285,557	1.38%	294,313	1.42%
2021	$ 1,878,947	$ 69,585	3.7%	$ 58,872	3.1%	22,281,461	285,765	1.28%	311,158	1.40%
2022	$ 2,056,565	$ 69,355	3.4%	$ 59,152	2.9%	22,326,106	285,149	1.28%	292,926	1.31%
2023	$ 2,236,945	$ 69,355	3.1%	$ 58,224	2.6%	22,518,603	285,149	1.27%	283,028	1.26%



The programs proposed in the 2024-2026 Plan are largely the same as those included in the prior Plan. While there were notable changes made in 2020 to combine some programs and measures for a more seamless customer experience, the Entergy Arkansas 2024-2026 Plan seeks to build on those experiences and learnings to increase the program efficiency and further evolve the customer journey. Changes to program measures are expected as federal lighting and appliance standards take effect. However, the general structure and markets served will remain unchanged from the 2020-2022 Plan and the 2023 Bridge Year. The Energy Efficiency Arkansas education and workforce development program, previously administered by the Arkansas Energy Office and funded by the participating utilities, ended on December 31, 2023 Order No. 65 Docket No. 07-083-TF .[16]

[16] Docket No. 07-085-TF Direct Testimony of Beau Blankenship; Order No. 65 in Docket 13-002-U will not be part of the 2024-2026 Plan.

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Table 1.5

Approved 2024-2026 Budgets

EAL Programs	Total Annual Budget ($1,000s)			
	2024	2025	2026	Total
Home Energy Solutions	$15,266	$15,249	$15,355	45,870
Energy Solutions for Multifamily Homes	$2,809	$2,857	$2,901	8,567
Energy Solutions for Manufactured Homes	$1,426	$1,421	$1,430	4,276
Low-Income Solutions	$5,384	$5,412	$5,482	16,278
Point of Purchase Solutions	$8,751	$8,741	$8,898	26,391
Large Commercial & Industrial Solutions	$19,010	$19,083	$19,432	57,526
Small Business Solutions	$4,173	$4,179	$4,230	12,582
Public Institutions Solutions	$2,965	$2,978	$3,028	8,971
Agricultural Energy Solutions	$2,122	$2,198	$2,275	6,594
Residential Direct Load Control	$5,311	$5,719	$6,079	17,109
Smart Direct Load Control Pilot	$2,698	$2,666	$2,634	7,999
Agricultural Irrigation Load Control	$3,764	$3,798	$3,946	11,508
Total	$73,680	$74,300	$75,691	223,671

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2.0 Portfolio Programs

2.1 Home Energy Solutions

2.1.1 Program Description

Home Energy Solutions ("HES") was designed to improve energy efficiency and benefit the owners and renters of single-family homes in Entergy Arkansas' service territory. The HES program helps homeowners achieve electricity savings by working with a participating trade ally network that will help residential customers analyze their energy usage, identify energy efficiency improvement projects and install no-cost, energy-saving measures at their home.

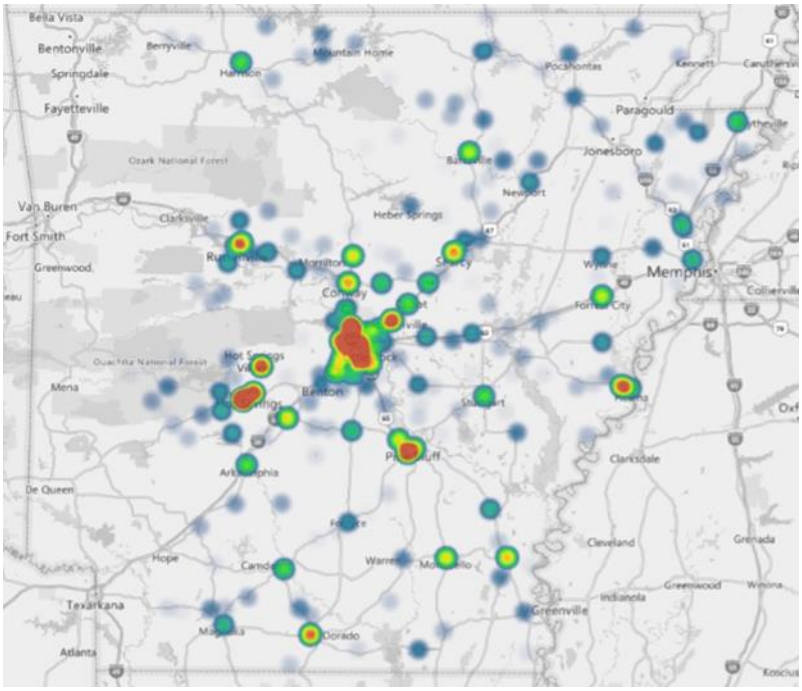
Design elements of HES include incentives to offset 100% of the cost of an energy evaluation provided by a certified trade ally. The first step to determine eligibility is accomplished by the trade ally completing a home energy assessment. During the home energy assessment, the trade ally completes a walk- through inspection, visually identifying inefficiencies in the homes building envelope, current level of attic insulation, identifies eligible direct install opportunities, secures customer permission to directly install equipment at the time of inspection (advanced power strips, and high efficiency showerheads, kitchen and bathroom aerators for customers with electric water heating) and produces a written report based on the visual inspection.

The trade ally also will perform diagnostic testing including a blower door test and duct blaster test to provide the customer with estimated energy savings and a list of prioritized recommendations. In 2023, the program achieved its energy savings by providing incentivized energy saving measures such as ceiling insulation, air conditioner tune-ups, duct sealing and air sealing measures to customers at no charge. These measures continue to make up the bulk of energy savings for the program. In addition, this program educates tenants and owners about the benefits of having energy saving measures installed on their property.

2.1.2 Program Highlights

- Saved 28,607 gross MWh in 2023 with a 100.5% realization rate and a net-to-gross ratio of 100%, resulting in 28,725 MWh net savings.
- Achieved 9.6 gross MW and 9.5 net MW savings in 2023 with a realization rate of 98.7%.
- Saw a total of 7,437 unique participants and 30,704 measures incentivized in 2023.
- Each trade ally has a Point of Contact within the team, and receives regular communications through email and telephone, a bi-weekly electronic newsletter, and monthly “coffee with the team” zoom video calls. In addition, several trade allies make up the Trade Ally Council. Through these enhancements there has been a noticeable increase in trade ally communications and satisfaction with their participation in the HES program. Trade allies also receive a monthly email from each program they participate in with their current allocation status for the quarter, pipeline status, burn rate, and any outstanding QAQC/flawed/complaint issues that need to be addressed.
- The HES program provided a wide variety of training sessions to educate trade allies on program requirements, measure installation best practices, and new tools, among others. In 2023, mandatory Customer Service training was also implemented for all trade ally employees. This training is provided in both online and in-person meetings, on an ad-hoc basis as needed.
- All technicians performing test-in and test-out on customer homes are required to hold one of several Building Performance Institute or RESNET energy professional certifications. This certification is also provided annually through ICF to trade allies wishing to participate.
- The program continued to provide services throughout the Entergy Arkansas service territory. The geospatial map in Figure 2.1.2:2023 shows the location of work performed in 2023.

Figure 2.1.2: 2023 Participants



- 7,770 duct and air sealing projects were performed in 2023. 621 of the projects went through the program's virtual QA/QC process and 337 projects went through the program's field inspection QA/QC process.
- Of the 2,054 ceiling insulation projects, 162 of the projects went through the program's virtual QA/QC process and 126 projects went through the program's field QA/QC process.
- 1,935 tune-up projects were completed. 164 air conditioner tune-ups went through the program's virtual QA/QC process and 33 projects went through the program's field inspection QA/QC process.
- 238 direct install projects went through the program's virtual QA/QC process and 79 projects went through the program's field inspection QA/QC process.
- Program account managers educated customers about other energy efficiency measures that they could implement and other Entergy Arkansas energy efficiency programs available to them.
- Promotion and outreach activities were executed in a variety of marketing channels. Paid media with print, digital and social media tactics were very successful in driving awareness and engagement. Entergy Arkansas' marketing channels also were used to promote this program via social media posts, the Entergy Solutions web page, the

Entergy Circuit newsletter and Entergy bill inserts. Trade ally co-branded marketing materials and referrals were also used to reach out to customers to increase awareness and participation. Program personnel attended several community events to promote the programs to Entergy Arkansas customers. These marketing efforts helped implement the program across the entire Entergy Arkansas service territory, rather than focusing on narrow areas.

- Incentives in the amount of $460,000 were transferred from the HES program to the Manufactured Homes program in the amount of $55,000, and the Multi-family Program in the amount of $405,000. Measure costs have increased due to supply chain product price increases and inflation, causing the Manufactured and Multi-family Homes programs to exceed incentive budgets.

2.1.3 Program Budget, Savings and Participants

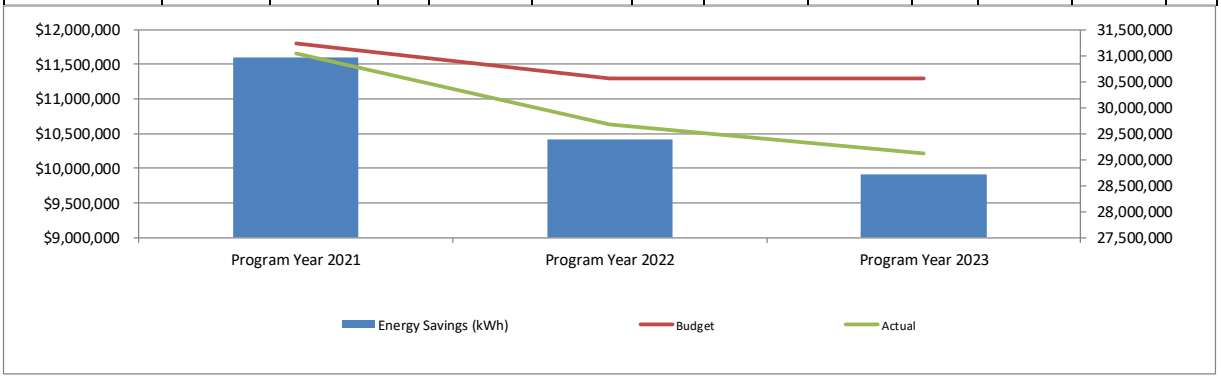
Table 2.1.3 shows the program budget, annual energy savings and participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.1.3

Home Energy Solutions Program Budget, Energy Savings and Participants

Home Energy Solutions

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 11,800,706	$ 11,659,333	99%	27,136,500	30,970,670	114%	10,251	9,732	95%	8,773	8,271	94%
Program Year 2022	$ 11,303,430	$ 10,639,863	94%	27,136,500	29,392,834	108%	10,251	9,741	95%	8,773	7,369	84%
Program Year 2023	**$ 11,303,430**	**$ 10,217,954**	**90%**	**27,136,500**	**28,724,746**	**106%**	**10,251**	**9,494**	**93%**	**8,773**	**7,437**	**85%**



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2.1.4 Description of Participants

Eligible participants include: Anyone with a valid Entergy Arkansas account number who lives in a single-family home that is a minimum of one year old and has a central ducted heat and air conditioning unit. Participants (7,437) are counted on a per account basis. Participant's homes must have an energy use of $0.10 per square foot in the summer or be at least 10 years old to qualify for the core weatherization measures.

Participants who receive Entergy Arkansas electric service under a residential homes rate code qualify for fuel appropriate measures in this program.

Table 2.1.4, from the Entergy Arkansas, LLC Evaluation Report – Program Cycle 2023, highlights key demographic information for participants in the HES Program. Pertaining to Act 1102, approximately 34% of the HES participants were aged 65 or older and approximately 71% of the respondents were eligible for LIHEAP benefits.

Table 2.1.4 For Program Cycle 2023 Demographic Information from Process Surveys

*Participants may not sum to participant totals highlighted in bold due to rounding error.

Respondent characteristic		Percentage*	Participants17
Respondent age	25–34	9.9%	737
	35–44	16.9%	1,259
	45–54	22.5%	1,676
	55–64	16.9%	1,259
	65 or older	33.8%	2,518
	Participants (n)		**7,449**
LIHEAP status	LIHEAP-eligible	70.8%	5,274
	Not LIHEAP-eligible	29.2%	2,175
	Participants (n)		**7,449**

*Percentages are estimated from BY2023 process surveys.

[17] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as duplicate smart thermostat measures claimed in the SDLC program, DI Labor Fee to track additional incentive for contractors without savings, and audit measures.

2.1.5 Program Challenges and Opportunities

Challenges:

With continued inflation, energy efficiency products and shipping costs are continuing to rise. The program increased the air sealing incentive by 20%, heat pump tune-ups from $250 to $300, and an increase in both Tier 1 and Tier 2 audits. This rise in costs has also created a challenge in achieving the program burn rate, which has been overcome by increasing the comprehensiveness of measures per home. Another challenge in 2023 was the removal of LEDs as a direct install ("DI") measure at mid-year. To help overcome this, the DI installation fee was removed, and DIs were adjusted to a flat rate per DI item to ensure DIs continued to be installed after the elimination of LEDs.

Opportunities:

It can be difficult for trade allies to identify customers who have or have not participated in the program while out in the field. It is important for trade allies to identify if a home has participated in the past to avoid submission of duplicate measures. In 2023, trade allies continued to utilize the past participation tool to verify customer eligibility. If past participation did occur, the tool provides exactly what measures were installed so that other opportunities may be identified, and duplicate efforts of other measures are avoided.

EM&V Recommendations:

- Increase internal QA/QC process on duct sealing to ensure all cooling and heating variables are captured.
- Ensure that customers are receiving the audit report along with guidance on other energy efficiency recommendations.
- Ensure trade allies are submitting key savings project documentation consistently.

2.1.6 Planned or Proposed Changes to Program and Budget

- An increase in rebates for air sealing, duct sealing, tier 3 (R9 to R14) ceiling insulation and DI products will be implemented in 2024 to account for inflation and product price increases.
- The HES program will continue to look for new ideas and channels to market the benefits of the program to Entergy Arkansas customers to increase participation.

2.2 Multifamily Homes Program

2.2.1 Program Description

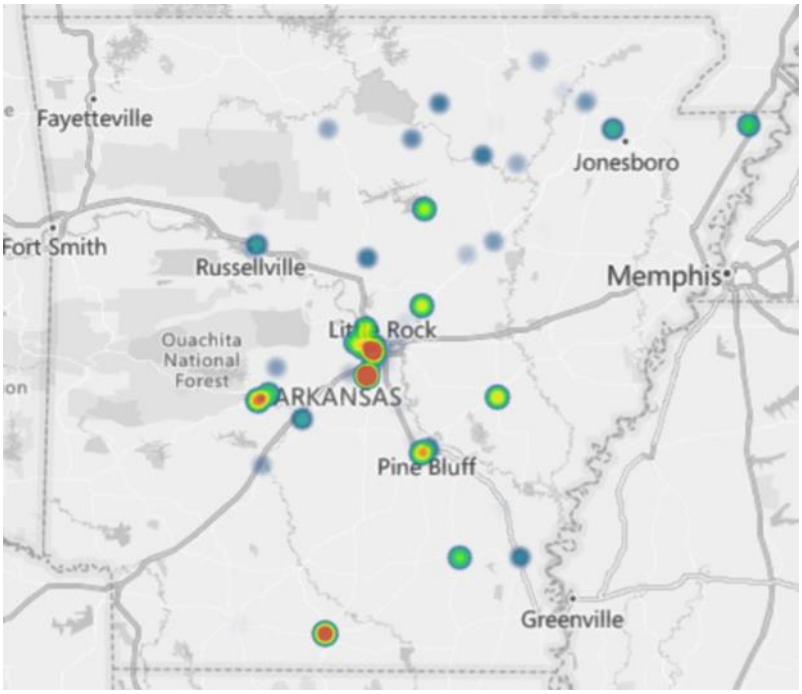
The Multifamily Homes ("MF") program continues to provide cost-effective energy efficiency measures to the multifamily residential and commercial markets throughout the Entergy Arkansas service territory. The program is designed to benefit both the property owners and residents of multifamily dwellings in the Company's service territory through increased energy efficiency in their homes and at their properties. The MF program continues to help overcome the split incentive barrier by making it easy for property owners to enroll and participate at little to no additional cost. The program continues to offer comprehensive energy saving incentivized measures such as air conditioner tune-ups, duct sealing, air sealing and direct install measures. In addition, the MF program now offers commercial, common area measures such as lighting, pool pumps and central HVAC replacement. These energy efficient measures continue to improve apartment communities by increasing comfort and reducing maintenance for property staff. By providing a more comprehensive approach to the multifamily market including qualified common areas, the program has evolved to provide an all-inclusive approach for multifamily property owners making the enrollment process more streamlined.

2.2.2 Program Highlights

The 2023 Multifamily Homes Program:

- Saved 13,084 in gross MWh in 2023 with a 96% realization rate and a net-to-gross ratio of 100%; this resulted in 12,565 MWh net energy savings.
- Achieved 2.3 gross MW and 2.3 net MW savings in 2023 with a realization rate of 98.4%.
- The program completed energy efficiency upgrades for 2,673 unique participants and incentivized a total of 13,470 measures.
- The program continued to provide services throughout the Entergy Arkansas service territory. The geospatial map in Figure 2.2.2.1 shows the location of work performed in 2023.

Figure 2.2.2.1: Map of 2023 Properties



- A total of 3,213 air and duct sealing measures were completed in 2023. Out of the 3,213 measures installed, 227 air sealing and duct sealing projects went through the program's virtual QA/QC process and 242 projects went through the program's field QA/QC process.
- A total of 347 ceiling insulation projects were completed in 2023. Out of the 347 measures installed, 38 ceiling insulation projects went through the program's virtual QA/QC process and 6 projects went through the program's field QA/QC process.
- A total of 801 A/C and heat pump tune ups were completed in 2023. Out of 790 measures installed, 30 A/C tune-up projects went through the program's virtual QA/QC process and 64 projects went through the program's field QA/QC process.
- A total of 1,047 direct installs measures were completed in 2023. Out of 1,047 measures installed, 39 direct install projects went through the program's virtual QA/QC process and 89 projects went through the program's field QA/QC process.
- A total of 16 commercial projects were completed in 2023. Three had field QAQC performed.
- A summary of the energy savings by measure category are found in Table 2.2.2.2 below.

Table 2.2.2.2 Summary of the Products Installed

Measure category	Reported kWh	Sampled kWh	Percentage kWh sampled	Reported kW	Sampled kW	Percentage kW sampled
Appliances	142,474	2,522	1.8%	16.9	0.3	1.8%
Domestic hot water	329,110	3,605	1.1%	34.2	0.4	1.1%
Envelope	1,826,319	18,138	1.0%	427.5	5.7	1.3%
HVAC	10,585,357	76,200	0.7%	1,801.8	18.5	1.0%
Lighting	200,719	915	0.5%	27.7	0.1	0.5%
Total	**13,083,980**	**101,379**	**0.8%**	**2,308.1**	**25.1**	**1.1%**

- Promotion and outreach in 2023 were primarily through Entergy Arkansas' marketing channels, social media posts, the Entergy Solutions web page, the Circuit Newsletter and trade ally marketing efforts. Networking through the Arkansas Apartment Association and property management companies generated leads that were shared with the trade ally network.
- Trade ally outreach efforts continued through targeting areas outside of central Arkansas and leads coming through different channels such as customer care and program email accounts. Each trade ally has a Point of Contact within the team, regular communications through email and telephone, bi-weekly electronic newsletter, monthly "coffee with the team" Zoom video calls, and the creation of the Trade Ally Council, with council members being on a rotation every two years. Through these enhancements, there has been a noticeable increase in trade ally communications and satisfaction with their participation in the MF program.
- Both field and virtual training was provided for the trade allies who performed air conditioner tune-ups and weatherization measures. The program account manager worked with the trade ally field technicians, office personnel and owners to provide in-depth training and verification of quality procedures. Additional classroom and field training was provided as needed, based upon the 100% desktop review of all applications.
- Incentives in the amount of $405,000 were transferred from the HES program to the MF program. Measure costs have increased due to product price increases causing the MF program to exceed its incentive budget.

2.2.3 Program Budget, Savings and Participants

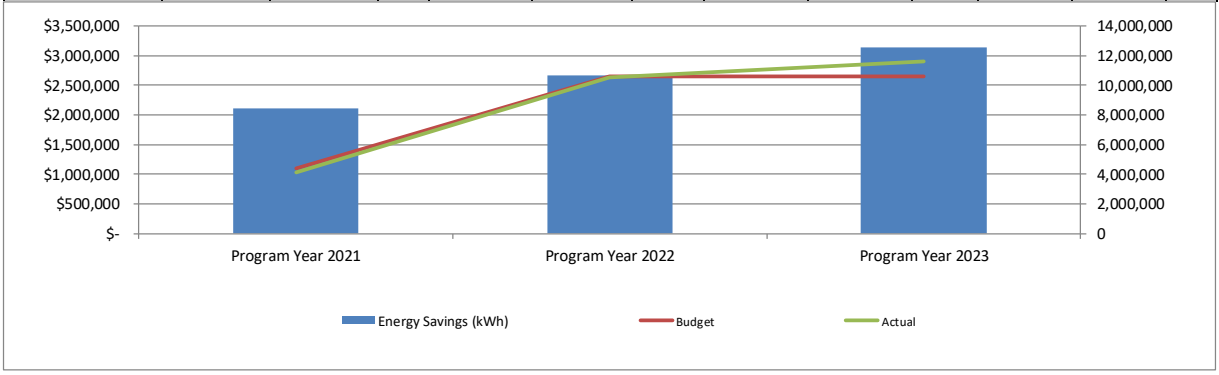
Table 2.2.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.2.3

Multifamily Homes Program Budget, Savings and Participants

Multifamily Homes

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 1,098,312	$ 1,033,810	94%	14,010,181	8,444,079	60%	5,501	1,293	24%	3,907	1,669	43%
Program Year 2022	$ 2,650,169	$ 2,621,921	99%	14,010,181	10,645,629	76%	5,501	1,782	32%	3,907	2,348	60%
Program Year 2023	**$ 2,650,169**	**$ 2,896,000**	**109%**	**14,010,181**	**12,564,687**	**90%**	**5,501**	**2,271**	**41%**	**3,907**	**2,673**	**68%**



2.2.4 Description of Participants

Multifamily properties that are duplexes, triplexes and large complexes located within the Entergy Arkansas electric service territory are eligible to participate in the Entergy MF program. Currently, properties under a residential, multifamily, or commercial rate code all qualify for this program. There are no maximum limits on the size of a building or number of qualifying buildings in a single multifamily property. Funds are limited and services are available throughout the Entergy Arkansas service territory.

Table 2.2.4, from the Entergy Arkansas, LLC Evaluation Report – Program Cycle 2023, highlights key demographic information for participants in the MF program. Pertaining to Act 1102, in the Program Cycle, approximately 31% of the Multifamily Homes participants were aged 65 or older and approximately 50% of the respondents were eligible for LIHEAP benefits. This

is based on the most recent process evaluation survey estimates, which were conducted in 2023.

Table 2.2.4

Program Cycle 2023 Demographic Information estimated from 2023 Process Surveys – Multifamily Homes

*Participants may not sum to participant totals highlighted in bold due to rounding error.

Respondent characteristic		Percentage*	Participants18
Respondent age	25–34	11.5%	307
	35–44	15.4%	412
	45–54	26.9%	719
	55–64	15.4%	412
	65 or older	30.8%	823
	Participants (n)		**2,673**
LIHEAP status	LIHEAP-eligible	50.0%	1,336
	Not LIHEAP-eligible	50.0%	1,336
	Participants (n)		**2,673**

*Percentages are estimated from BY2023 process surveys.

2.2.5 Program Challenges and Opportunities

Challenges:

With inflation continuing, the cost of energy efficiency products and shipping are still on the rise. The program is increasing incentives for air sealing, duct sealing, audits, heat pump and AC tune-ups, and direct install measures to offset the rise in costs. If this continues, it could create constraints on the program incentives budgets.

Turnover in property management staff within the multifamily market created a barrier. Decision makers for the program on properties were difficult to identify due to the turnover. This can also cause a gap in the communication chain between program staff, trade allies, and property representatives. To mitigate this issue, the program will continue to utilize ALN Apartment Data

[18] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as DI Labor Fee to track additional incentive for contractors without savings, and audit measures.

software, which provides updates in management turnover at the property and district levels. This will allow program representatives to identify new ownership and property staff members that will be used to build new relationships and equip trade allies with contact leads for multifamily properties.

Opportunities:

It can be difficult for trade allies to identify customers who have or have not participated in the program while out in the field. It is important for trade allies to identify if a multifamily property has participated in the past to avoid submission of duplicate measures. In 2024, the trade allies will continue to use the past participation tool to verify customer eligibility. If past participation has occurred, the tool provides exactly what measures were installed so that other opportunities may be identified, and duplicate efforts of other measures are avoided.

EM&V Recommendations:

- Increase the volume on Internal QA/QC efforts on the duct sealing measure for all heating types paying close attention to heating and cooling variables making sure they are captured correctly.
- Collect documentation that clearly verifies the installation method and location of Advanced power strip or use “average APS” consistently in the program. Given the nature of the measure, it is recommended the AR TRM add an in-service rate for Tier 1 smart strip in the next update process.
- Utilize the rated/measures capacity to factor into calculating AC/ HP tune-up savings.
- Heating type documentation, including but not limited to data tags, should be collected for all projects where savings calculated are contingent on heating type.

2.2.6 Planned or Proposed Changes to Program and Budget

Proposed changes:

- An increase in incentives for air sealing, duct sealing, audits, tune-ups, and direct install products will be implemented in 2024 to account for inflation and product price increases.

An increase in audit incentives will continue to be implemented in 2024 due to the rise in fuel and vehicle maintenance costs.

2.3 Manufactured Homes Program

2.3.1 Program Description

The Manufactured Homes Program was designed to improve energy efficiency and benefit the owners and residents of manufactured homes and parks in the Entergy Arkansas service territory.

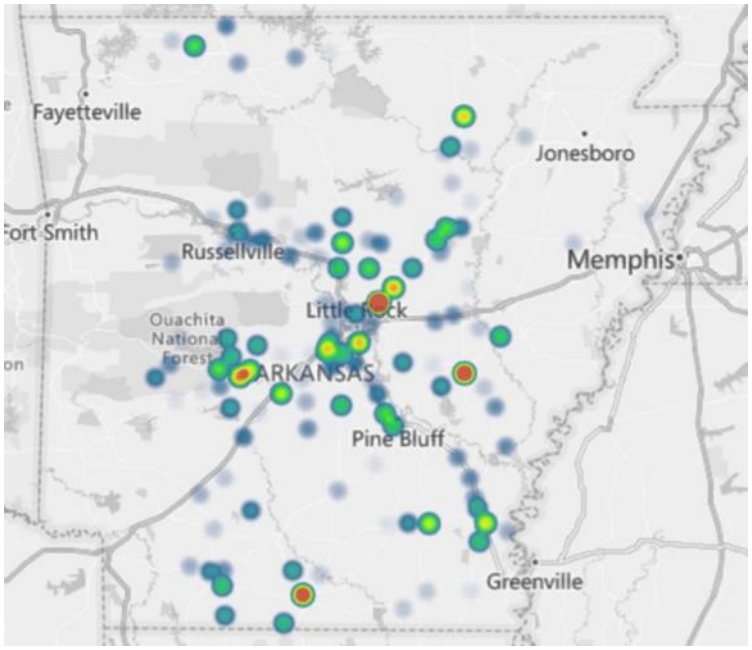
This program provides much needed services for a hard-to-reach customer segment, where customers paying the electric bill often do not have the ability to make energy efficiency upgrades. The program overcomes the upfront cost hurdle by making it easy for the occupant to participate at little to no cost. Another hurdle to overcome is the split incentive, where the landlord pays for the energy efficiency improvement while the tenant benefits by immediate improvement in comfort. The program incentivizes energy saving measures such as air conditioner tune-ups, duct sealing and air sealing. These measures continue to make up the bulk of energy savings for the program. DI measures such as advanced power strips, high efficiency showerheads, and kitchen and bathroom aerators for customers with electric water heating, are still offered under the program. In addition, this program educates tenants and owners about the benefits of having energy saving measures installed on their property. After the DI measures are installed, the tenants receive personalized tips on how to improve their homes' efficiency. At the end of the process, direct install participants complete a customer satisfaction survey. Residents are informed of other Entergy Arkansas energy efficiency programs, as well as other programs available to them if they use natural gas energy.

2.3.2 Program Highlights

- Saved 5,643 gross MWh in 2023 with a 99.8% realization rate and a net-to-gross ratio of 100%, resulting in 5,631 MWh net savings.
- Achieved 0.8 gross MW and 0.8 net MW savings in 2023 with a realization rate of100.2%.
- In 2023, a total of 625 manufactured homes participated in the program, some receiving more than one measure. A total of 2,627 measures were incentivized.

- The program continued to provide services throughout the Entergy Arkansas service territory. The geospatial map in Figure 2.3.2 shows the location of work performed in 2023.

Figure 2.3.2: 2023 Participants



- 76 duct and air sealing jobs went through the program's virtual QA/QC process and 58 projects went through the program's field QA/QC process.
- 19 air conditioner tune-ups performed went through the program's virtual QA/QC process.
- 36 total direct install projects went through the program's virtual QA/QC process and 21 projects went through the program's field QA/QC process.
- 6 Wi-Fi thermostat installations went through the program's virtual QA/QC process and 4 projects went through the program's field QA/QC process.
- The program account manager educated customers about other energy efficiency measures that they could implement and other Entergy Arkansas energy efficiency programs available to them.
- The effort on trade ally outreach continued. Each trade ally has a Point of Contact within the team, regular communications through email and telephone, bi-weekly electronic newsletter, monthly "coffee with the team" Zoom video calls and the creation of the Trade Ally Council. Through these enhancements there has been a noticeable increase in trade ally communications and satisfaction with their participation in the Manufactured Homes Program. Both field and virtual training was provided for the trade allies who performed air

conditioner tune-ups and weatherization measures. The program account manager worked with the trade ally field technicians, office personnel and owners to provide in-depth training and verification of quality procedures. Additional classroom and field training was provided as needed, based upon the 100% desktop review of all applications.

- The program continued to be more accessible to the Hispanic populations by having marketing collateral available in both English and Spanish to target this market. Spanish speaking trade allies are marked as such in the Find a Provider tool.
- Promotion and outreach activities were executed in a variety of marketing channels. Paid media with print, digital and social media tactics were very successful in driving awareness and engagement. Entergy Arkansas' marketing channels were also used to promote this program via social media posts, the Entergy Solutions web page, the Entergy Circuit Newsletter and Entergy bill inserts. Trade ally co-branded marketing materials and referrals were also used to reach out to customers to increase awareness and participation. These marketing steps helped implement the program across the entire Entergy Arkansas service territory, rather than focusing on narrow areas.
- Incentives in the amount of $55,000 were transferred from the HES program to the Manufactured Homes program. Measure costs have increased due to product price increases and inflation causing the MA program to exceed its incentive budget.

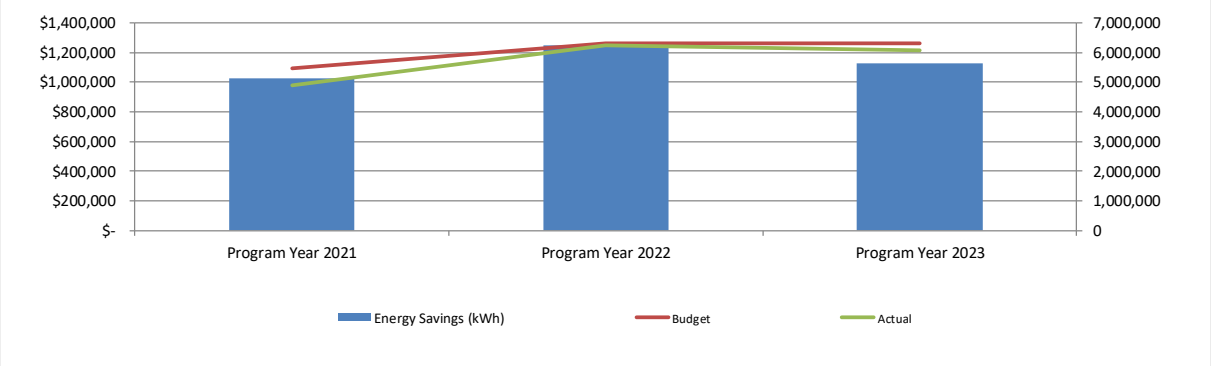
2.3.3 Program Budget, Savings and Participants

Table 2.3.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket 10-010-U.

Table 2.3.3
Entergy Solutions for Manufactured Homes Program Budget, Savings and Participants

Manufactured Homes

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 1,092,510	$ 979,573	90%	5,403,192	5,114,435	95%	674	751	111%	1,566	612	39%
Program Year 2022	$ 1,261,021	$ 1,247,001	99%	5,403,192	6,226,535	115%	674	792	117%	1,566	627	40%
Program Year 2023	**$ 1,261,021**	**$ 1,215,375**	**96%**	**5,403,192**	**5,631,397**	**104%**	**674**	**806**	**119%**	**1,566**	**625**	**40%**



2.3.4 Description of Participants

Participants who receive Entergy Arkansas electric service under a residential homes rate code qualify for fuel appropriate measures in this program. These are typically located within a park or complex and there are no maximum limits to the size of a park or complex. Manufactured homes comprise roughly 14% of the Company's housing stock. While this is twice the national average, there are still challenges reaching the market and generating leads.[19]

Table 2.5.4, from the Entergy Arkansas, LLC Evaluation Report – Program Cycle 2023 highlights key demographic information for participants in the Manufactured Homes Program. Approximately 36% of the Manufactured Homes Program participants were aged 65 or older and approximately 47% of the respondents were eligible for LIHEAP benefits. This is based on the most recent process evaluation survey estimates, which were conducted in 2023.

19 https://www.huduser.gov/periodicals/ushmc/fall02/summary_2.html#:~:text=Rounding%20out%20the%20top%2010,and%20Kentucky%20(13.3%20percent).

Table 2.5.4

Program Cycle 2023 Demographic Information estimated from 2018 Process Surveys

Manufactured Homes Program

*Participants may not sum to participant totals highlighted in bold due to rounding error.

Respondent characteristic		Percentage*	Participants20
Respondent age	18–24	6.1%	38
	25–34	15.2%	95
	35–44	24.2%	152
	45–54	12.1%	76
	55–64	6.1%	38
	65 or older	36.4%	228
	Participants (n)		**627**
LIHEAP status	LIHEAP eligible	46.4%	291
	Not LIHEAP eligible	53.6%	336
	Participants (n)		**627**

*Percentages are estimated from BY2023 process surveys.

2.3.5 Program Challenges and Opportunities

Challenges:

Due to the continued surge in inflation, energy efficiency product and shipping costs are rising. The program is increasing incentives for air sealing, audits, heat pump tune-ups, and direct install measures to offset the rise in costs. If costs continue to rise, it could create constraints on the program's incentives budgets.

Residents of manufactured homes are part of a particularly hard-to-reach market for several reasons. In general, residents of manufactured homes are less likely to invest in energy efficiency upgrades to their home because the out-of-pocket cost is simply too high to perform

[20] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as DI Labor Fee to track additional incentive for contractors without savings, and audit measures.

these upgrades. Even though the long-term effects can be very beneficial, renters of manufactured homes often don't have disposable income to invest in these upgrades. This program helps not only provide beneficial upgrades at no cost to the residents, but it also educates the customer about the fundamentals of energy efficiency and energy usage.

The most effective means of reaching customers is direct outreach from the trade ally to mobile home park owners. Bilingual and co-branded marketing material is available for use in the Manufactured Homes Program. This material helps the trade allies sell the program to prospective mobile home parks and individual owners.

Opportunities:

It can be difficult for trade allies to identify customers who have or have not participated in the program while out in the field. It is important for trade allies to identify if a home has participated in the past to avoid submission of duplicate measures. In 2023, the trade allies continued to use the past participation tool to verify customer eligibility. If past participation has occurred, the tool provides exactly what measures were installed so that other opportunities may be identified, and duplicate efforts of other measures are avoided. We have also implemented a lead generation program in 2023 to help further reach customers.

EM&V Recommendations:

- Continue the internal quality assurance/quality control (QA/QC) process on the duct sealing measure for all heating types to ensure all cooling and heating variables are captured correctly.
- Collect documentation that verifies the installation location of the smart strip or use "average APS" consistently in the program.
- Collect heating type documentation for projects where savings are dependent on heating type.
- Ensure contractors are consistently submitting key savings project documentation that is legible and that key parameters are identifiable.

2.3.6 Planned or Proposed Changes to Program and Budget

- An increase in rebates for air sealing, audits, heat pump tune-ups and direct

install products will be implemented in 2024 to account for inflation and product price increases. An increase in audit incentives will also be implemented in 2024 due to inflation and rising fuel costs. Trade allies will also be able to participate in a joint incentive program with gas utilities that will be introduced in 2024.

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2.4 Low-Income Solutions

2.4.1 Program Description

The Low-Income Solutions ("LIS") program was launched in Entergy Arkansas' residential portfolio in 2020, and was designed to serve income-qualified customers, as defined under Act 1102 of 2017 and in accordance with Order No. 30 in Docket No. 13-002-U. Like Entergy Arkansas' other home energy efficiency programs in the Entergy Arkansas portfolio, the LIS program offers many energy efficiency opportunities for owners and renters of single-family homes, manufactured homes, and multi-family dwellings in Entergy Arkansas' service territory.

The LIS program helps income-qualified residents achieve electricity savings by working with participating trade allies and Community Based Organizations ("CBOs"). Trade allies help residential customers analyze their energy use, identify energy efficiency improvement projects and install low- or no-cost energy-saving measures in the home. CBOs help the LIS program identify eligible customers and distribute program information to the local communities they serve.

Design elements of the LIS program include incentives to offset up to 100% of the cost of an energy evaluation provided by a certified trade ally. In addition, LIS customers may receive minor health and safety products or repairs for eligible homes, such as bathroom ventilation, smoke detectors, etc. To determine eligibility and receive an incentive, the trade ally completes both a home energy assessment and asks the resident to self-certify their income eligibility for participation. If the home is a candidate for health and safety measures, the trade ally will perform those during the visit or a subsequent visit. The program offers comprehensive energy-saving measures such as air conditioner tune-ups, duct sealing, air sealing, attic insulation, advanced power strips and high efficiency showerheads and aerators for all electric properties.

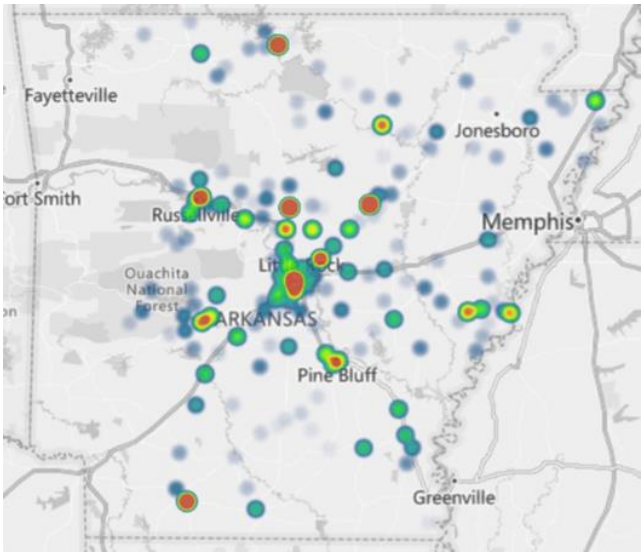
2.4.2 Program Highlights

In 2023, the LIS Program:

- Saved 7,946 gross MWh in 2023 with a 100% realization rate and a net-to-gross ratio of 100%, resulting in 7,947 MWh net savings.
- Achieved 1.9 gross MW and 1.8 net MW savings in 2023 with a realization rate of 99.4%.

- Incentivized 13,058 individual measures, and served 1,654 individual Entergy account holders of which:
    - 72% were single-family homes.
    - 22% were multifamily apartments.
    - 6% were manufactured homes.
- Installed at least one health and safety measure in 75% of participating properties.
- 137 duct and air sealing jobs went through the program's virtual QA/QC process and 94 projects went through the program's field QA/QC process.
- 37 ceiling insulation performed went through the program's virtual QA/QC process and 9 projects went through the program's field QA/QC process.
- 17 air conditioner tune-ups went through the program's virtual QA/QC process and 19 projects went through the program's field QA/QC process.
- 99 direct install projects went through the program's virtual QA/QC process and 49 projects went through the program's field QA/QC process.
- 55 health and safety projects went through the program's virtual QA/QC process and 34 projects went through the program's field QA/QC process.
- The program continued to provide services throughout the Entergy Arkansas service territory. The geospatial map in Figure 2.4.2 shows the location of work performed in 2023.

Figure 2.4.2: 2023 Participation



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One of the LIS program's missions is to increase opportunities for low income and elderly customers to access energy efficiency services. In 2023, the LIS program continued to grow the partnerships with both CBOs and outside agencies established during the first year of the program. The pilot project with the Arkansas Energy Office and the Better Community Development ("BCD") Group, a non-profit CBO who receives Weatherization Assistance Program ("WAP") funding to weatherize homes and apartments in Arkansas, continued to provide braided incentives in 2023, and increased the number of homes utilizing both LIS incentives and WAP funding. Working together, the LIS program and BCD successfully funded projects for 14 single family and manufactured homes and 12 apartments.

Traditional promotion and outreach activities were also executed through various marketing channels, including paid media with print, digital and social media tactics. Entergy Arkansas' marketing channels were also used to promote this program via social media posts, the Entergy Solutions web page, the Entergy Circuit newsletter and Entergy bill inserts. These marketing efforts helped promote the LIS program across the entire Entergy Arkansas service territory. We also attended multiple customer-supporting events including Depot Days (Newport, AR), Bryant Air Show, and Dassault Falcon Jet's Earth Day event.

The number of completed health and safety projects provided by the LIS program contributed to improving living conditions for the participating customers by reducing minor hazards inside the home. The percentage of Entergy Arkansas customers receiving health and safety measures increased 6% from 2022 to 2023 due to continued focus on health and safety specific training and workforce development efforts with the trade allies.

2.4.3 Program Budget, Savings and Participants

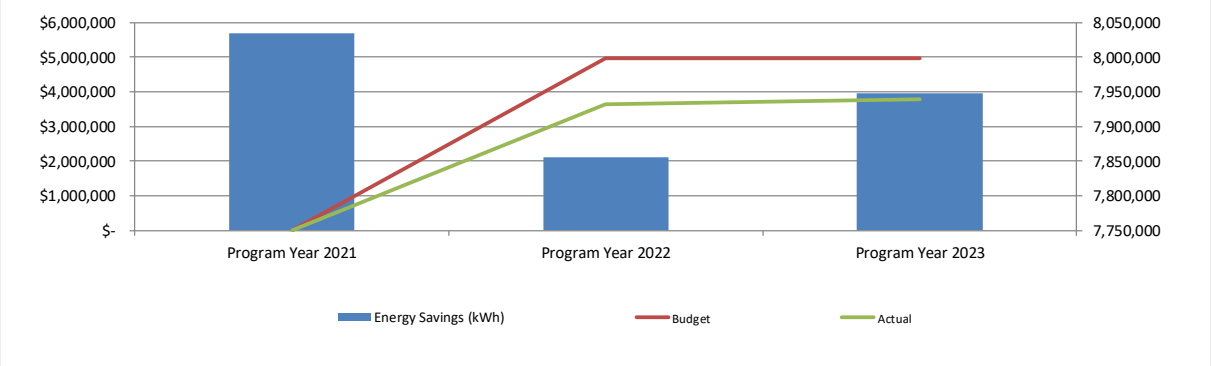
Table 2.4.3 is the program budget, annual energy savings and participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket 10-010-U.

Table 2.4.3 Low-Income Solutions

Entergy Solutions for Low-Income Program Budget, Savings and Participants

Low-Income Solutions

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	NA	NA	-	7,862,580	8,033,917	102%	2,946	2,151	73%	2,790	2,231	80%
Program Year 2022	$ 4,957,950	$ 3,652,325	74%	7,862,580	7,856,081	100%	2,946	1,889	64%	2,790	1,727	62%
Program Year 2023	**$ 4,957,950**	**$ 3,796,363**	**77%**	**7,862,580**	**7,947,477**	**101%**	**2,946**	**1,847**	**63%**	**2,790**	**1,654**	**59%**



Program Events & Training

- The LIS program continued to provide education and feedback to trade allies on program requirements, health and safety measures, and identifying income-qualified customers. The LIS program also participated in the annual Trade Ally Kickoff in tandem with the other residential Entergy Solutions programs. This summit for business principals and crew leaders included training on program updates, policy/procedural updates, and program performance rewards.
- All technicians performing test-in and test-out on customer homes are required to hold a Building Performance Institute professional certification. Trade allies with allocations in the LIS program are strongly encouraged to pursue additional training on home health and safety, such as the Building Performance Institute's Health Housing Principles Certificate of Knowledge. In 2023 the program confirmed that 38% of the companies enrolled as participating LIS trade allies had at least one technician earn the Healthy Housing Principles Certificate of Knowledge.

2.4.4 Description of Participants

Eligible participants include: anyone with a valid Entergy Arkansas account number who is 65 years of age or older or who meets the income eligibility qualifications for the LIHEAP

administered by the Department of Human Services[21] and lives in a single-family home, manufactured home or multifamily dwelling. Large multifamily complexes can be qualified for the LIS program at the property level if the property manager certifies that 60% or more of the residents meet the LIHEAP income requirements or the complex receives federal aid from the U.S. Department of Housing and Urban Development ("HUD"). The property must have a central ducted heat and air conditioning unit to receive the core weatherization measures, an air conditioner tune-up or a thermostat. Properties without a central ducted heat and air conditioning system are eligible for DI measures and health and safety measures. Participants are counted on a per account basis.

Table 2.4.4, from the Entergy Arkansas, LLC Evaluation Report – For Program Cycle 2023, highlights key demographic information for participants in the Low-Income Solutions Program. Pertaining to Act 1102, in the Program Cycle, approximately 35.7% of the low-income participants were aged 65 or older and approximately 53.7% of the respondents were eligible for LIHEAP benefits.

Table 2.4.4

For Program Cycle 2023 Demographic Information from Process Surveys Low-Income Solutions

*Participants may not sum to participant totals highlighted in bold due to rounding error.

Respondent characteristic		Percentage*	Participants22
Respondent age	18–24	2.4%	39
	25–34	11.9%	197
	35–44	23.8%	394
	45–54	11.9%	197
	55–64	14.3%	236
	65 or older	35.7%	591
	Participants (n)		**1,654**
LIHEAP status	LIHEAP-eligible	53.7%	888
	Not LIHEAP-eligible	46.3%	766
	Participants (n)		**1,654**

*Percentages are estimated from PY2023 process surveys.

[21] *See* Act 1102 of 2017.

[22] Participant count includes all participants reported in each program including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the SDLC program, *health and safety* measures, *contractor performance bonus* measures, and *audit* measures.

2.4.5 Program Challenges and Opportunities

Challenges:

With the continued surge in inflation, energy efficiency products and shipping costs are rising. The program is increasing incentives for air sealing, audits, heat pump tune-ups, and direct install measures to offset the rise in costs. If this continues, it could create constraints on the program's incentive budget.

Increasing the number of CBO partnerships in 2023 continued to be limited by CBOs' low bandwidth to engage in any activities beyond their core service offerings. Staffing challenges, constrained administrative support, and low operating budgets combined to limit the number of CBOs that could partner with the LIS program in promoting energy efficiency services.

Opportunities:

In 2023, the program added a LIHEAP-eligibility chart and customer signature line to the Enrollment Form required for all program participants. This helped to standardize the process for both trade allies and customers to self-certify the participants' LIHEAP eligibility and enroll in the LIS program.

EM&V Recommendations:

- Increase QA/QC on the APS measure to ensure contractors are educated on installing the APS and collecting documentation that clearly verifies the installation location of the smart strip.
- Ensure contractors are consistently submitting key savings project documentation.
- Increase training and QA/QC of air and duct sealing measures to ensure all leaks are thoroughly sealed.
- Consider ways to increase participation in the ceiling insulation measure for low-income customers.

2.4.6 Planned or Proposed Changes to Program and Budget

An increase in rebates for air sealing, audits, heat pump tune-ups and direct install products will be implemented in 2024 to account for inflation. An increase in audit incentives will also be implemented in 2024 due to inflation and rising fuel costs.

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2.5 Point of Purchase Solutions

2.5.1 Program Description

The Point of Purchase Solutions Program is an energy efficiency program designed to educate and influence Entergy Arkansas residential customers to purchase and use ENERGY STAR® qualified lighting, appliances, advanced thermostats and advanced power strips (“APSs”) in their homes, and to provide commercial customers with a convenient option for participation when completing smaller renovations or ongoing maintenance and repair. In 2023, as in past years, the Point of Purchase Solutions Program sought to minimize market barriers to participation for Entergy Arkansas’ residential and customers. These barriers include lack of information about and access to ENERGY STAR® qualified products, as well as higher first-cost for these products and the time it takes to research products prior to purchase. The two main program activities include (1) retailer and distributor recruitment and merchandising, and (2) administration of the incentive payment process.

Working with manufacturers, distributors and retailers, the program provided residential customers with discounts on qualified products at participating retail locations via rebates delivered after purchases and instant discounts at retail. The online marketplace, where residential customers can purchase discounted energy efficiency products, was originally launched in late 2020, and continued to be offered in 2023.

The program also continued working with non-profit organizations such as food banks and other non-profit organizations across the state to distribute free energy efficiency products to their constituents.

In 2023, residential customers interested in purchasing qualifying advanced thermostats had three methods for participating: purchase online with a discount, log into a web portal and receive an instant discount code after filling out a form with information about their home, or purchase at full price and receive a rebate post-purchase. This approach gives customers maximum flexibility to participate in the way they feel most comfortable, with the widest possible range of product choices. In the fourth year in which the program offered incentives on smart thermostats, the measure continued to have robust participation, with 854 units incentivized, a 6% decrease over 2022.

In 2023, the program continued relationships with L'Image, Greenlite and Maxlite, to ensure deeply discounted products were available year-round at participating retailers such as Dollar Tree, Habitat for Humanity, Goodwill, Salvation Army and independent retailers across the state. These market partners rely on utility sponsorships for these promotions, which bring in high quality ENERGY STAR® certified products outside of the retailer's normal inventory procurement process. The products, because they are not on the retailer's planogram, typically get prominent placement and sell quickly because of the clear value. These combined efforts resulted in over 213,363 LED lighting unit sales and 13,442 APS unit sales in 2023 to customers the utility considers to be "hard to reach."

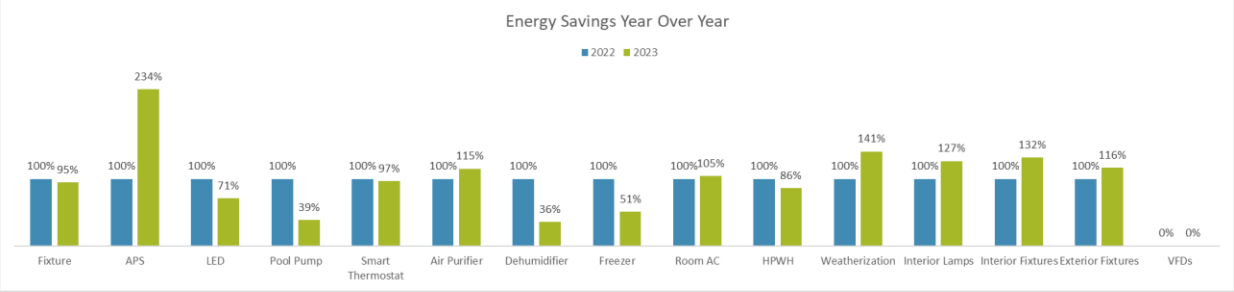
Electrical distributors participating in the program have stabilized post COVID and supply chain disruptions. As a result, discounted sales to commercial customers in 2023 decreased 2% from 2022. In an effort to evolve the program offerings beyond solid state lighting, work on new measures continued in 2023, and one new measure was launched.

In 2023, a portion of program resources was allocated to non-lighting measures such as advanced thermostats, APSs, pool pumps, air purifiers, dehumidifiers, weatherization, heat pump water heaters ("HPWH"), room air conditioners, and freezers. A diverse measure mix that includes non-lighting measures will keep the program relevant and establish a solid foundation for its ongoing success.

Table 2.5.1

Year Over Year (2019-23) Participation for All Measures

Measure						YOY % change			
	2019	2020	2021	2022	2023	2019-20	2020-21	2021-22	2022-23
LEDs	1,358,848	1,868,848	2,170,880	2,489,287	1,754,108	38%	+16%	+15%	-30%
Fixtures	43,418	54,822	41,463	23,601	20,927	+14%	-24%	-43%	-11%
Advanced Power Strips	68,465	73,907	105,696	63,641	148,668	+8%	+43%	-40%	134%
Clothes Washers	39	0	0	0	0	0%	0%	0%	0%
Pool Pumps	70	127	112	55	18	+81%	-12%	-51%	-67%
Air Purifier	20	49	114	38	36	+145%	+133%	-67%	-5%
Dehumidifier	25	49	45	33	14	+96%	-8%	-27%	-58%
Smart Thermostats	842	1,217	1,473	905	854	+45%	+21%	-39%	-6%
Freezers	0	1	5	11	6	-	+400%	+120%	-45%
Room AC	0	0	46	158	226	-	-	+243%	43%
HPWH	0	0	44	57	61	-	-	+30%	7%
Weatherization	0	0	0	27	49	-	-	100%	84%



Lastly, the program continued training sales associates using the existing toolkit for retailers to enable them to promote the energy- and cost-saving benefits of such products to their customers. The continued strength of this program reflects high customer and trade ally satisfaction as well as Entergy Arkansas' success in expanding the program through a diverse marketing and outreach strategy.

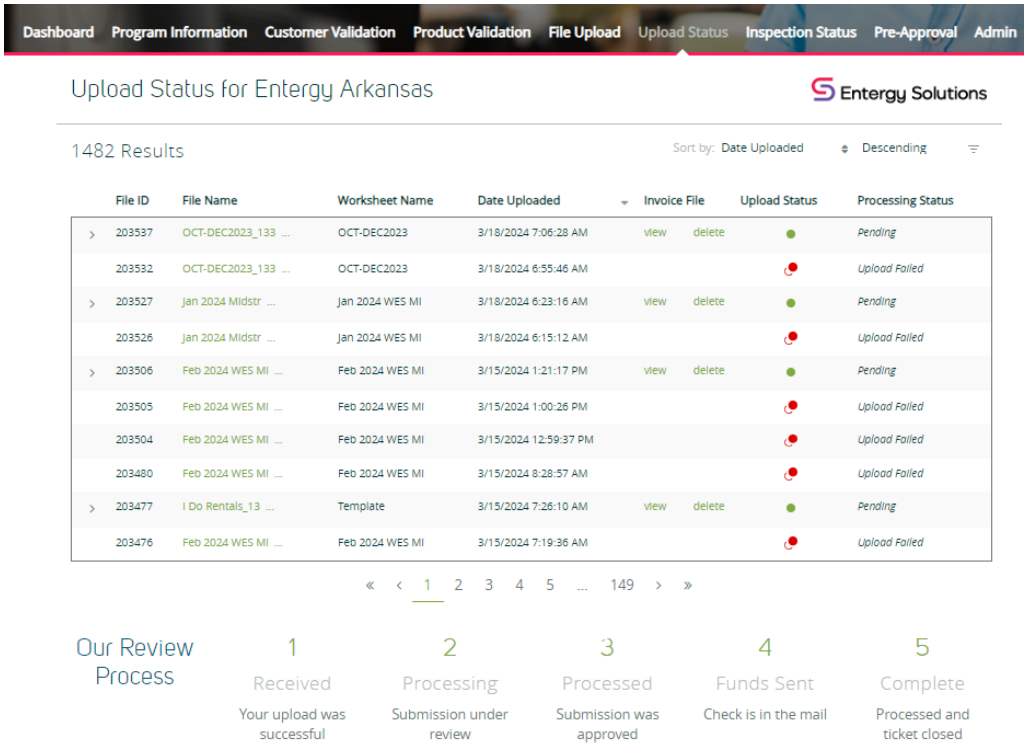
2.5.2 Program Highlights

The program achieved an evaluated annual energy savings of 85,012 MWh, 127% of the net savings goal. To put this in perspective, the energy saved by this program in 2023 is equivalent to the greenhouse gas emissions from 7.1 million gallons of gasoline consumed, or 12,570 homes' electricity use for one year. The program also achieved approximately 13.1 MW of evaluated demand savings. The widespread distribution of lighting products to those most impacted by macroeconomic and environmental factors continued to drive the volume of product units reported in 2023.

In 2023, Entergy Arkansas offered a convenient way to remove and recycle old, energy-inefficient refrigerators and freezers. Not only did the collected appliances not placed in a landfill, but after they were dismantled by recycling technicians, with 95% of the materials (such as plastic, metals, and glass) recycled. In 2023, 352 refrigerators and 105 stand-alone freezers were recycled, which is equivalent to the annual carbon dioxide emissions from 52 homes' energy use or the carbon dioxide emissions from charging 52,778,608 smartphones.

In 2023, distributors participating in the commercial program continued using the web portal introduced in 2020 for validating and submitting sales reports. The site, called Program Partner Central ("PPC"), enables the verification of customer and product eligibility, and provides real-time feedback on submitted sales data so the trade ally has the assurance that their report is error-free, reducing time spent communicating and correcting issues. The site also provides dashboards so trade allies can track their participation, processing status and payment information, one of the most frequently requested items from trade allies.

Figure 2.5.2 Program Partner Central online tool



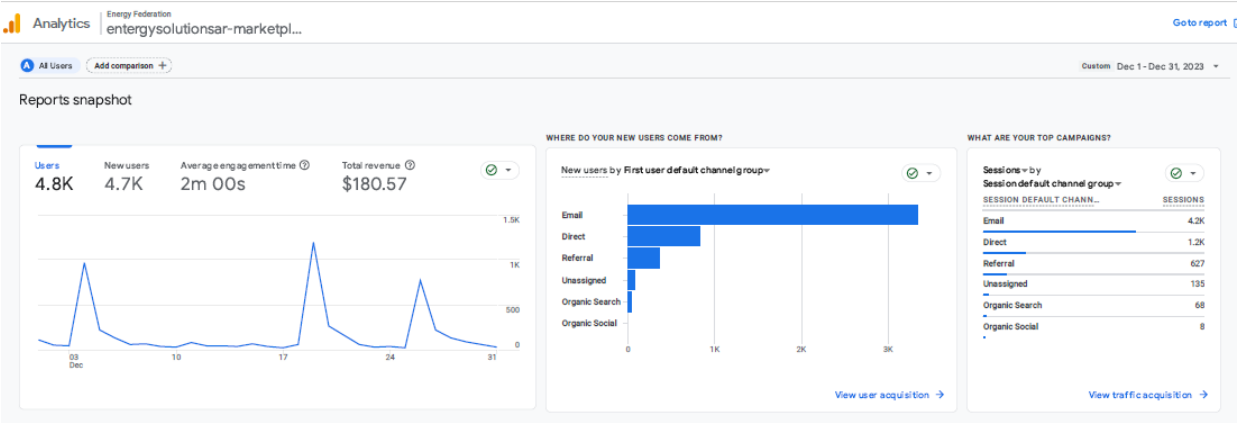
The program was recognized by the Environmental Protection Agency for the second time in 2023 in the Excellence in ENERGY STAR Marketing category, following five years of award-winning performance in Program Delivery. The Point of Purchase Solutions program marketing was comprehensive in 2023 and used various tactics to drive awareness and demand – reaching both new and past program participants. Rather than focusing solely on the incentives offered for measures, messages were designed to capture attention and educate customers on product energy and non-energy benefits, as well as financial incentives.

Email marketing proved to be a very effective marketing tactic in 2023. Most of the emails deployed to residential customers primarily drove to the online marketplace but included secondary cross promotion of the retail coupon, refrigerator recycling, and rebate offerings. Likewise, emails deployed through the Entergy Solutions commercial program included cross promotion of the commercial POPS program offerings. Subject lines continued to be tested and best practices leveraged such as the inclusion of emojis, questions and deadlines to increase customer engagement.

The online marketplace continued to provide residential customers in every part of the state the ability to make contactless purchases of energy efficiency products from the safety of their home. All measures in the residential program were offered via this channel, except for room air conditioners, heat pump water heaters and pool pumps.

The site is linked to from many pages on Entergy Arkansas' website for a seamless and convenient customer experience. The residential program's online marketplace provides the convenience of a discounted purchase available anywhere in the state, including for customers who are in areas where no brick-and-mortar retailers participate in utility incentive programs. This means the utility can reach more of its customer base. Additionally, the utility can validate discounted purchases while gleaning valuable demographic information about who is shopping the site. Compared to the previous year, focused marketing drove 38% more energy efficient product purchases through the online marketplace. In 2023, insights from a data analysis were leveraged to drive customer engagement and demand more efficiently to the online marketplace. Marketing segmentation approaches included reach back campaigns to past participants as well as targeted campaigns to demographic groups that showed underperformance compared to national averages.

Figure 2.5.3 POPS Online Marketplace



In 2023, an online rebate application portal was once again available for electronic submission of rebate applications. Any customer interested in submitting their application digitally could do so for pool pump, air purifier, dehumidifier, smart thermostat, and freezer rebates.

2.5.3 Program Budget, Savings and Participants

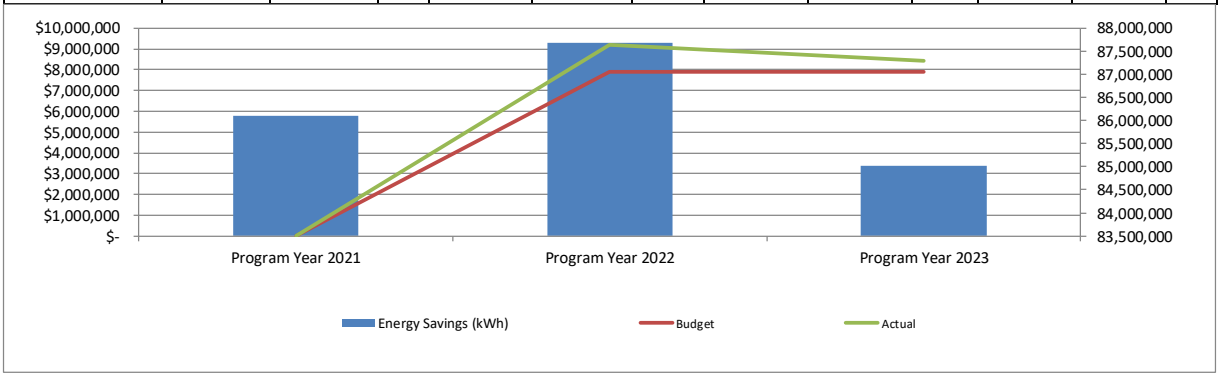
Table 2.5.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.5.3

Point of Purchase Solutions Budget, Energy Savings and Participants

Point of Purchase Solutions

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	NA	NA	-	65,094,281	86,096,313	132%	9,932	12,980	131%	310,213	92,133	30%
Program Year 2022	$ 7,888,520	$ 9,214,545	117%	66,846,295	87,690,107	131%	9,934	13,906	140%	271,464	780,005	287%
Program Year 2023	**$ 7,888,520**	**$ 8,417,611**	**107%**	**66,846,295**	**85,011,787**	**127%**	**9,934**	**13,142**	**132%**	**271,464**	**702,443**	**259%**



Program Events & Training:

The 2023 annual Trade Ally Summit and Awards was held in person in Little Rock. Distributors attending the summit heard from team leaders for all of the commercial programs in Entergy Arkansas' portfolio, as well as representatives from the engineering and marketing teams. Trainings on the PPC portal were held virtually throughout the year. A total of 5 trainings on commercial offerings and tools took place in 2023.

The Point of Purchase Solutions field team engaged with retail sales associates throughout the year, and the team led training sessions for 278 sales associates in participating retail locations, which focused on program participation, product technical details and processes to support seamless implementation. Retailers were encouraged to display program products in prominent locations throughout the store.

2.5.4 Description of Participants

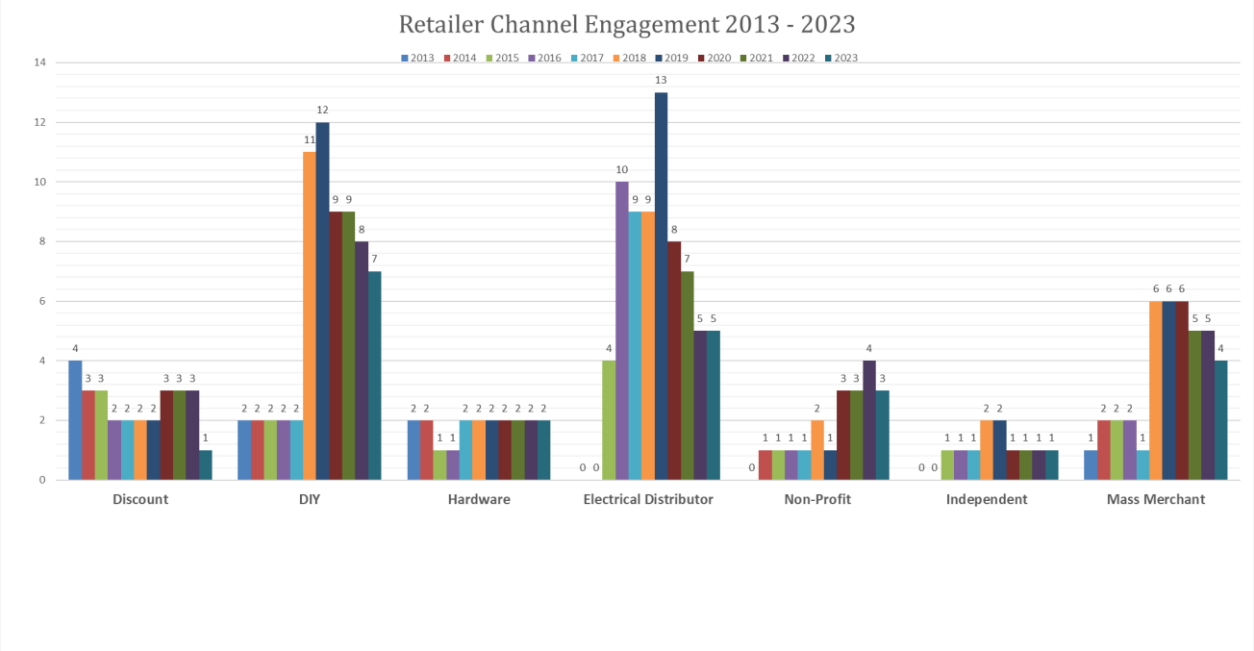
Participants included a diversified group of manufacturers, retail stores, electrical distributors and Entergy Arkansas customers across the state that purchased the discounted energy efficiency measures. In 2023, the program continued working with electrical distributors and independent retailers, such as small grocery markets, hardware stores and rural general stores, as well as Energy Federation Incorporated, the partner implementing the online marketplace. Three electrical distributors which did not participate in the 2022 program participated in the 2023 program. A-1 LED Lights LLC, All Electric Supply, and Secret Lighting LLC, were participants in the commercial promotions in 2023, but not in 2022.

In 2023, the program continued a large focus on recruiting participation from market partners that could provide low- or no-cost measures to customers. Examples are Megalight, with the provision of kits containing energy efficient lighting and advanced power strips to non-profit organizations; and Greenlite, who provided products to food banks for distribution to their constituent pantries. While 2023 continued to be a challenging year for recruiting traditional types of retailers, the program team was able to find creative ways to work with existing partners to offer products in new impactful ways.

For purposes of counting participants, the quantity of units subsidized for each energy efficiency measure is used, depending on the measure type. To illustrate, the estimate of participation for the program in 2023 is 609,843. This breaks down to 1,754,108 LEDs, 20,927 fixtures, 148,668 APSs, 36 air purifiers, 14 dehumidifiers, 854 smart thermostats, 18 pool pumps, 6 freezers, 226 room air conditioners, 61 heat pump water heaters, and 49 weatherization products subsidized through the program. With EISA, the program saw a 14% decrease in the number of incentivized units over 2021. This is due to large-scale distribution of products as described below, as well as increased participation in non-lighting product offerings as these become more well-known due to ongoing marketing efforts. Examples include room air conditioners, at a 43% increase, and heat pump water heaters, which saw a 7% increase over 2022 participation levels. For the purpose of evaluating the program's reach, Entergy Arkansas looks at both the areas served, and the demographic targets reached by the various retailers participating in the program. A chart showing the changes in participation of retailers and distributors over the past ten years is shown below.

Table 2.5.4.1

Retailer Channel Engagement



2.5.5 Program Challenges and Opportunities:

In the fourth year of the POPS Program, recruitment was focused on solidifying existing relationships with retailers, manufacturers, community partner organizations and online fulfillment partners to more closely align with the way customers were making purchases in 2023. To address the cost and accessibility barriers for residential customers (particularly low-income and rural customers), the program continued a partnership with Feeding America, first established in 2020. The partnership with Feeding America is designed to bring LED lighting and APSs to those who utilize the food donation services offered by their partner agencies. Individual pantries at small organizations such as churches or local development agencies receive food and other goods from regional food banks, who warehouse and distribute to the pantries weekly. In 2023, the program continued to expand the geographic area for donations by reaching out and shipping products directly to food pantries located in rural parts of the state. This portion of the program shrank due to EISA in 2023, by 3% over 2022 levels, to 990,624 bulbs donated directly to pantries across the state. This is significant because, according to Feeding America, food insecurity rates are higher in rural areas (those primarily served by the direct to pantry program) than in suburban areas.



The program was also able to continue partnerships with manufacturers Maxlite and Megalight to offer free lighting and load-control products to those most in need. Megalight recruited non-profit organizations across the state to distribute free kits to their patrons who receive the organization's primary services. Recipient non-profits ranged from large to small. These interactions provided the opportunity to distribute information for Entergy Arkansas' programs, driving increased awareness of the program. In addition to traditional home improvement and mass merchant retailers, independent retailers also displayed rebate application forms and educated customers about the availability of pool pump, thermostat, air purifier, dehumidifier and freezer rebates. While more than 62 percent of the program's annual savings still comes from lighting products, the program continued to lay the groundwork for expansion of non-lighting measures in future years.

While customer participation increased in 2023, trade ally participation in the commercial portion of the program took a slight dip in 2023. Comparing 2022 to 2023, three new distributors were recruited and participated in the program, while three distributors who submitted reports in 2022 did not participate in 2023, for a net loss of zero trade allies. The contribution to overall commercial energy savings by the three distributors who did not return in 2023 is 0.5%. As is the case in most commercial trade-ally-driven programs, a small percentage of those enrolled in the program submit the majority of the reported activity.

Table 2.5.5.2

Energy Efficiency Measures Changes

Existing Measures	Removed from 2023 Program	Added to the 2023 Program
Commercial and Residential: **LED bulbs and fixtures** **Commercial only:** **Electric Hand Dryers** **Variable Frequency Drives** **VSD Air Compressors** **Residential only:** **Advanced Power Strips** **Advanced Thermostats** **Room Air Purifiers** **Dehumidifiers** **Pool Pumps** **Freezers** **Heat Pump Water Heaters** **ES Most Efficient Room Air Conditioners**	**no measures removed**	**Commercial:** **Horticultural Lighting** **Residential:** **Appliance Recycling**

EM&V efforts resulted in largely positive results. In addition to almost across-the-board 100+% realization rates, the program received an overall NTG ratio of 91% due to 100% NTG values assigned to residential low-income measures. There was no change to the NTG ratio for APSs, air purifiers, and dehumidifiers. The NTG ratio for pool pumps declined almost 10%, from 97% to 88%. No spillover was identified for the program in PY 2023. Non-energy benefits were again applied in 2023.

In 2023, EISA continued to develop policy updates for GSLs. Implementation of these updates phased in throughout the year, prompting ongoing incentives for GSLs to end in June 2023. The

DOE had initiated a NOPR on December 13, 2021, to establish a "backstop" efficacy requirement of 45 lumens per watt for GSLs. This implementation led to a significant market transformation across major bulb shapes, including A-Line, Candle, Globe, and Reflector bulbs. The rulemaking process was completed in 2022, with the DOE issuing two Final Rules related to GSLs. One rule updated the definitions of GSLs and General Service Incandescent Lamps, while the second rule set the energy efficiency standard for GSLs to the aforementioned 45 lumens per watt requirement. Although the Final Rules came into effect in 2022, full compliance was phased in over the course of 2023. During this period, the EM&V team conducted an analysis of the impacts of the new baseline on Entergy Arkansas' portfolio savings. The analysis revealed a significant decrease in residential lighting savings delivered through Entergy Arkansas' residential energy efficiency programs in future program years due to the EISA changes. However, opportunities for savings through commercial programs remained viable.

2.5.6 Planned or Proposed Changes to Program and Budget

In 2023, Entergy Arkansas will continue to explore new cost-effective measures, expansion of non-lighting measures already in the program and continue those direct outreach and product sales methods which proved successful in 2023. Focus will be placed on expanding the measures offered online and continuing to reach underserved customers with low or no cost product offerings.

In 2023, the program will continue utilizing a database for residential offerings, which has led to more automation and enhanced reporting capabilities and will build upon successful data management processes already in place, ensuring reported savings and evaluated savings are closely matched. This will also facilitate successful program planning for Entergy Arkansas.

The independent evaluator's 2022 recommendations for the program were all completed or are in progress. Additionally, all 2023 recommendations are in progress.

2.6 Large Commercial and Industrial Program 2023

2.6.1 Program Description

The 2023 Large Commercial and Industrial Program ("C&I") is designed to provide Entergy Arkansas' C&I customers with technical assistance and financial incentives for implementation of efficiency measures. This program encourages C&I customers to maximize the efficiency of their facilities by upgrading their energy consuming equipment and improving their energy management practices.

Project energy savings may be quantified either through deemed savings calculations as outlined in the Arkansas TRM or through standard measurement and verification ("M&V") methodologies. In addition to financial incentives, the program offers technical assistance to participants and trade allies in the form of facility assessments, information on viable technologies, support in evaluating financial metrics and assistance in completing program documentation. Deemed savings estimates, as well as measurement and verification of savings for "custom" measures, are also provided.

Incentive rates remained the same for the 2023 program year. The program continued the same structure to allow for retroactive and excess incentives to be applied to projects in 2023. Retroactive incentives could be leveraged against other projects back to January of the previous year. Excess incentives could be leveraged against other projects and could carry forward to the end of the following year. The incentive rate structure is depicted in the below figure.

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Figure 2.6.1.1 2023 Large C&I Tiered Incentive Structure

Large C&I	1 measure	2 measures	3 measures	4+ measures	Cap
PC Power Management:	$0.10	$0.10	$0.10	$0.10	100%
Gaskets and Strip Curtains:	*Paid per LF (or SF) of damaged gasket/strip (contact program staff)*				100%
All other measures:	$0.14	$0.15	$0.16	$0.18	Up to 100%
*** Measures must be 30k kWh each for tier credit					
*** Measure credits for tiers are only retroactive to January of the previous program year					
*** Program Direct Install measures will count as only one tier, even if different end uses exist					
*** Excess incentives can be leveraged against other projects (up to the cap) and can carry forward to the end of the following year					
*** Retroactive incentives can be leveraged against other projects (up to the cap) back to January of the previous year					

2023 Large C&I Measure Categories

Eligible Measure Categories for Tier Credits:

- Lighting and On/Off Controls (Interior, Exterior, Specialty Lighting).
- Advanced Lighting Controls (Multi-step Controls, Dimming, Task Scheduled Controls, etc.).
- Comfort Cooling HVAC/Chiller Replacement.
- CoolSaver^{SM} Air Conditioner Tune-up.
- Chiller Tune-up.
- Retrofit VFD Drives for Air Handler Fans.
- Commercial Wi-Fi Thermostats.
- Building Automation Controls and Retro-Commissioning.
- Retro-Commissioning Lite (RCx Lite).
- Motor Replacement (including DC/AC Conversion and EC Motors).
- Motor Drive or VFD Upgrades.
- Computer Power Management (PCPM, Server Virtualization, Server Consolidation, Data Center UPS Upgrades).
- Commercial Refrigeration Upgrades (G/SC, ASHC, Zero Energy Doors, Night Covers, Open Cases to Solid Doors).
- Direct Install (Aerators, PRSV, Showerheads, LEDs, Weather Stripping).

- Compressed Air Upgrades (Leak Fixes, Demand Side, Supply Side, Air Treatment, Storage, Distribution, VFD Driven Compressors, etc.).
- Industrial Controls and/or Compressed Air System Controls (Installation or Modification of Process or Compressor Controls).
- Industrial Pump/Fan Upgrades.
- Injection Molding System Upgrades (Heater Barrel upgrades, Heater Band Replacement, Heater Barrel Blankets, Injection Machine Cooling, etc.).
- Industrial Heating (Kilns, Ovens/Heaters, Drying Processes, etc.).
- Industrial Cooling (Process Chillers, Industrial Refrigeration, etc.).
- Other Industrial Process Upgrades (Non-Heating/Cooling).
- Behavioral Savings (Continuous Energy Improvement).
- All Other Measures (Envelope Measures, Data Center Hot Aisle/Cold Aisle, etc.) that could be measured and verified.

Projects submitted to this program may include prescriptive and/or custom measures; however, custom measures must pass a cost-effectiveness test to be eligible for incentives. This test takes the form of an analysis performed by Entergy Arkansas as shown in the following table.

Figure 2.6.1.2

2023 Large C&I Entergy Arkansas Cost-Effectiveness Test Example

PROJECT ==>	**Example Customer Lighting**	
A. PARTICIPANT COST TEST	**PASS**	**6.01**
B. RATEPAYER IMPACT MEASURE ("RIM") TEST	**PASS**	**2.33**
C. TOTAL RESOURCE COST ("TRC") TEST	**PASS**	**2.48**
D. PROGRAM ADMINISTRATOR COST ("PAC") TEST	**PASS**	**2.73**
Overall Assessment ==>	**PASS**	

The Large C&I program relies mostly on trade allies for direct marketing to eligible customers. Trade allies are contractors or distributors in the state who are educated about the program and use the technical assistance and incentives to enhance their business offerings. In addition to

trade allies, the program utilizes account managers on the implementation staff. The outreach efforts from these account managers continue to improve Entergy Arkansas' ability to market directly to participants as well as support the trade allies in their marketing efforts. These outreach efforts included trade ally outreach, presentations at public/professional organizations, outreach with Entergy Arkansas customer service staff and direct outreach via program staff.

Feasibility study co-funding was continued for C&I customers in the 2023 program year. This co-funding allows for some costs of energy efficiency studies to be offset by program incentives, thus making studies for complex projects more affordable. These studies are targeted to develop comprehensive solutions by identifying projects that might not otherwise happen due to the initial cost to investigate and quantify the energy savings potential. Feasibility co-funding rates for the 2023 program year remained the same, utilizing a tiered structure to promote increased custom savings per study (see Figure 2.6.1.3 below). Since this change, the program has seen increased participation in the feasibility study co-funding for higher custom savings (*i.e.*, compressed air and advanced lighting controls). The program's feasibility study co-funding was changed to incentivize more comprehensive audits and custom projects. Therefore, the new tiered structure rewards trade allies that provide more comprehensive feasibility studies that include custom savings. The payout structure remained at 40% payout upon the delivery of the feasibility study and the remaining 60% once the project is complete. This approach seeks to encourage the trade ally to follow through with completing the project(s). The percentage of co-funding available for studies remained at a maximum of 100% of study funding.

Figure 2.6.1.3

2023 Feasibility Tiered Incentive Table

Feasibility Study Savings**		
Min kWh	Max kWh	Incentive*
50,000	100,000	$3,000
100,001	200,000	$6,000
200,001	300,000	$9,000
300,001	500,000	$12,000
500,001	1,500,000	$15,000
1,500,001	5,000,000	$20,000

*Full payout amounts with a total feasibility budget of $300,000

**Payout 40% for study submission and the remaining 60% upon project completion for cost savings*

***Must be M&V projects. Savings excludes "deemed" measures from the current version of the Arkansas TRM*

2.6.2 Program Highlights

- Continuous Energy Improvement ("CEI") and CoolSaver[SM] continued as measures in 2023. After a successful year in 2022, CEI contributed over 42 MWh in the third full year of implementation within the program. These measures had a successful year within the programs in 2023 in providing extra incentive tiering opportunities while contributing to more program comprehensiveness.
- Figure 2.6.2.1 indicates trade ally participation in the program. In 2023, 34 trade allies contributed to around 24% of the goal attainment.
- To show the continued program measure mix transformation, Figure 2.6.2.2 represents the measure mix from 2012, and Figure 2.6.2.3 represents the measure mix from 2023. This improved measure mix over the last eleven program years points to the continued comprehensive gains within the program portfolio of measures.
- Figure 2.6.2.4 shows the geographical distribution of installed projects in the Large C&I program. Note that most of the Entergy Arkansas service area continues to have successful activity in the program.

Figure 2.6.2.1 - Large C&I Top Trade Ally Participation

Trade Ally	% of Total Savings	% of Total Incentives
Trade Ally 1	5.93%	9.60%
Trade Ally 2	2.78%	5.50%
Trade Ally 3	2.29%	4.16%
Trade Ally 4	1.95%	3.14%
Trade Ally 5	1.79%	2.63%
Trade Ally 6	1.43%	2.59%
Trade Ally 7	1.33%	1.40%
Trade Ally 8	1.19%	2.08%
Trade Ally 9	0.78%	1.26%
Trade Ally 10	0.65%	1.04%
Trade Ally 11	0.40%	0.65%
Trade Ally 12	0.37%	0.60%
Trade Ally 13	0.31%	0.37%
Trade Ally 14	0.28%	0.48%
Trade Ally 15	0.24%	0.38%
Trade Ally 16	0.21%	0.33%
Trade Ally 17	0.21%	0.18%
Trade Ally 18	0.18%	0.29%
Trade Ally 19	0.16%	0.27%
Trade Ally 20	0.14%	0.25%
Trade Ally 21	0.13%	0.14%
Trade Ally 22	0.11%	0.10%
Trade Ally 23	0.11%	0.18%
Trade Ally 24	0.09%	0.15%
Trade Ally 25	0.08%	0.14%
Trade Ally 26	0.08%	0.17%
Trade Ally 27	0.06%	0.09%
Trade Ally 28	0.06%	0.09%
Trade Ally 29	0.05%	0.08%
Trade Ally 30	0.04%	0.05%
Trade Ally 31	0.04%	0.08%
Trade Ally 32	0.04%	0.06%
Trade Ally 33	0.02%	0.03%
Trade Ally 34	0.00%	0.01%

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Figure 2.6.2.2 Large C&I Program Measure Mix (2012 kWh percentage)
For Comparison to 2023 Measure Mix Below in Figure 2.6.2.3.

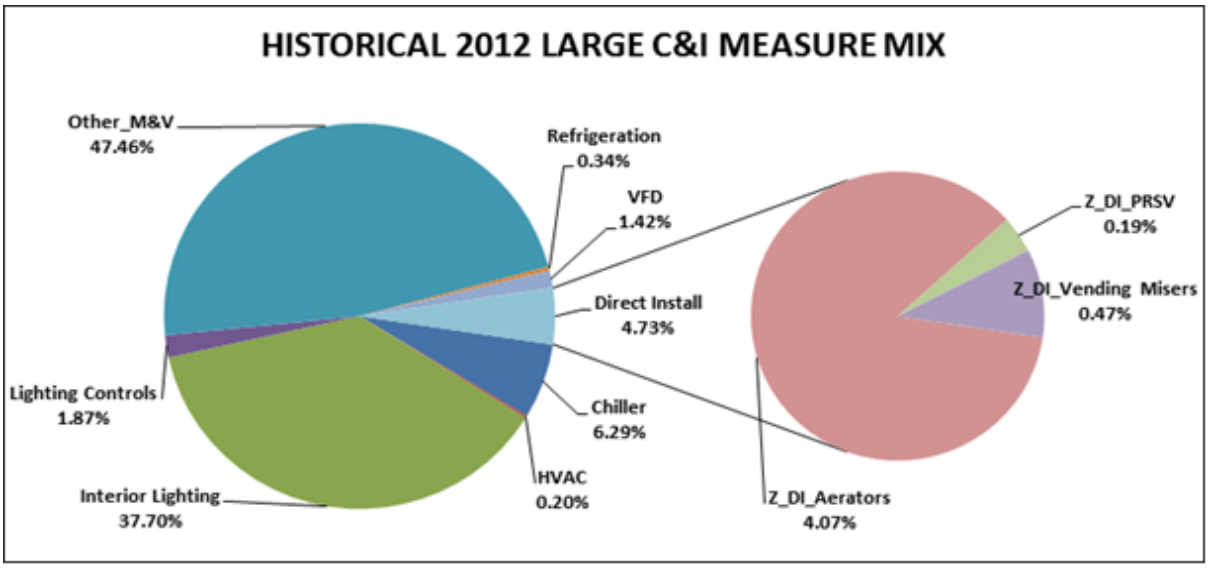
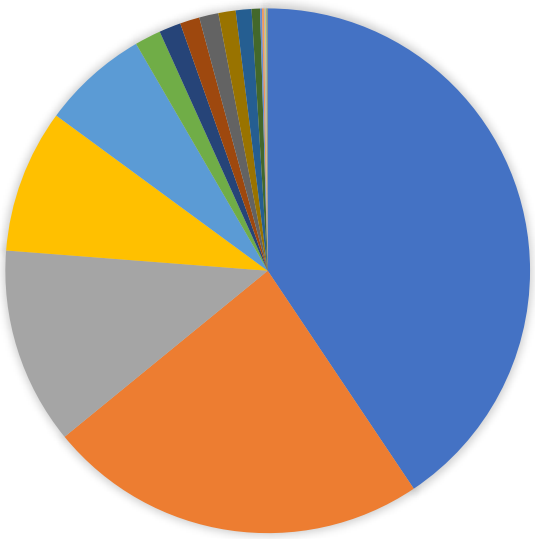


Figure 2.6.2.3
Large C&I Program Measure Mix (2023 kWh percentage)

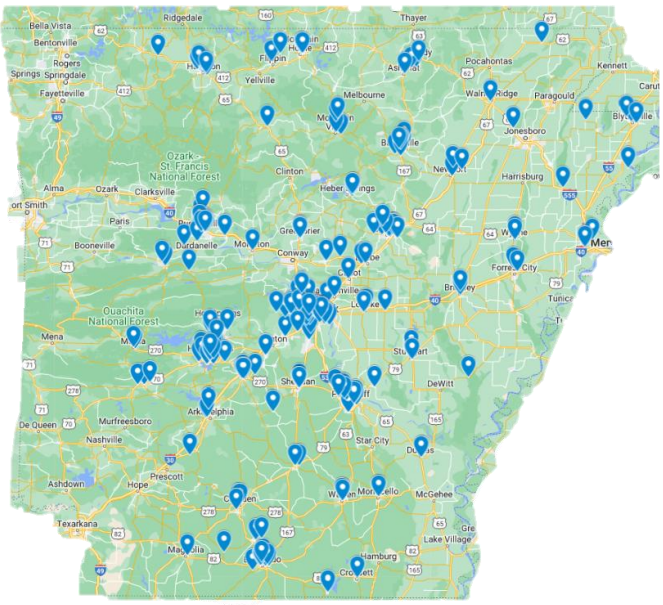


LCI Measure	kWh	%
Continuous Energy Improvement	42,841,637.21	40.60%
Custom	24,790,155.24	23.49%
Indoor Lighting	12,806,544.07	12.14%
VFD	9,336,314.19	8.85%
New Construction	6,917,591.20	6.56%
Outdoor Lighting	1,702,232.06	1.61%
Overhead Door Weather Stripping	1,416,923.16	1.34%
AC Tune Up	1,273,916.00	1.21%
Commercial Wi-Fi Thermostat	1,252,053.00	1.19%
Commercial Door Air Infiltration	1,121,393.82	1.06%
PTAC Sealing	1,021,895.80	0.97%
Chiller Replacement	545,154.93	0.52%
HVAC Replacement	124,471.11	0.12%
Refrigeration Door Gaskets	119,536.00	0.11%
Compressor Replacement	80,394.77	0.08%
Chiller Tune Up	45,392.02	0.04%
Commercial Showerheads	36,202.44	0.03%
High Efficiency Battery Chargers	33,372.00	0.03%
Weather Stripping for Refrigerated Spaces	16,933.40	0.02%
No Loss Condensate Drains	15,720.10	0.01%
Lighting Controls	8,924.28	0.01%
EC Motor	6,818.08	0.01%
Faucet Aerators	5,481.06	0.01%

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Figure 2.6.2.4

Distribution of Projects in Entergy Arkansas Service Area



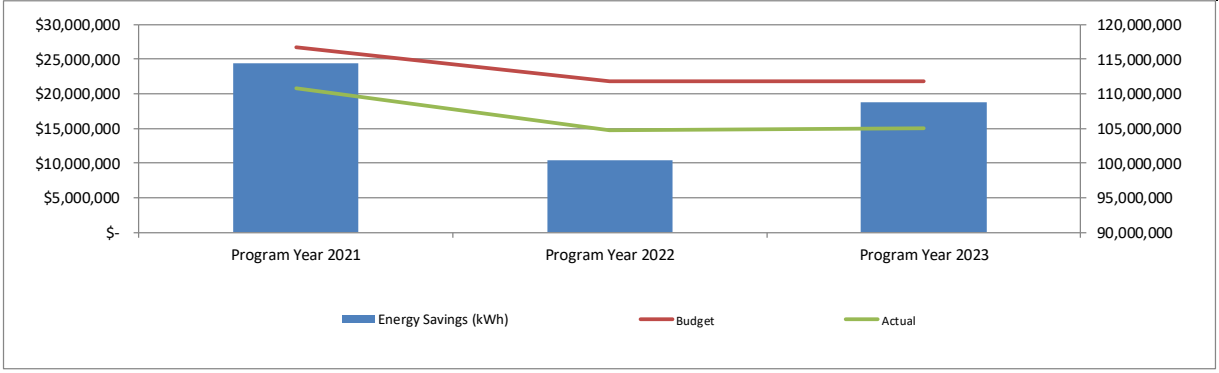
2.6.3 Program Budget, Savings and Participants:

Table 2.6.3 presents the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

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Table 2.6.3
Large C&I Solutions Program Budget, Savings and Participants

Large Commercial & Industrial Solutions												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2021	$ 26,793,738	$ 20,825,568	78%	118,077,533	114,421,277	97%	18,554	15,580	84%	481	483	100%
Program Year 2022	$ 21,779,439	$ 14,752,019	68%	114,386,504	100,459,669	88%	18,197	16,999	93%	437	521	119%
Program Year 2023	**$ 21,779,439**	**$ 15,016,623**	**69%**	**114,386,504**	**108,799,928**	**95%**	**18,197**	**12,257**	**67%**	**437**	**311**	**71%**



2.6.4 Description of Participants

A participant is any non-residential Entergy Arkansas customer, which is not classified under Public Institutions Solutions, with a demand greater than or equal to 100 kW that has enrolled in the energy efficiency programs and will exert best efforts to approve, fund, and install projects during the program year. Participants were qualified and defined by a unique Entergy Arkansas account number. Implementation staff used the Entergy Arkansas assigned Business Partner ("BP") number to combine like participants for reporting in order to identify unique participants with multiple participating account numbers. Non-residential customers with a demand less than 100 kW, which are not classified under the Public Institutions Solutions, are encouraged to participate in the Small Business Solutions Program unless a custom measure or new construction is performed, in which case they would participate in this Large C&I program.

2.6.5 Program Challenges and Opportunities

The 2023 Large C&I program strived to deliver successful prescriptive and custom energy efficiency projects even during a challenging year. The challenges of supply chain issues decreased from 2022, but longer lead times for products still caused increased project timelines. The incentive structure continued to allow for tiered incentives and assisted customers in

completing energy efficiency projects that may not have happened without the increased incentives. The feasibility study co-funding continued to be an avenue that trade allies used to evaluate facilities and develop complex projects that included compressed air measures. In 2023, co-funding was successful in helping in the development of additional compressed air measures and pump variiable frequency drive (VFD) technology studies from multiple contractors that resulted in successful custom projects.

Implementation staff continued efforts to help SD customers be well informed when considering participation in the program. These efforts resulted in continued success of customers either requesting in the program after having filed for SD status or remaining in the program while having the option to file for SD status. These efforts are ongoing as implementation staff continues to communicate participation options to customers for the purposes of facilitating more informed decisions.

2.6.6 Planned or Proposed Changes to Program and Budget

The program will continue to allow the payment of back tier incentive credits to January of the previous program year. Excess bonus incentives, derived from projects that earned more incentive than the project cost, will continue to carry forward to December of the following program year instead of the current program year. Continuing to encourage multiple year participation and removing barriers for longer equipment ordering lead times and budget constrained projects will remain a program focus.

2.7 Small Business Solutions

2.7.1 Program Description

Small Business Solutions is offered to commercial customers with less than 100 kW of peak demand. Certified participating contractors (trade allies) provide no-cost energy assessments to identify qualifying energy efficiency improvement projects and install cost-effective energy-saving equipment. Incentives for these projects are either passed directly to the customer on the trade ally's invoice or the customer may choose to receive the incentives directly. Trade allies or customers are paid from the incentive budget after reporting and QA/QC is completed. Small Business Solutions participants may also take advantage of no-cost direct install measures, including low-flow showerheads, low-flow faucet aerators, pre-rinse spray valves, LED lamps and commercial door air infiltration measures (weather stripping).

2.7.2 Program Highlights

In 2023, EALs Trade Ally Network and continued direct install efforts contributed significantly to the success of the program. This Trade Ally Network consists of program trained and certified contractors, electrical distributors, manufacturer representatives and energy services companies that conduct no-cost energy efficiency assessments and complete energy efficiency projects through the program. Figure 2.7.2.1 below shows the location of the home offices of all 2023 trade allies in the network. Additionally, 29 different trade allies completed non-direct install projects in 2023. Figure 2.7.2.2 shows the approximate location of those projects.

Figure 2.7.2.1 Location of 2023 Trade Ally Home Offices

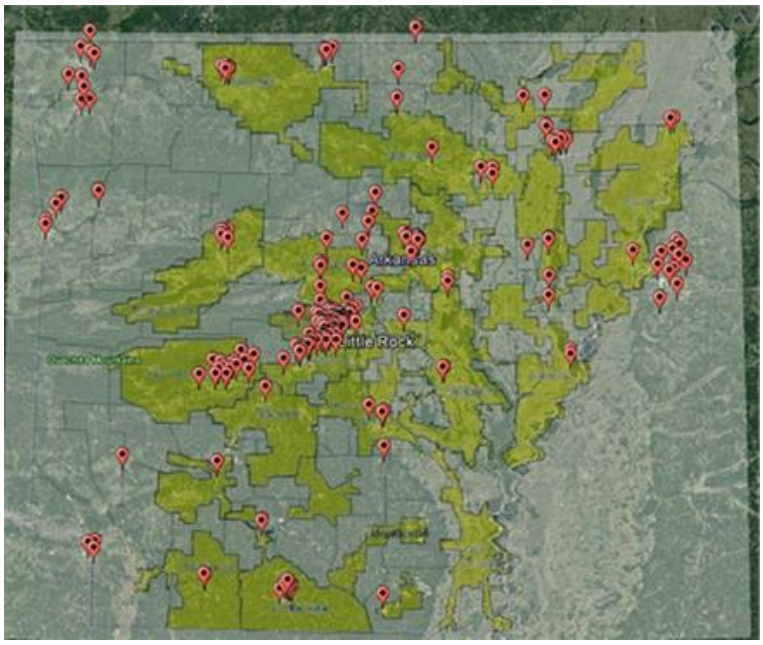
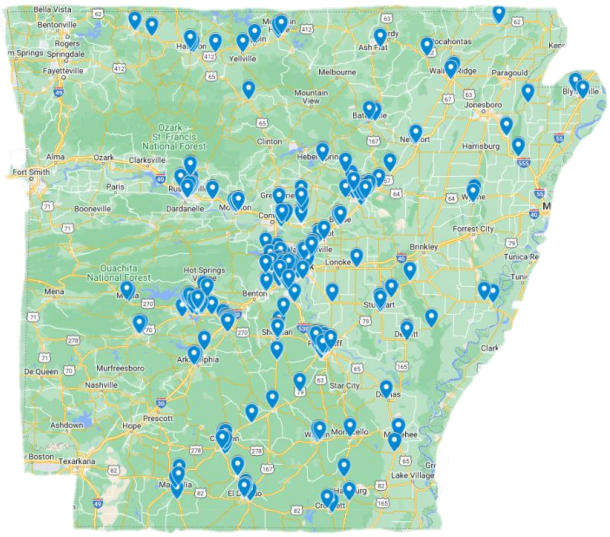


Figure 2.7.2.2 Distribution of Projects in Entergy Arkansas Service Area



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Table 2.7.2.3 represents 2023 Trade Ally achievement for non-direct install projects.

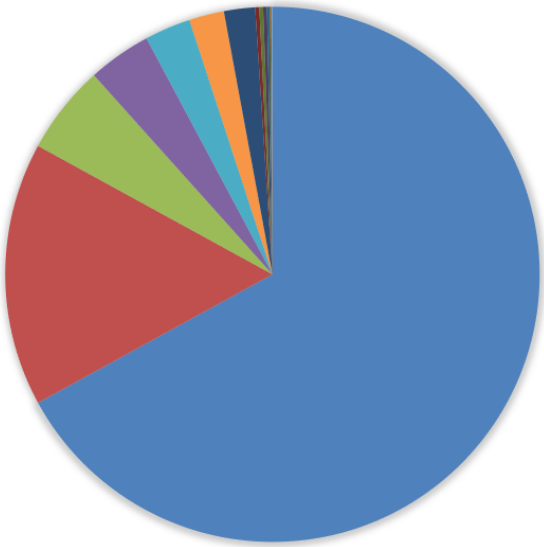
Table 2.7.2.3

Trade Ally	% of Total Savings	% of Total Incentiv
Trade Ally 1	42.13%	45.51%
Trade Ally 2	12.50%	13.33%
Trade Ally 3	6.00%	6.49%
Trade Ally 4	4.75%	4.82%
Trade Ally 5	3.86%	4.17%
Trade Ally 6	2.41%	2.60%
Trade Ally 7	2.40%	2.57%
Trade Ally 8	2.33%	1.28%
Trade Ally 9	2.15%	2.48%
Trade Ally 10	1.98%	2.14%
Trade Ally 11	1.81%	1.28%
Trade Ally 12	1.77%	1.91%
Trade Ally 13	1.54%	1.32%
Trade Ally 14	0.91%	0.98%
Trade Ally 15	0.72%	0.78%
Trade Ally 16	0.56%	0.54%
Trade Ally 17	0.53%	0.58%
Trade Ally 18	0.34%	0.37%
Trade Ally 19	0.33%	0.35%
Trade Ally 20	0.29%	0.25%
Trade Ally 21	0.29%	0.22%
Trade Ally 22	0.28%	0.48%
Trade Ally 23	0.25%	0.27%
Trade Ally 24	0.16%	0.18%
Trade Ally 25	0.13%	0.14%
Trade Ally 26	0.09%	0.10%
Trade Ally 27	0.07%	0.09%
Trade Ally 28	0.05%	0.02%
Trade Ally 29	0.02%	0.06%

The Small Business Solutions Program had a filed savings target of 13,871 MWh for the 2023 program year. Small Business Solutions achieved 9,221 MWh in evaluated energy savings.

Direct installation of low-flow faucet aerators, pre-rinse spray valves, LED lamps, commercial door air infiltration (weather stripping), overhead door air infiltration and shower heads provided more opportunities to increase measures and reach more businesses through lighting assessment leads for trade allies.

Figure 2.7.2.4
Small Business Solutions Measure Mix (2023 kWh)



Small Business Measure	kWh	%
Indoor Lighting	6,658,901.05	67.03%
Outdoor Lighting	1,583,367.05	15.94%
Commercial Wi-Fi Thermostat	535,742.00	5.39%
Overhead Door Weather Stripping	380,300.74	3.83%
Commercial Door Air Infiltration	276,600.70	2.78%
PTAC Sealing	210,266.70	2.12%
AC Tune Up	186,809.00	1.88%
Refrigeration Door Gaskets	24,575.80	0.25%
Commercial Showerheads	22,721.98	0.23%
Lighting Controls	22,695.93	0.23%
Faucet Aerators	18,959.27	0.19%
Pre Rinse Spray Valves	7,974.12	0.08%
Refrigeration Strip Curtains	5,663.95	0.06%

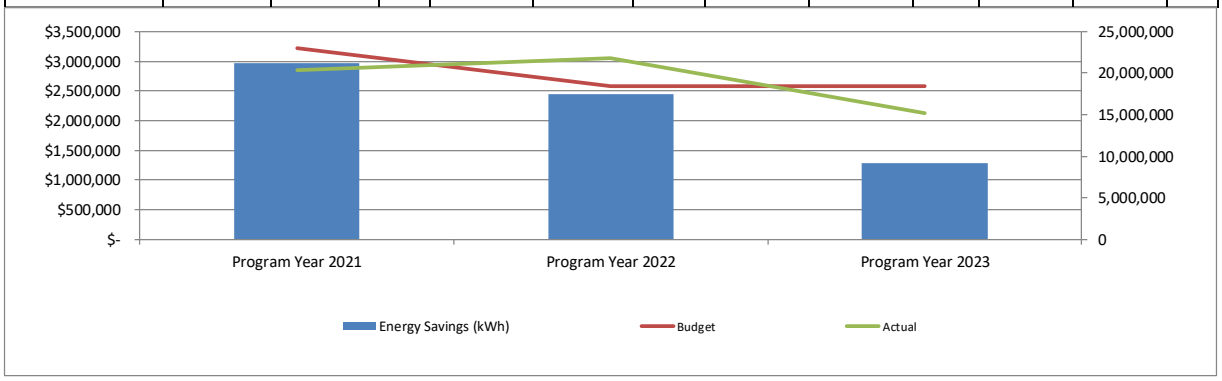
2.7.3 Program Budget, Savings and Participants

Table 2.7.3 shows the program budget, annual energy savings and number of participants from Workbook Table 5, as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.7.3

Small Business Solutions Budget, Savings and Participants

Small Business Solutions												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2021	$ 3,227,116	$ 2,848,333	88%	15,663,185	21,200,992	135%	1,844	3,364	182%	478	907	190%
Program Year 2022	$ 2,580,679	$ 3,048,245	118%	13,871,485	17,403,625	125%	1,740	2,782	160%	424	711	168%
Program Year 2023	**$ 2,580,679**	**$ 2,122,508**	**82%**	**13,871,485**	**9,221,327**	**66%**	**1,740**	**1,507**	**87%**	**424**	**469**	**111%**



Program Events & Training:

The Small Business Solutions Program conducted 58 recruitment and training events in the 2023 program year. The training events included instructions on program participation, calculator training, trade ally enrollment for training on field inspections and program best practices/processes. See the Annual Report Workbook for training details.

Providing adequate and effective training is essential to the success of the trade allies in the Small Business Solutions Program. In addition, it is important to provide trade allies with proper ongoing support and efficient processing of incentives.

2.7.4 Description of Participants

A program participant is defined as any Entergy Arkansas commercial customer with less than 100 kW of peak demand that receives electric service from Entergy Arkansas. Participants were qualified and defined by a unique Entergy Arkansas account number. Implementation staff also estimated unique Small Business Solutions Program participants with multiple participating account numbers for reporting to be approximately 469.

2.7.5 Program Challenges and Opportunities

With market saturation increasing in 2024, the challenge will be to provide more measures to the small business market sector while maintaining cost-effectiveness and comprehensiveness. Therefore, the development of more measures will be important for continued success beyond 2023. This challenge will be met through focusing staff resources to provide more development for new measures, which has already begun. Direct installation has again proven to be a great success in the Small Business Solutions Program for 2023.

2.7.6 Planned or Proposed Changes to Program and Budget

There are currently no major changes planned for the Small Business Solutions Program.

2.8 Public Institutions Solutions

2.8.1 Program Description

The Public Institutions Solutions Program provides technical assistance, energy planning recommendations and financial incentives to public entities (state, federal, cities, counties and public/private schools/colleges) for the installation of cost-effective energy efficiency measures. The program helps public entities operate their buildings more efficiently by explaining the technical and financial benefits of investing in energy efficiency, developing a plan to make energy efficiency improvements and providing support in completing projects.

The program provides technical assistance, manages program incentive funds, verifies that the savings claimed through the program are accurate and appropriate, and uses appropriate M&V methods to prove savings (where necessary). Energy Benchmarking and Energy Master Planning Workshops are provided for participants specified within the program.

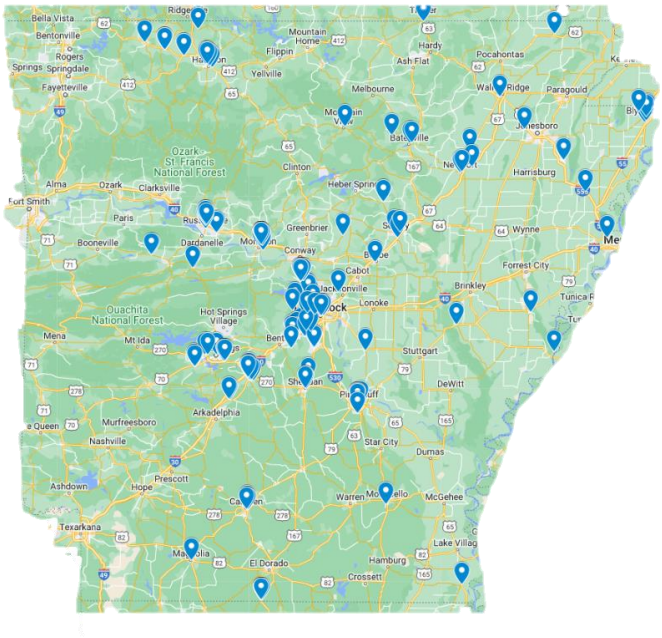
Whether retrofitting an existing building or incorporating energy efficiency technologies into new construction, the program helps participants identify and implement cost-effective projects that will help them facilitate using energy more efficiently. After upgrades are completed and verified, the program provides cash incentives for projects that save energy. The projects submitted under the Public Institutions Solutions Program can be single measure projects through a trade ally or comprehensive projects, including multiple, complex measures which require M&V.

2.8.2 Program Highlights

- Public Institutions Solutions achieved 16,833 MWh in gross energy savings, which is 68% of the 2023 kWh savings goal. The program was able to shift kWh savings in order for other programs to overachieve on total savings goals.
- Program Participation – The Public Institutions Solutions Program had customer participation throughout the Entergy Arkansas service area. Entergy Arkansas developed a map showing that the program achieved savings in a geographically diverse range of participants. (See map in Figure 2.8.2.1).

Figure 2.8.2.1

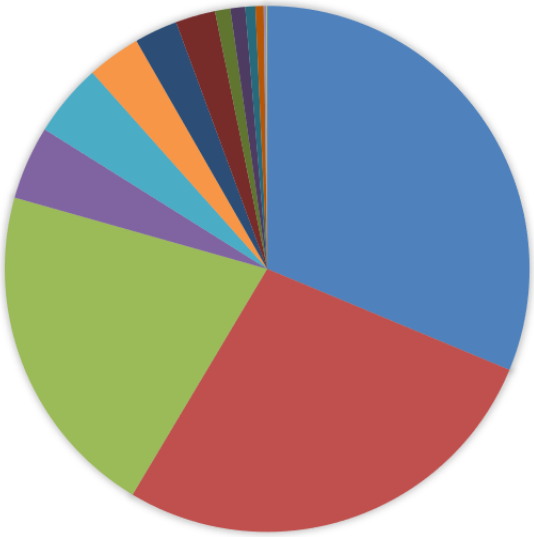
Distribution of Projects in Entergy Arkansas Service Area



- Benchmarking and Energy Master Planning - The Public Institutions Solutions Program benchmarked 20 buildings/sites for three participants using EPA's Portfolio Manager Tool. Energy Master Planning workshops were conducted for three participants to include improved learning environments, reducing energy expenditures, boosting the local economy (through upgrade projects) and enhancing community relations. Entergy Arkansas analyzed the efforts of benchmarking services to encourage participants to implement more energy efficiency upgrades in their facilities. The results of this analysis showed that those who participate in benchmarking services provided by the program implement, on average, 1.5 times more energy efficiency upgrades than those that do not participate.

Figure 2.8.2.2

Public Institutions Solutions Measure Mix (2023 kWh)



CitySmart Measure	kWh	%
Indoor Lighting	5,565,860.97	31.27%
Continuous Energy Improvement	4,858,625.87	27.30%
Commercial Wi-Fi Thermostat	3,701,261.00	20.80%
Outdoor Lighting	805,038.16	4.52%
Commercial Door Air Infiltration	801,710.76	4.50%
Custom	586,688.27	3.30%
New Construction	473,253.68	2.66%
AC Tune-Up	435,597.00	2.45%
Chiller Replacement	168,559.97	0.95%
HVAC Replacement	162,215.51	0.91%
Lighting Controls	110,528.64	0.62%
Overhead Door Weather Stripping	89,435.48	0.50%
Commercial Showerheads	15,178.37	0.09%
VFD	14,614.73	0.08%
Faucet Aerators	8,275.51	0.05%

2.8.3 Program Budget, Savings and Participants

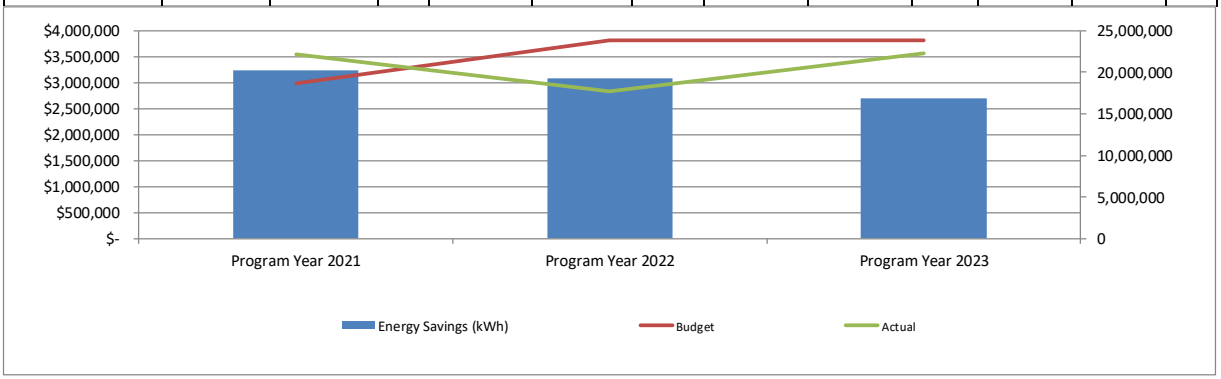
Table 2.8.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.8.3

Public Institutions Solutions Budget, Energy Savings and Participants

Public Institutions Solutions

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 2,979,392	$ 3,550,372	119%	21,986,658	20,234,829	92%	5,270	3,573	68%	56	392	700%
Program Year 2022	$ 3,805,633	$ 2,840,708	75%	24,661,483	19,224,703	78%	5,883	2,731	46%	61	263	431%
Program Year 2023	**$ 3,805,633**	**$ 3,572,008**	**94%**	**24,661,483**	**16,832,595**	**68%**	**5,883**	**3,176**	**54%**	**61**	**216**	**354%**



Program Events & Training:

In 2023, the Public Institutions Solutions Program conducted Energy Master Planning Workshops for three customers and benchmarked 20 buildings/sites. Energy Master Planning Workshops addressed energy management issues and obstacles and questions common to schools, cities and counties to address the key focus areas of planning and decision making, evaluation and monitoring, funding energy efficiency, facility operations and energy awareness. In addition, these workshops presented energy performance benchmarking analysis to assist public entities in benchmarking their facility performance against other similar facilities.

Program staff also conducted presentations across various locations and participant face-to-face meetings. Program presentations were made, and information booths were set up at several key events and several other conferences. See more training details in the Annual Report Workbook.

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2.8.4 Description of Participants

A participant is defined as any Entergy Arkansas customer that is a public and/or private entity customer (for example, federal/state buildings, K-12 schools, higher education institutions, and municipalities) that receives retail electric service from Entergy Arkansas. Participants are counted by tax ID number, which is represented by Business Partner Number in Entergy Arkansas' account data. Each participant can include multiple account numbers, projects and measures. Participants were qualified and defined by a unique Entergy Arkansas account number.

2.8.5 Program Challenges and Opportunities

The 2023 Program Year offered many opportunities and challenges. Customers in this market segment continue to be challenged by the economic climate and oftentimes find it difficult to fund projects. Entergy Arkansas worked with customers to identify short-term solutions, such as direct install and lighting solutions, and long-term solutions, including custom M&V projects, in order to gain rapid returns and savings that will persist.

Entergy Arkansas also continues to educate customers on other financial options, such as:

- Lease Agreements that offer low-rate (often tax-exempt) funding which allows financing of capital equipment over longer periods of time (10+ years) by utilizing "operating cost" dollars.
- Bond Issues through a taxpayer (public) approved mechanism that funds capital improvements over time at low rates (approvals can take substantial time); and
- Performance contracting through a guaranteed or shared savings agreement with a performance contractor that funds capital improvements over a period of time using energy and/or operational savings.

Developing more behavioral energy efficiency projects for this program remains important to continued success beyond 2023. Plans are currently underway to identify additional behavioral energy efficiency projects for 2023 and beyond. Program staff is working to implement future behavioral opportunities.

2.8.6 Planned or Proposed Changes to Program

The program will continue to allow the payment of back tier incentive credits to January of the previous program year. Excess bonus incentives, derived from projects that earned more incentive than the project cost, will continue to carry forward to December of the following program year instead of the current program year. Continuing to encourage multiple-year participation and removing barriers for longer equipment ordering lead times and budget constrained projects will remain a program focus. In addition, the program will continue to implement CEI and CoolSaver™ as measures within the PY 2024 program year as these measures began being a part of the tiering structure in PY 2020 with marked success.

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2.9 Agricultural Energy Solutions Program

2.9.1 Program Description

The Agricultural Energy Solutions Program is designed to reduce energy usage among agribusiness owners in Entergy Arkansas' service territory through custom and prescriptive incentives, as well as farmer energy efficiency and agricultural supplier education. The program seeks to accomplish these goals by lowering the barriers within this sector, such as: the lack of easy access to qualified vendors and installers, the lack of information and awareness of the benefits of participation, and financial incentives to overcome the first cost barriers of energy efficiency measures.

2.9.2 Program Highlights

- Saved 5,198 gross MWh in 2023 with a 99.3% realization rate and a net-to-gross ratio of 0.99, resulting in 5,111 MWh net energy savings.
- Achieved 2.0 gross MW and 1.9 net MW savings in 2023 with a realization rate of 99.9%.
- A total of 1,781 measures were incentivized for six unique participants. In 2023, the program continued to build and maintain relationships with numerous agricultural businesses, trade allies, contractors, government agencies, row crop farmers, indoor horticulture farmers and poultry farmers across Arkansas. These relationships heightened program awareness throughout the Entergy Arkansas service territory and were instrumental in achieving the 2023 MWh savings. Trade ally outreach generated 83.33% of program participation totals and the Entergy Solutions website generated 16.67% of program participation. See Figure 2.9.2.2 for a geospatial map of farms that participated in the Agricultural Program in 2023.

Figure 2.9.2.1 Referrals 2023

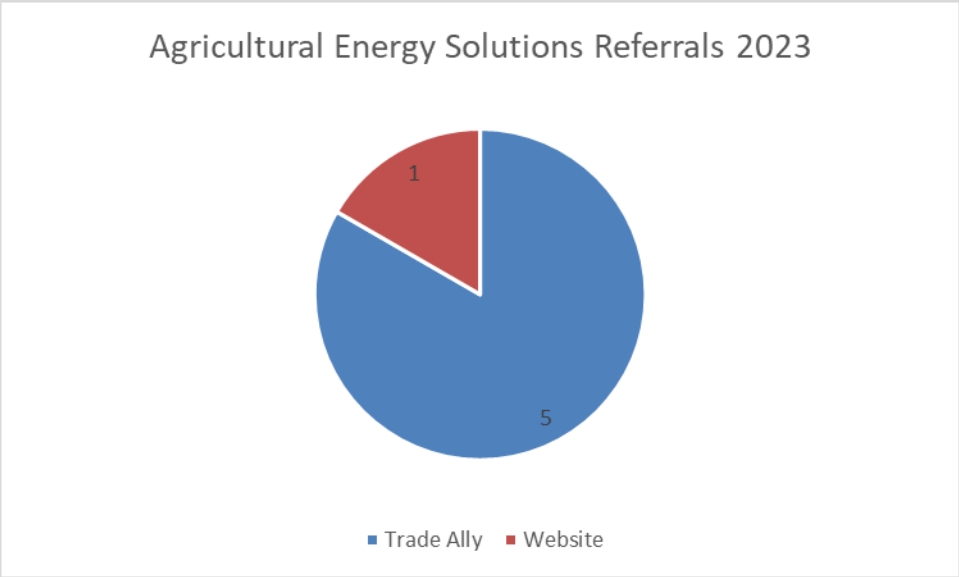
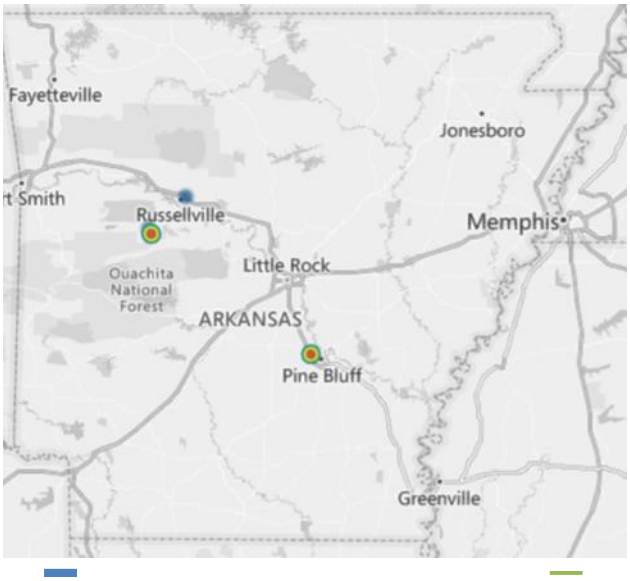


Figure 2.9.2.2 2023 Participants



- In 2023, 6 applications were received, and all participated in Quality Control (QA/QC) with a pass rate of 100%. This consisted of 3 pre-inspections and 6 post-inspections.
- In 2023, the majority of savings were captured with two indoor horticulture facilities accounting for over 64.88% of the program's kWh savings goal.

2.9.3 Program Budget, Savings and Participants

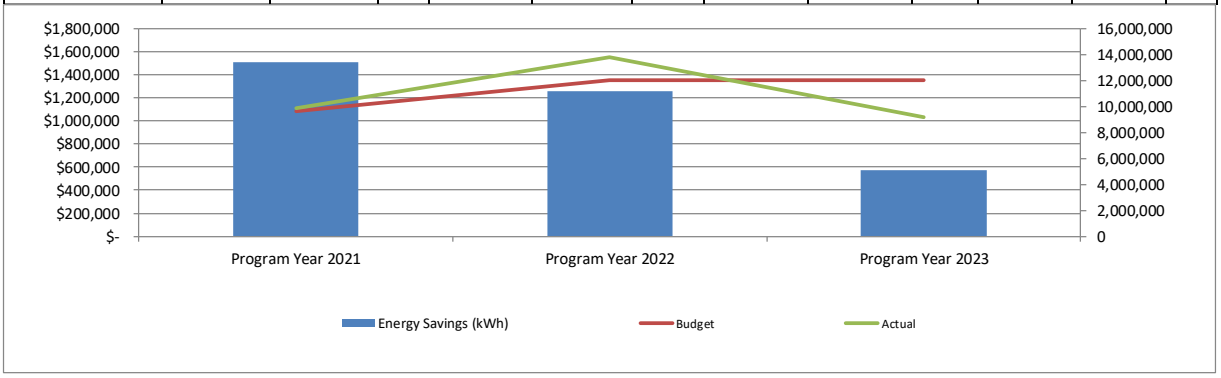
Table 2.9.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.9.3

Agricultural Energy Solutions Program Budget, Savings and Participants

Agricultural Energy Solutions

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 1,084,625	$ 1,110,773	102%	6,397,990	13,425,635	210%	969	2,071	214%	175	28	16%
Program Year 2022	$ 1,352,798	$ 1,552,719	115%	5,998,345	11,142,521	186%	928	2,893	312%	206	15	7%
Program Year 2023	**$ 1,352,798**	**$ 1,033,381**	**76%**	**5,998,345**	**5,111,279**	**85%**	**928**	**1,930**	**208%**	**206**	**6**	**3%**



2.9.4 Description of Participants

Any agricultural customer that receives electric service from the Company is eligible for the Agricultural Energy Solutions Program at its Entergy Arkansas serviced facilities. The following rate codes are eligible:

- Agricultural Pumping (“AP”)
- General Farm Service (“GFS”)
- Small General Service (“SGS”) customers that are classified as an agricultural business and
- Large General Service (“LGS”) customers that are classified as an agricultural business.

For purposes of this program, a participant is defined by a single Federal Tax ID number. Organizations with multiple locations are considered a single participant, regardless of how many Entergy Arkansas account numbers they may have.

2.9.5 Program Challenges and Opportunities

Challenges:

Savings opportunities are available for the agricultural sector, but there are challenges and market barriers to overcome to accomplish these savings. The major challenges associated with the program include:

- The agricultural sector is hard to reach because this sector relies more on a word-of-mouth approach rather than traditional mass marketing.
- Weather conditions impact crop production, which creates financial hardship for the farm. This hardship can cause limited funding for energy efficiency investments.
- The agricultural sector is seasonal and requires precise timing to conduct proper marketing efforts.
- Energy efficiency improvements can be difficult for farmers leasing land. Typically, both the farmer and landowner must agree on energy efficiency improvements. Split decisions can delay or terminate projects. Even with financial incentives, some farmers lack funds to invest in energy efficiency improvements.
- It can be difficult to gain trust in the tight-knit agricultural community.
- Biosecurity procedures are implemented in the poultry market to reduce the risk of transmitting infectious diseases due to outbreaks. Some protocols restrict site access to prevent transmittal of the disease from farm to farm. This can delay our outreach efforts and other field activities such as QA/QC.

Opportunities:

Although there are many challenges, the program implemented strategies to overcome these barriers. Employee experience in agriculture is very important; farmers are more willing to listen and trust someone to whom they can easily relate. These barriers are being overcome by hiring an account manager with a strong agricultural background. The manager accessed the rural communities and gained the customers' trust through successful one-on-one meetings with farmers and the ability to relate to the farmers on a personal level.

Entergy Arkansas also developed solutions for the seasonal marketing barriers associated with

agriculture. Row crop farmers are extremely busy during the planting and harvesting season. Marketing efforts were adjusted accordingly to address this issue. Marketing efforts now focus on row crop farmers during the winter and early spring months, and poultry farmers during the summer and fall months.

EM&V Recommendations:

- Continue to work collaboratively with the EM&V team and seek review of large or unique custom projects.
- Collect heating and cooling documentation when present on-site.
- Clearly define program requirements to determine if retrofit or new construction methodology should be used. If unclear which method should be used, consult the EM&V team to discuss and reach an agreement.
- Define additional measure descriptions to ArchEE, EAL's energy efficiency database, to clarify measure type as the program expands with new measure offerings beyond lighting.
- Monitor the time it takes for incentive checks to be sent.
- Increase internal QA/QC practices.

2.9.6 Planned or Proposed Changes to Program and Budget

The Agricultural Energy Solutions Program will change its net energy savings goal and incentive budget for 2024 to 6,724 MWh and $1,283,568.00 respectively. Additionally, Agricultural Energy Solutions will increase its incentive cap from 75% of incremental or project cost to 100% of incremental or project cost.

2.10 Residential Direct Load Control

2.10.1 Program Description

The Residential Direct Load Control program, referred to as the Summer Advantage Program, is designed to reduce peak electricity demand at the point of use in Entergy Arkansas' service territory. A Digital Control Unit ("DCU") that is installed on or near the customer's outside air conditioning or heat pump unit allows for cycling of the outside unit during peak electricity demand periods reducing electricity usage. The inside fan is allowed to operate normally to circulate cool air while the outside unit is cycled off.

Customers have a choice between 50% cycling and 75% cycling. Customer incentives are based on the customer's choice of 50% cycling or 75% cycling. All Summer Advantage participants will receive two incentive payments: an installation incentive and an annual incentive. Customers who are selected for the M&V program will receive an additional annual incentive based on their participation rate.

- Installation incentive. Upon successful installation of the DCU, the customer receives an installation incentive based on participation rate; those choosing 50% cycling receive $25 and those choosing 75% cycling receive $40.

- Annual incentive. The annual incentive is offered to Summer Advantage customers as recognition for their participation in the program throughout the year. These incentives may be prorated based on the customer's participation during control season. Customers who have full participation at 50% cycling are eligible to receive a total of $25, and those who have full participation at 75% cycling are eligible to receive a total of $40.

Customers who have more than one air conditioner or heat pump will be paid an installation and annual incentive for each outside unit that is installed on the program.

2.10.2 Program Highlights

2023 was a very successful year for the Summer Advantage Program and included the following highlights:

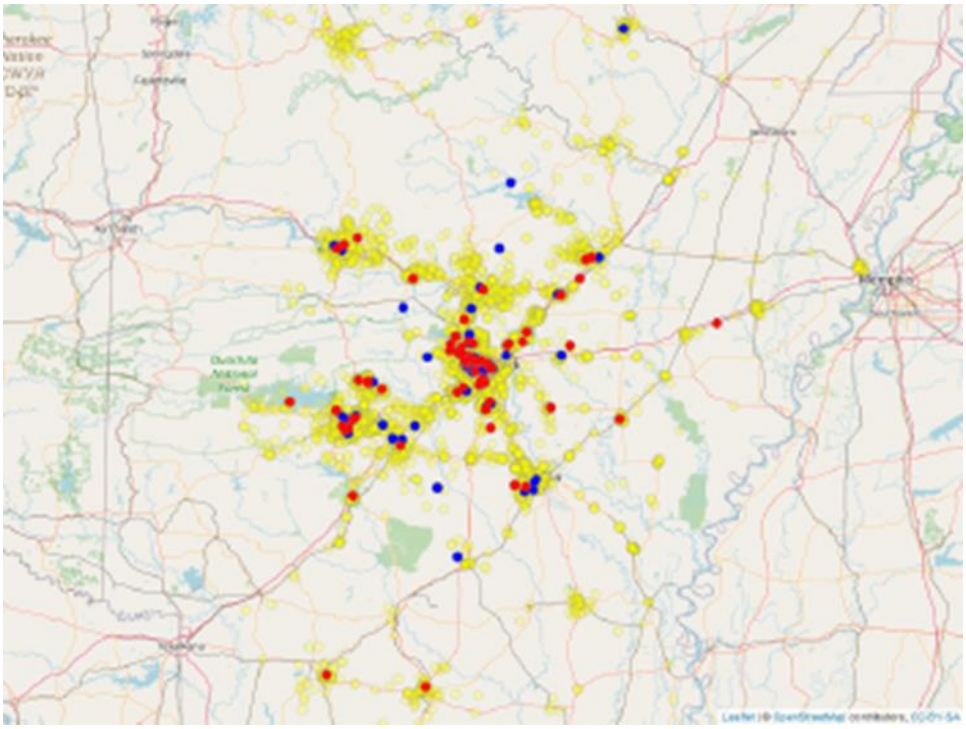
- Demand savings results provided a 15-minute maximum of 18.42 MW of estimated demand response load reduction during control season.
- In the 2023 Summer Advantage Program curtailment season, there were a total of four curtailment events including one test event. The maximum hourly reduction for the Summer Advantage program for the season based on qualifying event hours was 1.28 kW/device. This reduction corresponds to the actual reduction as was obtained from the MISO baseline with weather adjustment method. This leads to 18.42 MW demand response reduction based on the total installed end points of 14,393 throughout the Entergy Arkansas service area.
- Itron LTE CENTRON Meter Monitoring and Verification system provided reliable and accurate kW data. This system combines cellular meter hardware, a proprietary curtailment algorithm, and an Itron Digital Control Unit to provide load reduction data for analysis of energy curtailment events.

Geographical Presence:

Figure 2.10.2 shows a map of the Summer Advantage/ Residential Load Control Program participant area and M&V site locations. Yellow colored circles show the 2023 Summer Advantage population installations, while the red (50% Curtailment strategy) and blue (75% Curtailment Strategy) circles represent the M&V sites.

Figure 2.10.2

Summer Advantage Participants



Independent Evaluator Reports

Key Findings:

- An M&V sample is maintained by Itron, with 118 participants having interval data loggers that provide five-minute readings of equipment kW.
- The M&V sample is structured to represent the program population, and provides the data to calculate savings.
- In PY2023, the Summer Advantage/ Residential Direct Load Control program achieved 18.5 MW in gross demand savings.
- The EM&V team found that the approach to using the M&V sample deployed on direct control units in demand response curtailment calculations is appropriate.
- The evaluated savings using the MISO-based calculations differed slightly from Itron's calculations due to rounding differences in calculating per-device savings. These differences resulted in a realization rate of 100.6%.

EM&V Recommendations:

- Model the effect of weather on demand using a lagged time variable.
    - *Key Finding:* Demand is highly dependent upon the external air temperature, but this dependence is delayed by several hours. Adding a lagged variable to the temperature model could account for this delayed relationship.
    - *Resolution:* Itron is using the contractual MISO baseline adjustment methodology, where the most recent 10 eligible days (non-weekend, non-holiday, and non-event days) are considered for the baseline load. The baseline adjustment approach is calculated by comparing total load usage during events to load usage calculated for a baseline taken from similar days prior to the event. Calculation of the avoided kW for the MISO program using the baseline adjustment methodology involves averaging the 5-minute load data into 15-minute intervals for each device. In the baseline adjustment approach, all sites are curtailed and the load data taken during events (Actual Load) is compared to the baseline data (Adjusted Baseline Load) taken from 10 eligible days prior to the event.

Planned Actions:

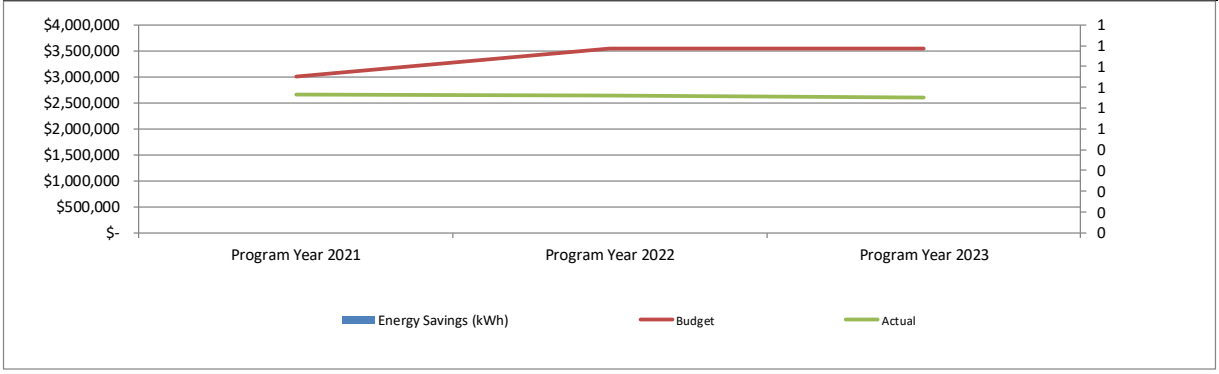
- Customers who are currently enrolled in the Summer Advantage Program will receive a pre-season letter describing the program and providing contact information for enrollment and incentive questions.
- Opt-in letters are sent to new customers that have an existing device installed at their premises with information on how to enroll in the program.

2.10.3 Program Budget, Savings and Participants

Table 2.10.3.1 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.10.3.1 Residential Direct Load Control Program Budget, Savings and Participants

Residential Direct Load Control												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2021	$ 2,996,660	$ 2,655,984	89%	0	0	-	30,536	18,328	60%	18,734	17,455	93%
Program Year 2022	$ 3,547,988	$ 2,643,301	75%	0	0	-	29,009	15,371	53%	17,797	15,685	88%
Program Year 2023	**$ 3,547,988**	**$ 2,595,874**	**73%**	**0**	**0**	**-**	**29,009**	**18,536**	**64%**	**17,797**	**14,393**	**81%**



Program Events & Training:

All Itron field team members are required to complete annual OSHA compliance training.

1. Back Safety and Injury Prevention
2. Bloodborne Pathogens Awareness
3. Electrical Safety
4. HVAC Specific Safety and Regulatory
5. First Aid: Basic
6. Ladder Safety
7. Lockout/Tagout
8. Lockout/Tagout for Authorized Persons
9. NFPA 70E Electrical Safety in the Workplace
10. PPE: Personal Protective Equipment
11. Slips, Trips, and Falls
12. Sprains and Strains
13. Heat Stress Recognition and Prevention

Program Savings:

For the 2023 curtailment season, Entergy Arkansas called a total of four curtailment events including one test event on June 1st. The results are shown in Table 2.10.3.2 below. For this program, the entire M&V population was curtailed. The maximum hourly reduction for the Summer Advantage program for the season based on qualifying event hours was 1.28 kW/device. This reduction corresponds to the actual reduction as was obtained from the MISO baseline with weather adjustment method. This leads to 18.42 MW demand response reduction based on the total installed end points of 14,393 throughout the Entergy Arkansas service area.

Table 2.10.3.2 - Summary of Curtailment Events

Date	Start time (CDT)	End time (CDT)	Itron baseline temperature	EM&V team baseline temperature	Itron weather-adjusted reduction (per-device kW)	EM&V team weather-adjusted reduction
06/01/2023	13:00	14:00	83.4	83.4	0.40	0.41
07/19/2023	13:00	14:00	86.9	87.2	0.98	0.98
07/19/2023	14:00	15:00	87.9	87.6	0.87	0.92
07/27/2023	16:00	17:00	90.7	90.7	1.21	1.23
07/27/2023	17:00	18:00	90.2	90.2	0.96	0.98
08/24/2023	15:00	16:00	93.4	93.5	1.28	1.29
08/24/2023	16:00	17:00	92.6	92.7	1.17	1.17
08/24/2023	17:00	18:00	91.6	91.5	1.04	1.06

2.10.4 Description of Participants

Any Entergy Arkansas residential customer who has a central air conditioner or heat pump in good working condition is eligible to participate in the Summer Advantage Program and is eligible to receive program incentives. Summer Advantage Program participants who request to be removed from the program will no longer be counted as a participant.

2.10.5 Program Challenges and Opportunities

The company is currently exploring options to decommission or upgrade older, obsolete demand response technologies, such as one-way controlled air conditioner switches, to continue transforming demand response programs to include new technologies such as smart thermostats and other new advanced wireless technologies, as they become available.

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2.11 Smart Direct Load Control Pilot

2.11.1 Program Description

The Entergy Arkansas Smart Direct Load Control Pilot Program is designed to reduce peak electricity demand at the point of use in Entergy Arkansas' service territory. The program works to help reduce high-energy demand. Customers can participate by enrolling their existing qualifying smart thermostat, applying for a self-installation or direct installation of a Sensi Touch smart thermostat.

The Smart Direct Load Control Pilot Program participants must meet the following criteria:

- Open to Entergy Arkansas residential and nonresidential customers who have central heating and air conditioning.
- Have an in-home or in-business Wi-Fi service.
- Have an existing Emerson Sensi Touch, Sensi Wi-Fi, Honeywell Lyric T5, T5 plus, T6, T9 and T10 smart thermostat or a thermostat that qualifies for a replacement of a professionally installed Sensi Touch at no additional cost to the customer.
- Are not already enrolled in the Summer Advantage Program. If enrolled, customers must unenroll from the Summer Advantage Program to participate.
- Must have a qualifying HVAC system.

2.11.2 Program Highlights

The Smart Direct Load Control Pilot Program achieved 3,173 gross MWh savings in 2023 with a 100% realization rate and a net-to-gross ratio of 100%; this resulted in 3,182 MWh net energy savings. For the 2023 curtailment season, there were four curtailment events for the total population; this includes a test event on June 1. The curtailment strategies used were temperature rises of up to three degrees and a pre-cool of negative two degrees.

Further event details can be found in figure 2.11.2.1.

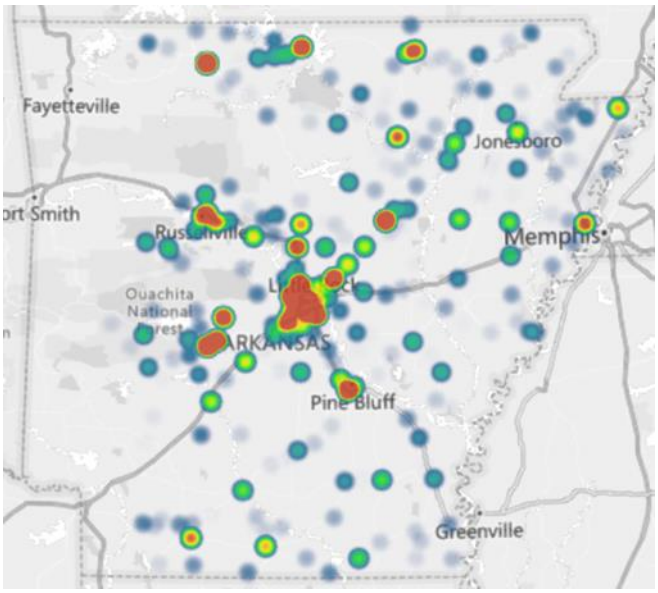
Figure 2.11.2.1

Date	Start time (CST)	End time (CST)	Participating thermostats	Event type
06/01/2023	12:55	15:00	7,215	Test event
07/19/2023	12:55	15:00	7,288	Normal event
07/27/2023	15:55	18:00	7,289	Normal event
08/24/2023	15:55	18:00	7,161	Normal event

- In 2023, the Smart Direct Load Control Pilot Program implemented successful marketing efforts, such as emails, and media campaigns.
- Of the newly enrolled thermostats in 2023, 811 went through the program's field QA/QC process.
- There were 53 M&V devices installed. These devices will be used to validate the load reduction for each conservation event.
- In 2023, 10,124 thermostats were enrolled during the demand response season. This includes enrollments from the 2020 through 2022 program years.

Figure 2.11.2.2 represents new customer participating locations within Entergy Arkansas service territory.

Figure 2.11.2.2



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Program Overview:

The Entergy Arkansas Smart Direct Load Control Pilot allows residential and nonresidential customers who have qualifying thermostats or replacement of a baseline thermostat with a Sensi Touch smart thermostat to enroll. Participants authorize Entergy Arkansas to control the participating equipment (smart thermostat) on days when electricity demand is highest, helping to reduce demand when it counts most. These are known as “conservation periods.”

Customers may enroll by choosing a participating trade ally or by enrolling through the enrollment portal located at the following webpage: entergyarkansas.com/thermostat. Customers that qualify for a no-additional-cost installation receive a professionally installed thermostat, which is a $225 value. In addition to the free thermostat, participating customers can receive an annual enrollment incentive up to $40 for residential customers and up to $100 for business customers. This is a $265-$325 value in the first year of participation.

For those who already have a qualifying Emerson or Honeywell thermostat (Sensi Touch, Sensi Wi-Fi, Honeywell Lyric T5, T5 Plus, T6, T9 or T10), the customer will receive an enrollment incentive of $50 for residential and $100 for non-residential. An additional annual participation incentive will be issued to qualifying customers after the demand response conservation season with incentives up to $40 for residential customers and $100 for business customers.

Conservation periods will occur from June 1 through September 30 on non-holiday weekdays (Monday-Friday), noon to 7 p.m. Central Standard Time. Conservation periods will last approximately four hours in any single day and occur for no more than three consecutive days in any one program season (June to September). Participants may override conservation periods by opting out; overriding conservation periods may reduce annual enrollment incentives.

The annual enrollment incentive is dependent on the number of events in which the customer participated. If the customer’s thermostat is disconnected due to Wi-Fi issues, or if the customer chooses to opt out of a conservation event, this could reduce the annual enrollment incentive amount. Thermostat disconnectivity and conservation period opt outs will be counted as an opt out. Both residential and non-residential customers may opt out one time without a reduction. If a customer opts out two or three times, the residential incentive will decrease to $25 while the non-residential incentive will reduce to $50. If a customer opts out four or more times, residential and non-residential customers will not receive an annual incentive.

2.11.3 Program Budget, Savings and Participants

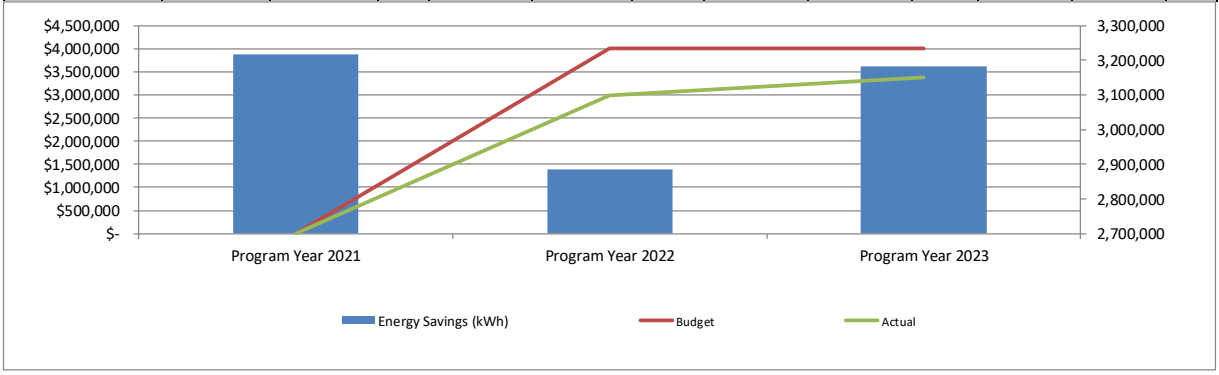
Table 2.11.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket 10-010-U.

Table 2.11.3

Smart Direct Load Control Solutions Budget, Savings and Participants

Smart Direct Load Control Pilot

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	NA	NA	-	4,132,827	3,215,997	78%	19,481	3,238	17%	11,275	2,346	21%
Program Year 2022	$ 4,005,439	$ 2,986,435	75%	4,972,827	2,884,190	58%	27,513	3,868	14%	16,525	3,643	22%
Program Year 2023	**$ 4,005,439**	**$ 3,390,368**	**85%**	**4,972,827**	**3,182,436**	**64%**	**27,513**	**5,942**	**22%**	**16,525**	**1,393**	**8%**



2.11.4 Description of Participants

Customers who have an Entergy Arkansas residential or non-residential account that meet the program eligibility requirements may participate. The program eligibility requirements can be found within the Program Description section.

2.11.5 Program Challenges and Opportunities

The Smart Direct Load Control Pilot Program is an innovative program that allows for several paths to participate. The pilot aims to reduce peak electricity demand while also capturing deemed kWh savings from thermostat installations for both residential and commercial customers. The many paths of participation and thermostat models offered within the program

can create customer confusion. As the pilot progresses, continued refinement to program information will improve the enrollment experience.

M&V devices are vital to confirm load reduction during conservation events. The program experienced hesitancy in 2023 from the participating customer base in allowing M&V device installation. Program improvements such as offering an incentive for M&V device installation may be needed to achieve M&V goals in 2024.

EM&V Recommendations:

- Model the effect of weather on demand using a lagged time variable.

2.11.6 Planned or Proposed Changes to Program and Budget

The program's implementation and incentive budget and MWh savings for 2024 will increase to account for the growth in enrollment.

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2.12 Agricultural Irrigation Load Control Program

2.12.1 Program Description

Entergy Arkansas' Agricultural Irrigation Load Control ("AILC") program is designed in accordance with the conservation and energy efficiency benefits and objectives set forth in the C&EE Rules. The AILC program year 2023 is the fourteenth year of the AILC program plan. The 2023 AILC program awarded cash incentives to eligible participants in return for allowing Entergy Arkansas the right to interrupt their irrigation pump motors during peak times of the day for the summer months. Since 2015, the AILC program has been implemented by an implementing contractor, Connected Energy, that supplies the control equipment, provides the communications modules, arranges and manages cellular service connections, provides the equipment installation and equipment maintenance activities, manages and operates the required software components and conducts all of the AILC program marketing.

Program rebate incentives are paid to AILC program participants based on Table 2.12.1 below:

Table 2.12.1

Agricultural Irrigation Load Control Incentive Structure

Agricultural Irrigation Load Control Incentive Structure	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Tier 7	Tier 8	Tier 9
Motor HP	10-25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	>200
Monthly Incentive*	$50	$100	$200	$250	$350	$450	$550	$650	Upon request
**Incentive void if customer actions interfere with event. Minimum of 64 run-time hours is required during summer months to receive incentive.*									

In addition to cash incentives, the participants receive other benefits such as real-time notifications of the program interruptions and secure internet access to control systems which enable the participant to manage their participating pumps remotely year-round. The following screenshot is representative of the typical information and control systems participants may access. The participant portal first gives an overview of the participant's farm and well locations overlaid with the most current weather radar information. The participant may select any colored well marker to operate the well. Red markers indicate an active irrigation pump and blue markers

indicate pumps which are turned off. Yellow colored markers indicate trouble or inactive accounts with no electric service while green markers indicate the pump is under the control of Entergy Arkansas. Selecting any well marker opens up the control window for the pump with the option to turn an active pump off or an inactive pump on. Load consumption data is also displayed.

Figure 2.12.2

Farmer Secure Portal View 1



26 new pump installations and 375 LTE device conversions were completed in 2023. In addition to the 2023 installations and LTE conversions, Connected Energy maintained and managed over 3,600 previously installed well locations from 2014 through 2023. In 2023, the AILC program was registered for a tenth year as a MISO Load Modifying Resource. The 2023 AILC program demand reduction target was 49.92 MW of curtailment and 1.4 MW firm service level.

2.12.2 Program Highlights

- New Equipment Installations and Conversions: The AILC program executed its 2023 plan of 26 new installations and 375 LTE device conversions.
- Software: Entergy Arkansas successfully executed 5 irrigation load management events in 2023 utilizing the Connected Energy-hosted CNRG-Demand Management and Farmer Portal solutions as the sole operating system.

- Maintenance: Connected Energy completed 212 field maintenance actions to ensure that the overall system performed as required.
- Technology: Connected Energy continued to prioritize 3G device conversions over to the Verizon LTE wireless communication network during all new installation, conversion, and maintenance activities during 2023 due to the termination of the Verizon 3G network on December 31, 2022.

2.12.3 Program Budget, Savings and Participants

Table 2.12.3 is the program budget, annual energy savings and number of participants from Workbook Table 5 as required by the C&EE Rules, Section 9: Annual Reporting Requirements and Order No. 16 in Docket No. 10-010-U.

Table 2.12.3

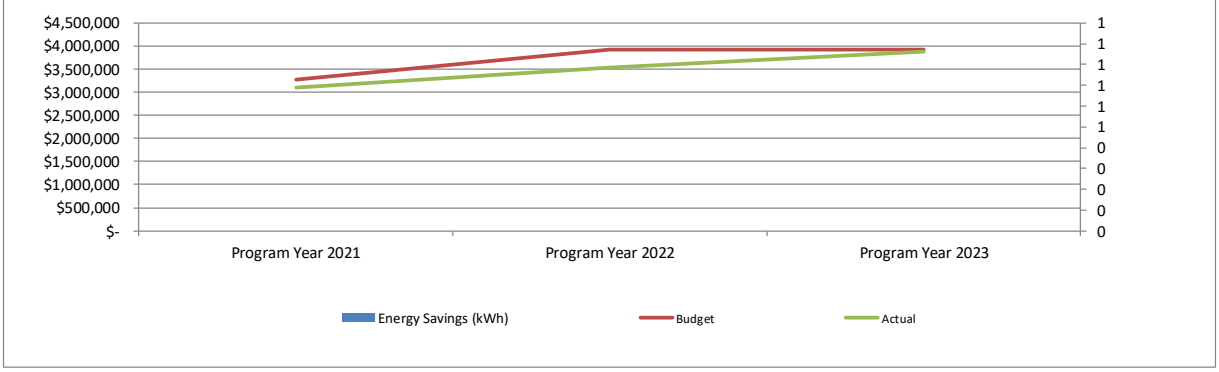
Agricultural Irrigation Load Control Program Budget, Energy Savings and Participants

Main Menu | Table 5 | << Back

Agricultural Irrigation Load Control — *Select program from dropdown menu to view details.*

Agricultural Irrigation Load Control

	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	**Budget**	**Actual**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Evaluated**	**%**	**Plan**	**Actual**	**%**
Program Year 2021	$ 3,272,606	$ 3,096,751	95%	0	0	-	44,132	22,320	51%	1,654	1,166	70%
Program Year 2022	$ 3,918,060	$ 3,541,018	90%	0	0	-	49,922	21,795	44%	1,871	1,857	99%
Program Year 2023	**$ 3,918,060**	**$ 3,869,623**	**99%**	**0**	**0**	-	**49,922**	**17,711**	**35%**	**1,871**	**1,605**	**86%**



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Program Events & Training:

- AILC device installation and maintenance training was provided to our installation subcontractors on April 4, 2023 and April 5, 2023. Training included the review and reinforcement of all AILC device installation processes supporting new and legacy technology including a review of required PPE, wiring diagrams, mounting, wire termination, phase angle determination, CT orientation, reporting, site cleanup, Center for Disease Control recommended COVID-19 guidelines, and electrical & environmental safety.

Program Savings:

There were no deemed savings in this program because it is a load control program. On July 31, 2023, a peak load of 23.22 MW was available on the system for curtailment.

On July 27, 2023, an evaluated interrupted load of 18.593 MW was curtailed with 917 wells reporting as curtailable with 99.7% (total base of 920 wells) successfully reporting curtailments. All results were verified by an independent third party who used actual 15-minute interval data from each account with equipment installed to interrupt the loads. The MISO baseline methodology in BPM 26 for SMA continued to be utilized for 2023 evaluations.

In PY 2023, the AILC program responded to five load control events totaling 14 curtailment hours. The first of the events was a test event (June 1), used to verify equipment operability and verify M&V data collections, while the other 4 events occurring on July 19, July 27, August 3, and August 24 were used to reduce loads during the event hour. The June 1 event duration was one hour in duration, the July 19 event was 3hours in duration, the July 27 event was 2 hours in duration, and the August 3 and August 24 events both lasted 4 hours. The data collected by the metering equipment allowed each participant to have their load metered in a 15-minute interval for the entire load-control season, providing highly granular data to support program baseline and event savings calculations.[23]

[23] PY2023 Agricultural Irrigation Load Control Program Impact Evaluation Results, Evaluation Report, Tetra Tech, 18 April 2023, p. 316.

2.12.4 Description of Participants

A participant is an Entergy Arkansas agricultural irrigation pumping account that is receiving AILC program rebate incentives as a result of being an active participating account controlled by Entergy Arkansas during an event. Program marketing and enrollment is primarily executed via direct mail with an Entergy Arkansas retiree following up with a call. Other marketing channels included social media posts on Facebook and Twitter and farmer referrals.

2.12.5 Program Challenges and Opportunities

- Severe Arkansas weather including 2 tornados and several high yield rain events reduced available system load during 2023 while increasing needs for field maintenance support by 38% (post restoration).
- Existing program participants, or “First Chance” farmers, made up the majority of new AILC program enrollment requests in 2023.
- AILC program participants misplace or delay depositing seasonal incentive checks beyond the 90-Day timeframe after which the checks may become void and must be reissued. Entergy Arkansas will update the program T&C in 2024 for the disposition of uncashed AILC incentive checks.

Program Outlook for Continuation, Expansion, Reduction or Termination:

2024 recruiting: New AILC program recruiting will see increased activity during early 2024 with 300 new installations planned. Connected Energy will continue to support new pump enrollments from existing program participants and the prioritization of larger motor well pump locations maximize the total load potential contributing to the AILC program.

2.12.6 Planned or Proposed Changes to Program and Budget

- Continued enhancements to event and program reporting as requested.

2.13 Energy Efficiency Arkansas

- The Energy Efficiency Arkansas ("EEA") Program's objective is to cost-effectively deliver relevant, consistent, and fuel neutral information and training that causes people to consume less energy through energy efficiency and conservation measures. By leveraging the knowledge, experience, and skills of the Arkansas Energy Office and the combined resources of the undersigned utilities, the EEA Program will be able to deliver that information and training in the most cost-effective manner as required for statewide energy efficiency.
- Orders No. 65 and 62 in Docket Nos. 13-002-U and 07-083-TF respectively, granted the Arkansas Energy Office request to terminate the EEA Comprehensive Program no later than December 31, 2023. AEO intends to independently administer a separate and independent suite of energy education and training programs, similar to the EEA. The AEO will administer the expanded suite of programs with state and federal funding and will no longer need funding from the Arkansas utilities. No additional funding was administered for the program after December 31, 2023.
- For more information about this program please see the EEA report as filed by the Arkansas Energy Office on May 1, 2024 in Docket No. 07-083-TF.

3.0 Supplemental Requirements

3.1 Staffing

The 2023 programs had five full-time staff members, one of whom is an Energy Efficiency program manager, plus one full-time employee to assist in marketing and communications coordination, two part-time contract employees to assist in administrative and analysis activities, and three part-time contract employees to assist in quality assurance and control. The certifications, education and experience of the Entergy Arkansas staff makes for a strong team. Of the five full-time staffers, two are degreed engineers. Combined, the staff brings knowledge and experience in customer service, market planning, product development, construction and transmission project experience, transmission planning, accounting, regulatory affairs, and community and economic development. Three staff members have Association of Energy Engineers Business Energy Professional certification, one staff member has an Association of Energy Engineers Energy Efficiency Practitioner Professional certification, and another is an Association of Energy Engineers Certified Energy Manager. The staff also includes a certified energy auditor. Two staff members hold the Building Performance Institute's Business Analyst certifications. One staff member has a Master's degree in the area of business, and one has an accounting degree. The utility also leveraged many other non-incremental employees to promote the programs, provide benefit cost analysis, regulatory and legal support, back-office billing and contractor recruitment for the irrigation load control program.

None of the non-incremental employees used more than 50% of their annual man-hours supporting the programs.

3.2 Stakeholder Activities

Entergy Arkansas is involved in all of the Commission-ordered stakeholder processes. Entergy Arkansas considers stakeholders to be customers, trade allies, and state agencies that provide informative feedback to enhance program delivery and acceptance. Further, all training activities provide opportunities for the collaborative exchange of ideas and enhancements. Those training sessions can be found below, as well as in the 2023 SARP tabular report.

EXTERNAL TRAININGS

Event No.	Start Date	Class
1.	1/1/2023	AC and HP high performance tune up
2.	1/1/2023	Smart DLC training
3.	1/1/2023	HVAC for non technical employees
4.	1/5/2023	Trade Ally Training
5.	1/11/2023	BPI Energy Modeling and Workscope
6.	1/12/2023	Advance Building Assessment & Retrofit Strategies
7.	1/12/2023	2023 Q1 Information security
8.	1/18/2023	AEE Chapter Meeting
9.	1/27/2023	BPI Review session
10.	1/31/2023	New TA Training
11.	2/1/2023	US Trade compliance
12.	2/3/2023	BPI Review session
13.	2/6/2023	Trade Ally Training
14.	2/10/2023	BPI Review session
15.	2/14/2023	Trade Ally Training
16.	2/15/2023	AEE Chapter Meeting
17.	2/15/2023	Defensive Driving
18.	2/17/2023	BPI Review session
19.	2/23/2023	Trade Ally Summit 2023
20.	2/24/2023	BPI Review session
21.	2/24/2023	Trade Ally Training
22.	2/28/2023	AESP
23.	2/28/2023	Trade Ally Training
24.	3/1/2023	Trade Ally Training
25.	3/1/2023	Trade Ally Training
26.	3/3/2023	BPI Review session
27.	3/3/2023	TA projects review
28.	3/6/2023	Trade Ally Training
29.	3/7/2023	BPI Practice test review
30.	3/8/2023	TA projects review
31.	3/8/2023	Trade Ally Training
32.	3/9/2023	TA projects review
33.	3/10/2023	BPI Practice test review
34.	3/14/2023	TA Inspection
35.	3/14/2023	Trade Ally Training
36.	3/14/2023	BPI Testing
37.	3/15/2023	ACTU Training
38.	3/15/2023	AEE Chapter Meeting

39.	3/16/2023	Trade Ally Training
40.	3/29/2023	Customer service training
41.	3/29/2023	Trade Ally Training
42.	4/4/2023	AILC Field Operations - Device Installation, maintenance, troubleshooting, safety
43.	4/5/2023	Management Fundamentals
44.	4/5/2023	AILC Field Operations - Device Installation, maintenance, troubleshooting, safety
45.	4/10/2023	2023 Q2 Information security
46.	4/10/2023	NREL
47.	4/12/2023	Trade Ally Training
48.	4/12/2023	Management Fundamentals
49.	4/13/2023	Compressed Air Best Practices
50.	4/18/2023	Trade Ally Training
51.	4/19/2023	Trade Ally Training
52.	4/19/2023	AEE Chapter Meeting
53.	4/19/2023	Management Fundamentals
54.	4/21/2023	Trade Ally Training
55.	4/24/2023	General Contractor Code
56.	4/25/2023	Energy Auditing for Building Success
57.	4/25/2023	General Contractor code
58.	4/26/2023	Trade Ally Training
59.	4/26/2023	Management Fundamentals
60.	5/1/2023	Trade Ally Training
61.	5/2/2023	Trade Ally Training
62.	5/3/2023	Trade Ally Training
63.	5/3/2023	Management Fundamentals
64.	5/4/2023	Trade Ally Training
65.	5/8/2023	47th PLMA Conference
66.	5/9/2023	TA projects review
67.	5/10/2023	Management Fundamentals
68.	5/16/2023	TA projects review
69.	5/17/2023	Management Fundamentals
70.	5/17/2023	BPI Training
71.	5/26/2023	Trade Ally Training
72.	6/1/2023	Customer service training
73.	6/1/2023	SLM ACTU training
74.	6/1/2023	SLM Training
75.	6/1/2023	Duct sealing best practices
76.	6/1/2023	Air sealing best practices
77.	6/7/2023	Trade Ally Training
78.	6/9/2023	Trade Ally Training
79.	6/13/2023	NEUAC Conference
80.	6/14/2023	Trade Ally Training
81.	6/21/2023	Planters Cotton Oil Mill EE education booth

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82.	6/21/2023	Trade Ally Training
83.	6/21/2023	AEE Chapter Meeting
84.	6/23/2023	Customer service training
85.	6/23/2023	SEACAC
86.	6/26/2023	SEACAC
87.	6/26/2023	Trade Ally Training
88.	6/27/2023	SEACAC
89.	6/29/2023	SEACAC
90.	6/29/2023	SEACAC
91.	6/29/2023	Molex Employee Appreciation Day
92.	7/5/2023	Trade Ally Training
93.	7/6/2023	Trade Ally Training
94.	7/13/2023	Trade Ally Training
95.	7/15/2023	Protecting human rights
96.	7/15/2023	2023 Q3 Information security
97.	7/17/2023	Energy Forum
98.	7/19/2023	AEE Chapter Meeting
99.	7/24/2023	Trade Ally Training
100.	7/29/2023	Beacon Tier 2 training
101.	7/31/2023	SLM ACTU training
102.	8/3/2023	Trade Ally Training
103.	8/7/2023	TA Inspection
104.	8/7/2023	Trade Ally Training
105.	8/10/2023	JREC presentation
106.	8/10/2023	Trade Ally Meeting
107.	8/16/2023	Trade Ally Training
108.	8/16/2023	Trade Ally Training
109.	8/23/2023	Management Fundamentals
110.	8/31/2023	Trade Ally Training
111.	9/13/2023	Trade Ally Training
112.	9/19/2023	Alliance to Save Energy
113.	9/20/2023	Trade Ally Training
114.	9/20/2023	AEE Chapter Meeting
115.	9/21/2023	Trade Ally Meeting
116.	9/25/2023	Trade Ally Meeting
117.	9/26/2023	Trade Ally Meeting
118.	9/27/2023	Customer service training
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120.	10/2/2023	Global code of conduct 2023
121.	10/3/2023	Trade Ally Training
122.	10/5/2023	Trade Ally Training
123.	10/9/2023	Weatherization/LIHEAP Conference
124.	10/12/2023	Trade Ally Meeting
125.	10/16/2023	2023 Q4 Information security

126.	10/23/2023	Trade Ally Training
127.	10/25/2023	2023 AILC Lessons Learned Meeting
128.	10/27/2023	Trade Ally Training
129.	11/1/2023	AAEE Energy Summit
130.	11/1/2023	AAEE Energy Summit
131.	11/1/2023	AEE/ASHRAE Summit
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133.	11/1/2023	AEE/ASHRAE Summit
134.	11/1/2023	AEE/ASHRAE Summit
135.	11/1/2023	AEE/ASHRAE Summit
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139.	11/1/2023	AEE/ASHRAE Summit
140.	11/1/2023	AEE/ASHRAE Summit
141.	11/13/2023	PMVA Class
142.	11/14/2023	Arkansas Apprentiship Summit
143.	11/15/2023	Trade Ally Training
144.	11/28/2023	Trade Ally Training
145.	11/29/2023	Customer service training
146.	11/30/2023	Trade Ally Training
147.	12/5/2023	Act 1102 training webinar
148.	12/12/2023	Trade Ally Training
149.	12/13/2023	TA Inspection
150.	12/20/2023	Insulation best practices
TOTAL: 150 Trainings		

INTERNAL TRAININGS

Event No.	Start Date	Class
Event No.	**Start Date**	**Class**
1.	1/12/2023	IRA funding training
2.	1/15/2023	Entergy Security 101 - Introduction to Security
3.	1/26/2023	Industrial Gas-Fired Systems - Part 1
4.	1/27/2023	Overview of Purchasing in Maximo Part 1 CBT
5.	2/9/2023	Industrial Gas-Fired Systems - Part 2
6.	2/10/2023	Course Code Payment Request Form WBT FIN
7.	2/15/2023	Forecasting Energy Savings
8.	2/17/2023	Entergy's Form I-9 Training
9.	2/21/2023	Data Access and Security

10.	2/23/2023	Managing High Workloads
11.	3/9/2023	Building Electrification
12.	3/23/2023	Presentation Skills Roundtable
13.	4/5/2023	EM&V training
14.	4/6/2023	Cascade Ammonia Cooling
15.	4/17/2023	BPA annual conference and trade show
16.	4/20/2023	Climate Science and Policy 101
17.	5/1/2023	Arkansas Affiliate Transaction Rules Self Study Materials
18.	5/4/2023	Utilizing AI in Energy Efficiency
19.	5/4/2023	Measurement and Verification Standards and Certifications
20.	5/18/2023	Energy Efficiency in Petroleum Refineries
21.	5/25/2023	IRA funding training
22.	5/30/2023	Code of Entegrity Process
23.	5/30/2023	Managing Entergy Records
24.	5/31/2023	Advanced Energy Professional Apprentacship
25.	5/31/2023	Protection of Information
26.	5/31/2023	Incident Response 101
27.	5/31/2023	Workplace Violence Prevention and Active Shooter Awareness
28.	6/4/2023	Energy Workforce Apprentice Program
29.	6/15/2023	IRA funding training
30.	6/15/2023	Sustainable Agriculture and Decarbonization
31.	6/19/2023	Path to Premier Learning Map Experience
32.	6/29/2023	PowerBI for Engineering
33.	7/20/2023	Engine Block Preheating with Heat Pumps
34.	7/23/2023	FERC Standards of Conduct and Affiliate Restrictions Training
35.	8/3/2023	Custom Project Show and Tell: Oil and Gas Edition
36.	8/7/2023	DDI - Communication - Connect Through Conversations
37.	8/8/2023	DDI - Letting Go and Delegating More
38.	8/8/2023	SAFETY LEADERSHIP
39.	8/8/2023	DDI - Developing Individual Team Members
40.	8/9/2023	DDI - Prioritizing and Productivity
41.	8/9/2023	RISKS AND DECISIONS
42.	8/9/2023	DDI - Embracing Change - Yourself and Others
43.	8/10/2023	FOUNDATION LEADERSHIP PROGRAM
44.	8/10/2023	FOUNDATION LEADERSHIP PROGRAM 3 WEEK
45.	8/10/2023	Foundation Leadership Program
46.	8/12/2023	TALENT AND PERFORMANCE MANAGEMENT
47.	8/17/2023	Germicidal Ultraviolet Systems for Healthier and More Energy Efficient Buildings
48.	8/31/2023	Integrating Solar Projects into Efficiency Programs
49.	9/19/2023	Assesing Home Energy Score Training
50.	9/21/2023	Engineering Ethics
51.	9/28/2023	IRA tax credit training
52.	10/4/2023	Insider Threat Awareness

53.	10/5/2023	Phasing out Natural Gas Energy Efficiency Measures: Challenges and Implications
54.	10/17/2023	Accelerated Electric Vehicl Adaptation
55.	10/19/2023	ASHRAE 90.4 and New Construction Data Centers
56.	10/31/2023	Logistics 101
57.	11/2/2023	Data Analysis of Heat Pump Water Heaters
58.	11/5/2023	One Card Program Business Travel & Expenses
59.	11/5/2023	Email Security
60.	11/7/2023	Learning Map Session
61.	11/17/2023	Demand Response Principles and Programs
62.	12/5/2023	Act 1102 training webinar
Total: 62 Trainings		

3.3 Information Provided to Consumers to Promote Energy Efficiency

See Appendix D.

Appendix A: EM&V Report

Appendix D: Marketing Collateral

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ENTERGY ARKANSAS, LLC

Arkansas Energy Efficiency

Program Portfolio Annual Report

Docket No. 07-085-TF

2023 BRIDGE YEAR

May 1, 2024

Appendix A

EM&V Report for Entergy Arkansas, LLC Annual Report



Arkansas, LLC

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Evaluation Report—Bridge Year 2023



TETRA TECH

May 1, 2024

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ACKNOWLEDGEMENTS

We want to acknowledge the many individuals who contributed to the evaluation, measurement, and verification (EM&V) of the bridge year 2023. This evaluation effort would not have been possible without their assistance and support.

Entergy Arkansas, LLC (EAL) staff participated in ongoing evaluation deliverable reviews and discussions, attended multiple meetings, and responded to follow-up questions and program data and documentation requests. EAL staff included Sharnelle Allen, Santiago Asimbaya, Beau Blankenship, Heather Hendrickson, and Denice Jeter. The Independent Evaluation Monitor (IEM), led by Dr. Katherine Johnson, also provided input and guidance throughout the evaluation process. We also wish to thank implementation contractor staff at CLEAResult, ICF Consulting, Itron, and Connected Energy, who provided program data and documentation and insight into program implementation. CGI's team overseeing EAL's data-tracking system provided assistance throughout the year in understanding data extracts from EAL's program tracking system. It provided high-quality data that was user-friendly and readily available to the EM&V team.

EM&V team primary report contributors include:

Firm	Contributor	Role
Tetra Tech	Lark Lee	Project director and technical reviewer
	Jonathan Hoechst	Project manager, demand response and non-energy benefits lead
	Kendra Mueller	Commercial sector lead
	Katie Jakober	Residential sector lead
	Carrie Koenig and Jessica Hirsch	Process and net-to-gross leads
	Holly Farah, Nathan Kwan, Mohammad Qandil, and Andrew Spista	Program leads
	Theresa Wells and Graham Thorbrogger	Data analysis and reporting

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ACRONYMS/ABBREVIATIONS

Acronym/abbreviation	Term
AEE	Association of Energy Engineers
AC	Air conditioner
ADRC	Avoided and deferred replacement cost
AER	Automatic engineering review
AES	Agricultural Energy Solutions
AOH	Annual operating hours
AILC	Agricultural Irrigation Load Control
APSC	Arkansas Public Service Commission
ArchEE	Entergy Arkansas Energy Efficiency Tracking System
BR	Bulged reflector
BY	Bridge year
C&EE	Conservation and energy efficiency
C&I	Commercial and industrial
CEE	Consortium for Energy Efficiency
CF	Coincidence factor
CCFL	Cold cathode fluorescent lamp (bulb)
CFL	Compact fluorescent lamp (bulb)
CFM	Cubic feet per minute
CPM	Computer power management
DCU	Digital control unit
DI	Direct install
DLC	DesignLights Consortium
EAL	Entergy Arkansas, LLC
ECM	Electronically-commutated motor
EER	Energy efficiency ratio
EFLH	Equivalent full-load hours
EISA	Energy Independence and Security Act
EL	Efficiency loss
EM&V	Evaluation, measurement, and verification
ESCO	Energy service company
GPM	Gallons per minute
HDD	Heating degree days
HEC	Home Energy consultants

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Acronym/abbreviation	Term
HES	Home Energy Solutions
HID	High-intensity discharge
HOU	Hours of use
HP	Heat pump
HSPF	Heating seasonal performance factor
HVAC	Heating, ventilation, and air conditioning
IEF	Interactive effects factor
IEM	Independent Evaluation Monitor
IEER	Integrated Energy Efficiency Ratio
IPLV	Integrated part-load value
IPMVP	International Performance Measurement and Verification Protocol
ISR	In-service rate
IT	Information technology
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light-emitting diode
LFL	Linear fluorescent lamp
LMR	Load modifying resource
LPD	Lighting power density
M&V	Measurement and verification
MR	Multifaceted reflector
NC	New construction
NEB	Non-energy benefit
MISO	Midcontinent Independent System Operator
MW	Megawatt
MWh	Megawatt-hour
NPV	Net present value
NTG	Net-to-gross
PAC	Program administrator cost
PAR	Parabolic aluminized reflector
PCT	Participant cost test
PG&E	Pacific Gas & Electric
PSE	Puget Sound Energy
PSI	Pounds per square inch

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Acronym/abbreviation	Term
PSIG	Pounds per square inch in gauge
PTAC	Packaged Terminal Air Conditioners
PTHP	Packaged Terminal Heat Pumps
PY	Program year
QA	Quality assurance
QC	Quality control
QMP	Quality management process
RCA	Refrigerant charge adjustment
Res DLC	Residential Direct Load Control
RIM	Ratepayer impact measure
RLA	Residential Lighting and Appliances
ROB	Replace-on-burnout
SDLC	Smart Direct Load Control
SEER	Seasonal energy efficiency ratio
SMA	Symmetric multiplicative adjustment
TMY	Typical meteorological year
TRM	Technical reference manual
VFD	Variable frequency drive

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1.0 EXECUTIVE SUMMARY

In bridge year (BY) 2023 (BY2023), Entergy Arkansas, LLC (EAL) provided a comprehensive range of customer options focused on energy efficiency and demand reduction coupled with education and training activities through 11 energy efficiency programs and 1 pilot. EAL designed its portfolio to meet the following objectives:

- achieve the net energy-savings target of 285,148 megawatt-hours (MWh) and demand reduction target of 162 megawatts (MW)[1];
- provide significant energy-savings opportunities for all customers and market segments, including low-income and senior customer segments as outlined in Act 1102, resulting in broad ratepayer benefits;
- meet comprehensiveness in seven areas (i.e., comprehensiveness factors) defined by the Arkansas Public Service Commission (APSC)[2]; and
- deliver the consistent weatherization approach (CWA) through its residential programs.

EAL selected an independent, third-party evaluation contractor under APSC Rules for Conservation and Energy Efficiency Programs (C&EE Rules). EAL selected Tetra Tech as its evaluation, measurement, and verification (EM&V) contractor. The BY2023 EAL evaluation included impact and process analyses specified in the APSC rules and follows the Arkansas Technical Reference Manual (TRM) Version 9.1 (TRM 9.1) Volume 1 protocols and savings algorithms. Figure 1 highlights the primary evaluation activities. The independent evaluation monitor (IEM) reviews and provides feedback on Tetra Tech's evaluation plans.

Deviations from the evaluation plan. The BY2023 Evaluation Plan[3] included up to 365 desk reviews, 85 on-sites, and census meter analysis for three demand response programs for impact evaluation activities. The EM&V team completed 328 desk reviews, 78 on-sites, and 34 commercial project meter analyses in addition to the three demand response programs census analysis. Metered data analysis is included as an optional task for commercial evaluation plans if determined to be needed for custom projects. In BY2023, the EM&V team completed 26 custom project-level meter analyses for Large C&I Solutions and 8 for Public Institutions Solutions. Agricultural Energy Solutions (AES) only conducted two desk reviews and two on-site ride-alongs in BY2023 instead of the planned estimate of 10 desk reviews and five on-sites because there were only six customers who participated in the AES program, with two horticulture participants making up over 75 percent of the reported energy savings. Those two horticulture participants were the focus of the desk reviews and on-site ride-alongs, given they comprised the majority of the program savings. The EM&V team refined the target completes throughout the evaluation period during sampling based on the results' confidence and precision. For each program, the EM&V team's impact results achieved better than the industry standard of 90 percent confidence ±10 percent (the reader is referred to the Technical Appendix

[1] The APSC approved EAL's 2020–2022 Energy Efficiency Plan in response to Commission Order No. 41 in Docket No. 13-002-U; the request for a Bridge Year in 2023, using Program Year 2022 goals, budgets, and incentive structures, was approved by the APSC in Commission Order No. 62.
[2] As defined by the APSC in the C&EE Rules of Order No. 17 in Docket 08-144-U.
[3] Entergy Arkansas, LLC Program Year 2023 Evaluation Plan, Tetra Tech, August 2023.

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for precision calculations by program). The four downstream residential programs had participant surveys completed. A total of 170 participant surveys were planned to support those efforts, and the EM&V team completed 193 surveys to increase representation across different measures.

Figure 1. Highlights of the BY2023 Evaluation Activities



The impact evaluation resulted in defensible lifetime and annual gross and net energy and demand estimates. Impact evaluations were used to calculate realization rates; these rates are determined by dividing evaluated savings (ex-post) by EAL-reported savings (ex-ante savings). A net-to-gross (NTG) ratio was applied to the evaluated savings to determine the net evaluated or achieved savings. The overarching approach to impact evaluations was to:

- complete a tracking system review to assess if TRM 9.1 is correctly applied to calculate savings[4] and assess data captured for new or expanded measure offerings;
- adjust program-reported gross savings using the results of evaluation research, relying primarily on the tracking system and engineering desk reviews, metered data analysis, and on-site or independent verification;
- discuss evaluation adjustments for TRM deemed savings or custom measures in each program-level impact section, and document reasons for adjustments and how they directly inform impact recommendations;
- achieve a minimum precision of ±10 percent of the gross realized savings estimate with 90 percent confidence;
- update program NTG values with primary or secondary data research for every program once over the PY2020–BY2023 program cycle, as well as review and adjust NTG ratios annually for any changes in the program design or measure mix;

[4] Tracking system review realization rates provided in program-level detailed results are very close to or 100 percent. The EM&V team completes an interim census tracking system review mid-program-year to facilitate adjustment in savings calculations as needed. This proactive review supports corrections being made prior to final tracking data and supports healthier realization rates at the end of the program year.

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- provide complete documentation and transparency of all evaluated savings estimates[5];
- provide ongoing technical reviews and guidance to implementers and EAL upfront;
- calculate portfolio non-energy benefits (NEB); and
- conduct EM&V research to inform possible updates for the next version of the TRM.

The approach to the process evaluation was to:

- gain an in-depth understanding of program operations, challenges, and evaluation needs through interviews with EAL and implementation contractor key staff at both the beginning and end of the evaluation cycle, complemented with communication and program documentation reviews throughout the program year, including biweekly implementation contractor status meetings;
- conduct a comprehensive process evaluation for every program once over the three-year PY2020–BY2023 program cycle and assess other process evaluation needs annually;
- document EAL's progress in incorporating recommendations identified during the prior year's evaluation; and
- update the assessment of EAL's success in achieving the goals and objectives established in the APSC's Comprehensiveness Checklist.

Table 1 provides a summary of EM&V activities by each program in the BY2023 portfolio.

Table 1. Summary of Evaluation, Measurement, and Verification Activities for EAL BY2023 Programs

Program	NTG approach	Process evaluation activities	Gross impact evaluation completes			
			Tracking system review	Desk reviews	On-site M&V or independent verification	Metered data analysis[6]
Home Energy Solutions	BY2023 EM&V research—participant surveys	Program staff interviews (1) Materials review Participant surveys (72) Update Act 1102 Update NTG	Census	50	10	None

[5] For detailed desk review and on-site results, the reader is referred to the Technical Appendix to this report.
[6] This column refers to EAL customer metered data provided to the EM&V team as opposed to primary metered data collected as part of the on-site measurement and verification (M&V).

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Program	NTG approach	Process evaluation activities	Gross impact evaluation completes			
			Tracking system review	Desk reviews	On-site M&V or independent verification	Metered data analysis[6]
Energy Solutions for Multifamily	PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (50) Update Act 1102	Census	31	6	None
Energy Solutions for Manufactured Homes	PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (30) Update Act 1102	Census	20	5	None
Low-Income Solutions	PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (41) Update Act 1102	Census	31	5	None
Point of Purchase Solutions	PY2021 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	100	None	None
Large Commercial & Industrial Solutions	PY2022 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Early engagement reviews (19)	Census	70	30	26
Small Business Solutions	PY2022 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	25	10	None

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Program	NTG approach	Process evaluation activities	Gross impact evaluation completes			
			Tracking system review	Desk reviews	On-site M&V or independent verification	Metered data analysis[6]
Public Institutions Solutions	PY2022 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	30	15	8
Agricultural Energy Solutions	PY2022 EM&V research—participant surveys	Program staff interviews (2) Materials review	Census	2	2 (ride alongs)	None
Residential Direct Load Control	Stipulated at 1.0 as industry practice	Program staff interviews (2) Materials review	Census	None	None	Census
Smart Direct Load Control Pilot	PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	None	None	Census
Agricultural Irrigation Load Control	Stipulated at 1.0 as industry practice	Program staff interviews (2) Materials review	N/A	N/A	N/A	Census

1.1 KEY FINDINGS AND RECOMMENDATIONS

EAL met its portfolio energy goals, achieving 99 percent of its filed goal, but over 100 percent of APSC targets. This is the first year this program cycle that EAL did not exceed its filed goal, which can be partially attributed to the transition from lighting as well as inflationary pressures reported in program staff interviews as a challenge. EAL again fell short of its demand goals, meeting 55 percent of the portfolio demand goal. The performance difference between energy savings and demand goals is similar to the last few years; the demand reduction shortfall is driven primarily by the demand response programs not meeting their planning demand reductions as well as some of the energy efficiency programs' performance against planned demand reductions, discussed below. Investigations into better-aligning energy savings and demand savings in the next program plan continue per a recommendation from prior evaluations. (The EM&V team has conducted a measure-level analysis that provides additional insight into the kilowatt-hour and kilowatt performance differences.) An overarching theme from program design and delivery staff interviews is that the cost of energy efficiency is increasing as baselines are increasing (e.g., the recent impact on lighting) and persistent inflationary pressures are also affecting project costs and customer decision-making.

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Individual program performance relative to program savings and demand goals varied. Four of the ten programs[7] achieved or exceeded their megawatt-hour savings goals. Six programs did not reach their energy savings goals; these six programs ranged between 64 percent and 95 percent of energy savings goals. Three of 12 programs achieved their megawatt goals; one program met 90 percent or more of the demand savings goal; and eight met less than 90 percent of the demand savings goal. The performance of EAL's overall portfolio achieved 99 percent of goal savings.

The Smart Direct Load Control pilot continues to struggle to gain momentum, meeting 64 percent of its energy savings and 22 percent of its demand reduction goals. Residential program performance against the energy savings goal was stronger, with Energy Solutions for Multifamily Homes achieving 90 percent of its goal and all the other residential programs meeting or exceeding energy savings goals. In contrast, none of the downstream commercial programs met planned goals. The Agricultural Energy Solutions program continues to be the highest performer across demand reductions relative to goal as the program has seen large new construction horticulture projects in recent years.

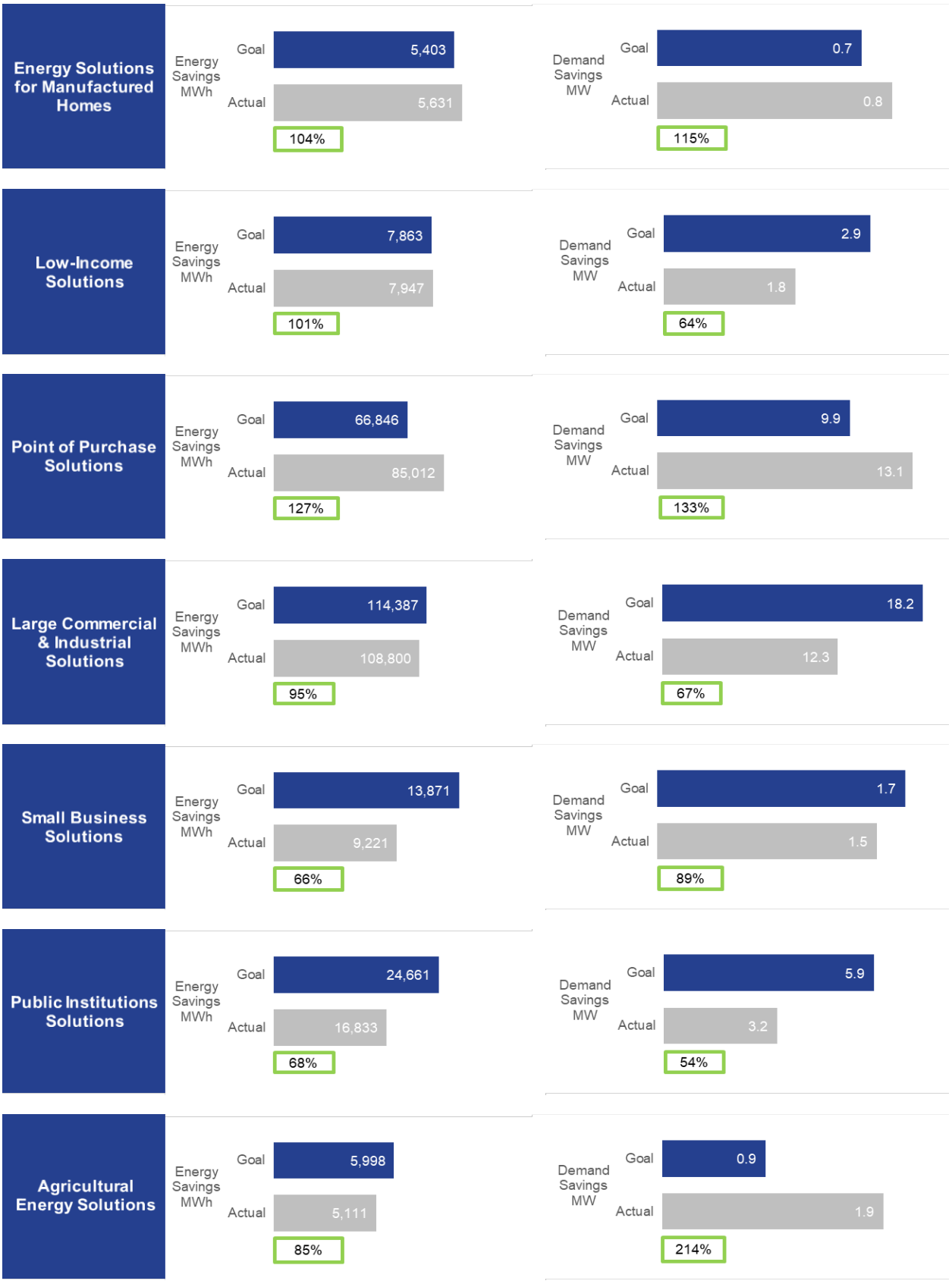
Figure 2 shows the portfolio's total performance relative to program goals, followed by each program's achieved savings relative to program goals.

Figure 2. EAL BY2023 Achieved Savings Relative to Program Goals—Overall and by Program



[7] Residential Direct Load Control and Agricultural Irrigation Load Control programs had no megawatt-hour savings goals.

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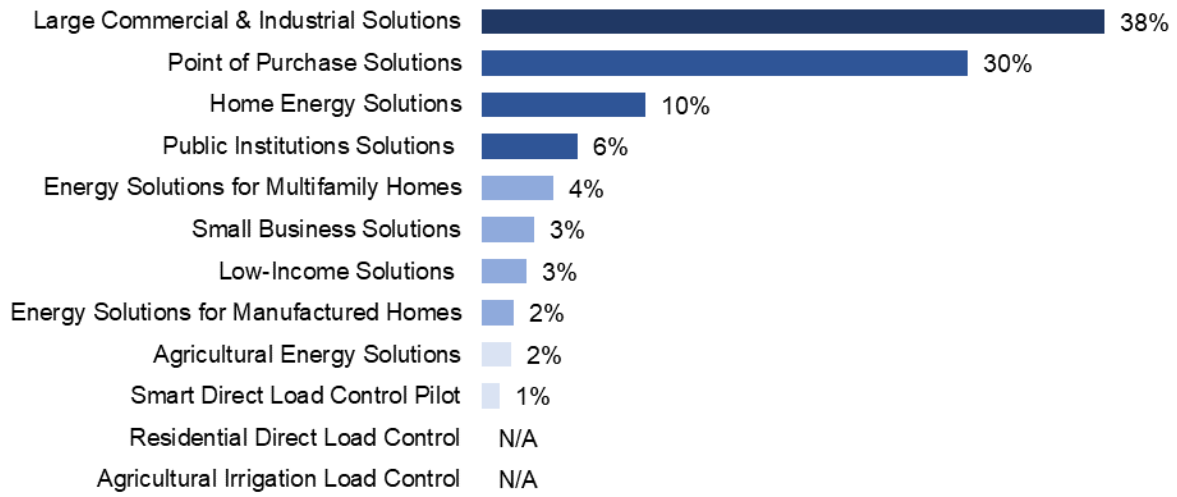


Figure 3 shows each program's contribution toward the total portfolio's net energy savings. Large Commercial and Industrial (C&I) Solutions and Point of Purchase Solutions are the two most significant contributors toward energy savings goals, contributing 38 percent and 30 percent of total portfolio energy savings, respectively.

Notably, 20 percent of portfolio savings are achieved through successfully reaching harder-to-reach sectors. EAL employs best practices in its portfolio design by including programs that specifically address the barriers to energy efficiency in these harder-to-reach sectors (public institutions, small businesses, agriculture, multifamily, low-income, and manufactured homes).

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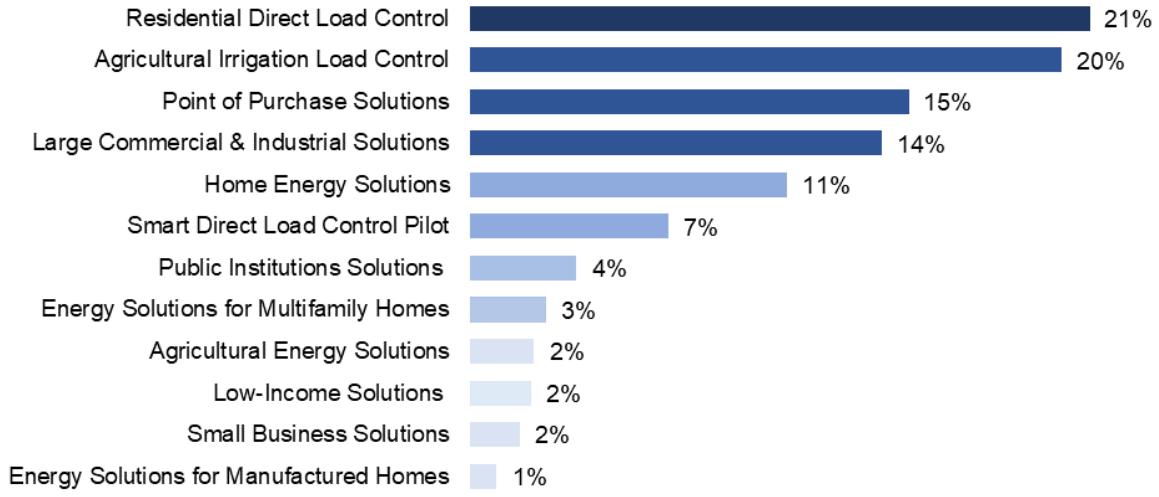
Figure 3. EAL BY2023 Program Contribution to Total Portfolio Kilowatt-Hour Energy Savings*



*Results are rounded to the nearest whole number and may not sum to 100 percent as a result.

Figure 4 shows each program's contribution toward the total portfolio's net demand savings. The Residential Direct Load Control and Agricultural Irrigation Load Control programs were the most significant contributors to net demand savings, accounting for 21 percent and 20 percent of kilowatt savings, respectively. EAL's Point of Purchase Solutions program was the third-highest contributor, with 15 percent kilowatt savings, followed by Large Commercial & Industrial Solutions, which had 14 percent kilowatt savings.

Figure 4. EAL BY2023 Program Contribution to Total Portfolio Kilowatt Demand Savings*



*Results are rounded to the nearest whole number and may not sum to 100 percent as a result.

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Overall, evaluated savings were close to matching claimed energy savings with an overall portfolio gross realization rate of 97 percent for energy savings and 98 percent for demand reductions, as detailed in Table 2. Program-level gross realization rates ranged from 93 to 101 percent for energy savings and 88 to 101 percent for demand savings. Net savings are calculated based on multiplying evaluated gross savings by an NTG ratio that estimates the percentage of savings attributable to the program. We calculated NTG for all residential and C&I programs (outside of demand response, deemed from industry standard) at least once throughout the program cycle. NTG remains strong across all programs, with most savings directly attributable to the programs and an overall portfolio NTG ratio of 99 percent, an increase from last year's 97 percent. While the Point of Purchase Solutions, Public Institutions Solutions, and Agricultural Energy Solutions programs had NTG ratios slightly under 100 percent, the Large Commercial and Industrial Solutions program saw over a 100 percent NTG ratio due to reported spillover where participants installed additional energy efficiency measures because of the program. As shown above, the Large Commercial and Industrial Solutions program is the largest contributor to overall portfolio savings in BY2023.

Table 2. EAL BY2023 Gross Savings and Realization Rates[8]

Program	Reported kWh	Evaluated kWh	Gross realization rate (kWh)	Reported kW	Evaluated kW	Gross realization rate (kW)	NTG (kWh)
Home Energy Solutions	28,607,133	28,755,428	100.5%	9,628	9,498	98.7%	100%
Energy Solutions for Multifamily Homes	13,083,980	12,564,687	96.0%	2,308	2,271	98.4%	100%
Energy Solutions for Manufactured Homes	5,642,694	5,631,397	99.8%	804	806	100.2%	100%
Low-Income Solutions	7,946,285	7,947,477	100.0%	1,859	1,847	99.4%	100%
Point of Purchase Solutions	98,832,874	92,571,010	93.7%	14,867	14,469	97.3%	92%
Large Commercial & Industrial Solutions	105,059,917	103,371,891	98.4%	11,946	11,808	98.8%	105%
Small Business Solutions	9,934,578	9,222,040	92.8%	1,723	1,507	87.5%	100%
Public Institutions Solutions	17,057,952	16,930,362	99.3%	3,180	3,191	100.4%	99%
Agricultural Energy Solutions	5,198,600	5,162,908	99.3%	1,951	1,949	99.9%	99%

[8] Results are rounded to the nearest whole number.

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Program	Reported kWh	Evaluated kWh	Gross realization rate (kWh)	Reported kW	Evaluated kW	Gross realization rate (kW)	NTG (kWh)
Residential Direct Load Control*	-	-	N/A	18,423	18,536	100.6%	100%
Smart Direct Load Control Pilot	3,173,302	3,173,270	100.0%	6,559	5,942	90.6%	100%
Agricultural Irrigation Load Control*	-	-	N/A	17,711	17,711	100.0%	100%
Total portfolio	**294,537,316**	**285,330,470**	**96.9%**	**90,958**	**89,535**	**98.4%**	**99%**

* The Residential Direct Load Control and Agricultural Irrigation Load Control programs do not claim energy savings. Therefore, these cells are represented with a dash.

Evaluation results are positive with EAL and its implementers, demonstrating continuous improvement in its program design and delivery processes, tracking system, documentation, and savings tools. Evidence of this continuous improvement is an improvement in net savings, as demonstrated through an increase in the portfolio's NTG from 90 percent in PY2020, 95 percent in PY2021, 97 percent in PY2022, and now 99 percent in BY2023 as EAL continues to effectively serve harder-to-reach segments. This increase resulted from specific outreach and expanded delivery to low-income households of energy-efficient products through downstream residential and upstream point-of-purchase programs as well as custom projects in the commercial sector.

Both EAL and its implementation contractors have been responsive to evaluation recommendations and engaged with the EM&V contractor throughout the bridge year. Continued technical assistance and collaboration between EAL, its program implementers, and the EM&V team supported the programs and facilitated healthier gross savings realization rates. The BY2023 evaluation effort identified additional recommendations to continue to stabilize realization rates in subsequent program years; increase the transparency, accuracy, and evaluability of program savings in the future; and develop process improvements to further program performance and satisfaction. The tables below summarize EAL's programs and pilot, overviewing key findings and recommendations from the BY2023 evaluation. EAL's status in completing prior PY2020, PY2021, and PY2022 evaluation recommendations are in each program-specific section. As mentioned above, a continuing portfolio-level recommendation is to better align energy savings and demand reduction goals.

Table 3. Home Energy Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	This program targets single-family residences and is delivered through a trained group of home performance contractors. The program offers a comprehensive home inspection with diagnostic testing performed by a qualified contractor and direct installation of low-cost measures. *Duct sealing* is often performed and represents the most significant contributor to savings. The program also delivers the consistent weatherization approach (CWA).

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Key findings	• The program's gross evaluated energy savings were slightly higher than reported energy savings and reported demand savings were slightly lower, with a realization rate of 100.5 percent and 98.7 percent (megawatt-hour and megawatt, respectively). • The program performed well, exceeding the energy goal (achieving 106 percent) and nearly achieving the demand goal (92 percent).
BY2023 impact recommendations	• Continue to increase the internal quality assurance/quality control (QA/QC) process on the *duct sealing* measure for gas and *heat pump heating* types to ensure all cooling and heating efficiency values are captured correctly. • Increase the internal QA/QC process to ensure that all *ceiling insulation* and *smart thermostat* variables are captured correctly. • Collect documentation that clearly verifies the installation location of the *advanced power strip (APS)* or use *average APS* consistently.
BY2023 process recommendations	• Compare the documentation collected during QA/QC to key parameters in tracking data; the EM&V ride-alongs observed photos of key attributes are taken but not checked against tracking data. • Provide a home assessment leave-behind document and review it with customers to ensure they understand what is included in the audit, the recommendations, information on other programs, and contact information for follow-up questions. • Consider developing a list of recommended contractors for improvements identified in the home assessment; this was specifically requested by Home Energy Solutions program participants.

Table 4. Energy Solutions for Multifamily Homes—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	The program targets multifamily property owners and managers, as well as tenants. This program offers both no-cost direct installation measures (*lighting, low-flow showerheads, low-flow faucet aerators, and APS*) and incentivizes *envelope* and *weatherization* measures, including *AC and heat pump tune-ups*, *air infiltration*, and *duct sealing*.
Key findings	• The realization rates were a little lower than reported by the implementor at 96.0 and 98.4 percent realization rates for energy savings and demand reductions, respectively. • The program was somewhat short of its energy savings goals, achieving 89.7 percent of the planned energy goal while only achieving 41.3 percent of the planned demand goal, though this is up from 32 percent last year.

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BY2023 impact recommendations	• Increase the internal QA/QC process on the *duct sealing* measure for all *heating* types to ensure all cooling and heating variables are captured correctly. • Collect documentation that clearly verifies the installation location of the *APS* or consistently use *average APS* in the program. • Utilize the rated or measured capacity to calculate *AC/HP tune-up* savings. • Heating type documentation should be collected for all projects where savings are dependent on the heating type.
BY2023 process recommendations	• Landlords expressed a high interest in receiving more information on energy efficiency; therefore, continue to share information directly with landlords and customers. Email and direct mailing were reported as preferred information sources. • Provide a home assessment leave-behind document and review it with customers to ensure they understand what is included in the audit, the recommendations, information on other programs, and contact information for follow-up questions. • Ensure contractors are appropriately trained, correct any problems that occur during program services, and allow sufficient time in scheduling to service each home.

Table 5. Energy Solutions for Manufactured Homes—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	This program targets manufactured and mobile homeowners, landlords, and community managers. The program offers a combination of incentives for *direct-install* measures, *envelope* measures, and *education services*. The program has recruited and trained partnering contractors to provide complete turnkey program delivery services to this hard-to-reach customer segment.
Key findings	• The program's gross savings were very similar to reported energy savings and demand savings, resulting in realization rates of 99.8 and 100.2 percent (megawatt-hours and megawatts, respectively). • The program exceeded planning goals, achieving 104 percent of the energy savings goal and 115 percent of the demand savings goal, which is a marked improvement from last year when it did not meet goals.
BY2023 impact recommendations	• Continue internal QA/QC processes, as they largely appear to be working well in producing verifiable results and correctly inputting data. • Collect documentation that clearly verifies the installation location of the *APS* or consistently use *average APS* in the program.

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BY2023 process recommendations	• Heating type documentation should be collected for all projects where savings are dependent on the heating type. • The implementer QA/QC process should include a comprehensive review of documentation materials provided by the trade allies and compare them with the documentation collected during the QA/QC process to verify all key parameters in the tracking data. • Provide a home assessment leave-behind document and review it with customers to ensure they understand what is included; in particular, manufactured homes participants would like to know more about implemented *duct sealing* and *air sealing* and more recommendations for incentivized equipment that can save them money and information on other programs. • Manufactured homes participants would appreciate a specific customer service contact so they can reach out with questions regarding the equipment installed, additional incentives available, and energy bill questions (with the third possibly better addressed by EAL customer service versus the program).

Table 6. Low-Income Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	The Low-Income Solutions program targets eligible low-income households and customers aged 65 or older to reduce energy use and lower bills. As part of the Low-Income Solutions program, EAL offers the following services at no cost to qualifying customers: *home energy assessments* by qualified field technicians and direct installation of *LED bulbs*, *low-flow showerheads*, *faucet aerators*, *advanced power strips,* and *health and safety* measures. EAL also offers the following *weatherization* measures at no cost to the customer: *air sealing*, *duct sealing*, *ceiling insulation*, *advanced thermostats*, and *heat pump and AC tune-ups*. The program helps with home repairs to correct minor problems that may otherwise prevent the building from receiving weatherization upgrades or pose a health or safety risk.
Key findings	• The program's gross evaluated savings were slightly lower than reported energy savings and demand savings, resulting in realization rates of 100.0 and 99.4 percent for energy savings (megawatt-hours) and demand savings (megawatts), respectively. • The program slightly exceeded its energy savings goals; however, it fell short of the demand savings goals, 101.2 percent for energy savings (megawatt-hours) and 63.7 percent for demand savings (megawatts), respectively.
BY2023 impact recommendations	• Collect documentation that clearly verifies the installation location of the *APS* or consistently use *average APS* in the program. • Ensure QA/QC results and findings are incorporated to update savings calculation and ArchEE. • Continue internal QA/QC processes to improve documentation and transparency and resolve discrepancies.

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BY2023 process recommendations	• Educate contractors and customers on the proper use of an *APS*, as field verification found the lowest *APS* ISR for this program. Continue focusing on training contractors on the importance of customer communication and best implementation practices to maximize savings. • Provide a home assessment leave-behind document and review it with customers to ensure they understand what is included in the audit, the recommendations, information on other programs, and contact information for follow-up questions. • Work with the EM&V team, IEM, and Parties Working Collaboratively (PWC) to identify streamlined methods to verify program eligibility; collecting sensitive income information was both a barrier to upfront program eligibility verification and back-end program eligibility verification by the EM&V team.

Table 7. Point of Purchase Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	EAL's midstream and upstream programs merged into the comprehensive Point of Purchase Solutions (POPS) program in PY2020. The program aims to provide fast, easy energy efficiency solutions to residential and nonresidential customers where they shop, discounting *efficient lighting* products, *appliances*, *equipment*, and *building materials*. Two advantages of this program design are that (1) it can ramp up quickly and (2) it is streamlined for residential customers because, for many measures, there is no application, and the discounts are applied at the point of sale. Cooperation with distributors and opening clear communication channels are critical for promoting measures incentivized through midstream channels.
Key findings	• The POPS program's evaluated savings resulted in slightly lower energy and demand savings (97.3 percent kilowatt and 93.7 percent kilowatt-hour realization rates) than those calculated by the program implementer. The primary adjustment that decreased savings was the application of an ISR to *APSs* distributed through low-income giveaways; the primary adjustment increasing savings was recalculating 6.7 percent of *upstream lighting* sales using commercial methodologies. • The NTG ratio remains the lowest of EAL programs primarily due to the *upstream lighting* NTG. The overall program resulted in 91.8 percent for energy savings and 90.8 percent for demand savings. • The program exceeded planning goals, achieving 127.2 percent and 132.7 percent of energy and demand savings goals, respectively.

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BY2023 impact recommendations	• Apply an ISR of 0.67 to *APSs* distributed via low-income giveaways; this was the *APS* ISR found through on-site verification for the Low-Income Solutions program. • For *residential lighting*, increase QA/QC on the baseline and retrofit wattages reported in the tracking data.[9] • For *commercial midstream lighting*, increase QA/QC of commercial midstream program tracking data to reduce errors. • Reconcile the kilowatt savings gap for the POPS *weatherization* measure. • Work with EM&V team to improve estimates of residential program participants.
BY2023 process recommendations	• Reorganize information presented on the POPS residential website and program manual to enhance clarity.

Table 8. Large Commercial & Industrial Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	This program provides a solution for nonresidential customers interested in purchasing energy-efficient technologies that can produce verifiable savings through a calculated (prescriptive) or a measured and verified (custom) approach. The program is available to all EAL LCI customers with a peak electric demand of over 100 kW at either one site or multiple sites owned by the same company. Additionally, the program is available to all commercial new construction customers. The program design generates high energy savings and longer-term market penetration by nurturing delivery channels such as design professionals, distributors, contractors, and energy service companies.
Key findings	• Overall, the LCI program evaluated savings resulted in slightly lower demand and energy savings (98.4 percent kilowatt realization rate and 98.8 percent kilowatt-hour realization rate, respectively) than those calculated by the program implementer. • The program fell short of its planning goals for BY2023, achieving 95.1 percent of the energy savings goal and 67.3 percent of the demand savings goal.

[9] While residential lighting measures will not be offered in future POPS iterations, the EM&V team retained this recommendation as it was based on 2023 EM&V findings.

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BY2023 impact recommendations	• Continue discussions with the EM&V team and IEM on the sources of, and uses for, weather data in *continuous energy improvement* (CEI) and *custom* projects. • Increase the review of the statistical results on regression coefficients for projects. • Increase QA/QC of formulas and parameters entered for *custom* projects. • Enhance QA/QC of *general service lamp (GSL)* baseline wattage.
BY2023 process recommendations	• Continue upfront technical reviews to gain consensus across the EM&V team, EAL, and the implementer, particularly for *custom* and *CEI* projects. Discuss if savings thresholds for upfront reviews should be adjusted for the next program cycle.

Table 9. Small Business Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	This program offers small commercial customers cash and non-cash incentives for implementing energy efficiency improvements. The program assists small business customers by analyzing facility energy use and identifying energy efficiency improvement projects. The program targets small business customers with a peak electric demand of less than 100 kW. Trade allies are responsible for analyzing customers' energy use, identifying energy efficiency improvement projects, and installing the recommended measures.
Key findings	• The Small Business Solutions program's evaluated energy and demand savings were lower than the program implementer's savings (92.8 percent kilowatt-hour and 87.5 percent kilowatt, respectively). • The program did not meet its planning goals, achieving 66.5 percent of the energy savings goal and 88.6 percent of the demand savings goal.
BY2023 impact recommendations	• Increase QA/QC on *lighting* projects where significant renovations take place. • Enhance QA/QC of *air conditioning* type on *lighting* projects. • Enhance QA/QC of *general service lamp* baseline wattage. • Increase QA/QC on *building type* selection for *lighting retrofit* projects. • Increase QA/QC on baseline *lighting fixture* types and quantities. • Review savings algorithms for *Wi-Fi thermostat* measures to ensure consistency.
BY2023 process recommendations	• Investigate opportunities to increase energy efficiency program participation amongst small businesses in light of barriers that were encountered during BY2023, including rising baselines, persistent inflationary pressures, and high interest rates; this should include the comprehensiveness of measures installed, as *lighting* is still the majority of savings in this program.

Table 10. Public Institutions Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

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Program summary	This program offers small commercial customers cash and non-cash incentives for implementing energy efficiency improvements. The program targets governments, government-owned institutions, and public-private education entities with a peak electric demand of less than 100 kW. Trade allies are responsible for analyzing customers' energy use, identifying energy efficiency improvement projects, and installing the measures.
Key findings	• The program's evaluated savings resulted in a slightly lower energy savings realization rate (99.3 percent) and higher demand savings, resulting in a 100.4 percent kilowatt realization rate compared to those calculated by the program implementer. • The program fell short of its planning goals for BY2023, achieving 68 percent of the energy savings goal and 54 percent of the demand savings goal. • The *lighting* measures were the most significant measure category for participation and savings in BY2023, with *Custom-CEI* as the second most significant. These two measure categories accounted for approximately 66 percent of reported and evaluated energy and demand savings.
BY2023 impact recommendations	• Continue discussions with the EM&V team and IEM on the sources of, and uses for, weather data in *CEI* and *custom* projects. • Increase the review of the statistical results on regression coefficients for projects. • Increase QA/QC on certified/non-certified lights for *lighting retrofit* projects. • Increase QA/QC on baseline *lighting fixture* types and quantities.
BY2023 process recommendations	• Discuss potential opportunities to focus additional outreach efforts and program offerings to non-profit organizations serving hard-to-reach segments in EAL's territory.

Table 11. Agricultural Energy Solutions—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	This program offers a combination of farm audits, custom and prescriptive incentives, and education to agricultural suppliers. The program has focused on poultry farm *lighting* projects, although it has expanded to include *irrigation pump* and *horticulture* measures.
Key findings	• The program's evaluated savings resulted in slightly lower energy and demand savings (99.3 percent and 99.9 percent realization rates, respectively) than those calculated by the program implementer. • The program far exceeded the demand goal, achieving 214 percent of planned savings. Energy savings achieved 85 percent of the total goal.
BY2023 impact recommendations	• Continue to work collaboratively with the EM&V team and seek review of large or unique *custom* projects. • Collect photo documentation on-site when able to. • Limit *lighting* eligibility to ENERGY STAR®, DesignLights Consortium, or Consortium for Energy Efficiency (CEE)-certified lamps, except in cases where the *lighting* is designed and used for animals.

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	• Define additional measure descriptions to ArchEE to clarify measure type as the program expands with new measure offerings beyond *lighting*.
BY2023 process recommendations	• Continue to monitor barriers to wider agricultural participation, including inflationary pressures and high interest rates. The program has exceeded its goal in recent years due to horticulture; however, program design and delivery staff report persistent market barriers with poultry farms delaying planned participation, especially in new construction.

Table 12. Residential Direct Load Control—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	The Residential Direct Load Control program focuses on residential air-conditioning loads and cycles a participant's home central air conditioning condenser during called demand-response events. A turnkey implementation contractor delivers the program by utilizing *radio technology*.
Key findings	• The program achieved 18.5 MW in gross demand savings, approximately 64 percent of the planning goal. • The evaluation team's savings calculations resulted in slightly higher demand savings than those provided by the program implementer, resulting in a realization rate of 100.6 percent.
BY2023 impact recommendations	• Model the effect of weather on demand using a lagged time variable.
BY2023 process recommendations	• Continue to monitor and utilize opportunities to move participants from *radio technology* to *smart thermostats* in the next program cycle.

Table 13. Smart Direct Load Control Pilot—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	The Smart Direct Load Control (SDLC) pilot coordinates with a participant's thermostat during demand-response events. The program offers residential and small commercial customers rebated *smart thermostats* or the opportunity to enroll an existing *smart thermostat* to participate in demand-response events during the load control season.
Key findings	• Realization rates for energy savings were 100.0 percent for *smart thermostats* installed in both commercial and residential applications. • Realization rates for demand savings were 90.6 percent for *smart thermostats* installed in both residential and commercial applications. • This program most underperformed in relation to its planning goal, only achieving 22 percent of planned demand reductions.
BY2023 impact recommendations	• Collaborate with the EM&V team to update energy savings for commercial *smart thermostats*.
BY2023 process recommendations	• Continue to investigate opportunities to increase program participation in small business segments as well as residential to improve the underperformance of this pilot in relation to planning estimates.

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Table 14. Agricultural Irrigation Load Control—BY2023 Summary Evaluation, Measurement, and Verification Findings and Recommendations

Program summary	The Agricultural Irrigation Load Control (AILC) program pays participants incentives in return for allowing EAL to interrupt their pumping loads (also referred to as a *curtailment event* or a *scheduled event*) during summer peak loads. The load control season runs from June 1 through August 31 each year. The target market is customers with large motors used in agriculture.
Key findings	• The AILC program evaluated savings matched those calculated by the program implementer (realization rate of 100.0 percent). The implementer and the EM&V team uses the Midcontinent Independent System Operator (MISO) symmetric multiplicative adjustment (SMA) baseline calculation, which is appropriate for registering savings with MISO. • The program fell short of its BY2023 planning goal, reaching 35.5 percent of its demand savings.
BY2023 impact recommendations	• Consider tracking opt-outs by event or event-hour.
BY2023 process recommendations	• Continue to assess the role of this program in EAL's overall demand response opportunities, as it provides a unique participation path.

1.2 TRM UPDATE RECOMMENDATIONS

Tetra Tech has identified the following TRM updates for consideration from the EM&V research:

Table 15. Technical Reference Manual Recommendations from BY2023 Evaluation

Existing measures	
2.6.1 Advanced power strips	Currently, the Arkansas TRM includes an in-service rate (ISR) for Tier 2 *advanced power strips (APS)* but lacks an ISR for Tier 1. Additionally, we noted in EAL's mid-year tracking system review that the volume of *APSs* incentivized in POPS has increased. For example, through September 27, 2023, 132,351 *APSs* (resulting in 22.2 million kilowatt-hours) were incentivized through POPS, compared to 63,641 *APS*s (resulting in 10.6 million kilowatt-hours) in all PY2022. The actual energy savings hinge on correct installations, but recent on-site inspections revealed issues even when contractors directly installed the *APSs* for customers. Considering the surge in volume in BY2023, installation complexity, and the absence of an ISR in the calculation method, Tetra Tech believes the claimed savings significantly differ from the realized savings for *APSs* delivered through both the time-of-sale or kit model, where customers are expected to install the measure themselves. Tetra Tech suggests adding multiple ISRs to the residential Tier 1 *APS* measure algorithm, considering various delivery methods like direct installation, time-of-sale, kits, etc. One example of this is the Illinois TRM, which includes six ISR values for this measure.
3.6.3 Lighting efficiency	Tetra Tech noted that formula 323 (kilowatt savings for new construction with code-required controls) lacks the IEF_d. Tetra Tech applied the IEF_d in the evaluation and notified the IEM in January 2024.
	Currently, the *residential lighting* measures include Energy Independence and Security Act Tier 2 baselines for applicable *GSLs* installed after July 1, 2023, but

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	the commercial section of the TRM does not contain or reference the same language. Tetra Tech applied the *GSL* requirements from the residential section to applicable commercial measures and notified the IEM of the issue in November 2023.
Existing measures	
Agricultural lighting	The Arkansas TRM does not address *agricultural lighting* with the nonresidential section. Arkansas has experienced significant growth of cannabis grow houses in recent years, where implementers are applying *custom* methodologies for savings. In particular, defining the baseline wattages has been problematic as none of the available *new construction lighting* power densities are accurate for this application. Tetra Tech suggests referencing other TRMs, particularly the Illinois TRM[10], to develop a separate *agricultural* measure for *grow-house lighting*.
Variable frequency drives	The Arkansas TRM does not include *prescriptive* measures for *variable frequency drives (VFDs)* on *commercial fans* and *pumps*. Tetra Tech suggests reviewing available approaches from other TRMs to develop a *VFDs for fans and pumps* measure for Arkansas that would reduce implementer burden for small projects.
Other TRM Items	
Weather data for regression analysis	Tetra Tech made multiple adjustments to projects related to weather data. Various projects within *CEI* used weather data that differed from publicly available sources. The EM&V team used a common approach for evaluating these projects: using actual weather observations from the nearest airport through Weather Spark. Tetra Tech also noted that some projects using regression and normalization used weather data at specific locations and normalized against the climate zone reference location. In the case of a location like Searcy, this can lead to a location-based bias in the results where the weather data averages four degrees warmer than Little Rock. The EM&V team conducted regression and normalization for these projects at the same location. From examining individual projects, the EM&V team calculated savings adjustments of two to six percent from these approaches. Tetra Tech suggests the IEM discuss the use and sources of weather data to develop a common approach among the implementers and evaluators in Arkansas.

[10] https://www.ilsag.info/wp-content/uploads/IL-TRM_Effective_010124_v12.0_Vol_2_C_and_I_09222023_FINAL_clean.pdf

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2.0 INTRODUCTION

On March 15, 2019, Entergy Arkansas, LLC (EAL) filed its 2020–2022 Energy Efficiency Plan in response to Commission Order No. 41 in Docket No. 13-002-U. The Arkansas Public Service Commission (APSC) approved the 2020–2022 programs, which built upon EAL's comprehensive programs that have been implemented in Arkansas since 2011 and specifically the most recent 2017–2019 program cycle. In response to pandemic challenges, an additional 2023 bridge year (BY) (BY2023) was also approved to allow sufficient time to respond to challenges and plan for the next program cycle (2024–2027).

This report presents the evaluation, measurement, and verification (EM&V) results for EAL's energy efficiency programs implemented in BY2023. Following APSC Rules for Conservation and Energy Efficiency Programs (C&EE Rules), EAL selected an independent, third-party EM&V contractor. This evaluation effort aims to evaluate program impacts annually for all programs that provide kilowatt-hour or kilowatt savings.

The EAL BY2023 evaluation included impact and process analyses specified in the APSC rules and followed the Arkansas Technical Reference Manual (TRM) Version 9.1 (TRM 9.1) protocols and savings algorithms. Also, the EM&V team developed the program evaluation activities based upon discussions with EAL staff and its implementation contractors, reviews of program tracking and documentation, a review of prior years' EM&V efforts and EAL annual reports, and input from the independent evaluation monitor (IEM).

The remainder of this section overviews the EM&V team's evaluation approach. Section 3.0 discusses the overall portfolio results, including the Comprehensiveness Checklist. Sections 4.0 through 15.0 detail the EM&V results for each program, including specific discussions of evaluation methodologies. Section 16.0 details the consistent weatherization approach (CWA) results and participation in Act 1102 categories across residential programs based on BY2023 process evaluation results. Finally, Section 17.0 presents the EM&V team's calculation of non-energy benefits (NEB), which was first included in EAL's programs in PY2016 in keeping with Commission Order No. 30. To foster complete transparency of all evaluation results in this report, the EM&V team has provided a separate Technical Appendix with desk review, on-site measurement and verification (M&V) details, confidence and precision calculations, and data collection instruments for EAL and the IEM.

2.1 EVALUATION APPROACH

In this section, we discuss the EM&V team's evaluation approaches for EAL within the following topics:

- impact evaluations,
- process evaluations,
- evaluation prioritization, and
- data collection activities.

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2.2 IMPACT EVALUATIONS

Our principal approach to the impact evaluation activities for EAL for BY2023 is to continue a similar approach to the three-year program cycle, including:

- verify program tracking data and correctly apply the Arkansas TRM to the applicable program year to calculate savings following TRM 9.1 Volume 1 Protocol A;
- estimate gross- and net-energy and demand impacts at the measure, program, and portfolio levels;
    - adjust program-reported gross savings using the results of evaluation research, relying primarily on the tracking system, engineering desk reviews, and independent verification where impact parameters are deemed by the TRM and use metered data analysis and equipment metering where impact parameters are not deemed by the TRM;
    - update program net-to-gross (NTG) values with primary or secondary data research for every program once over the three-year program cycle, as well as review NTG ratios annually for any changes in the program design or measure mix following TRM 9.1 Volume 1 Protocol F; and
    - provide complete documentation and transparency of all evaluated savings estimates and, where relevant, comparison with TRM 9.1 calculations;
- provide ongoing technical reviews and guidance throughout the evaluation cycle;
- annually review tracking system data to assess data captured for new measure offerings following TRM 9.1 Volume 1 Protocol A;
- identify possible updates for the next version of the TRM; and
- calculate non-energy benefits (NEB) for the EAL portfolio.

The impact evaluations resulted in defensible lifetime and annual estimates of gross and net energy and demand impacts and adhered to TRM 9.1 Volume 1, Protocols B1, B2, and B3. Impact evaluations were used to calculate realization rates, determined by dividing evaluated savings by EAL-tracked savings. BY2023 primarily included a combination of the tracking system and desk reviews, metered data analysis, and independent verification. When determining the appropriate activities to be completed by program and measure type, the EM&V team considered key factors that included a contribution toward savings and level of savings uncertainty (TRM 9.1 Volume 1 Protocol D) to identify high-priority measures and programs where more rigorous impact evaluation activities were beneficial. Sampling strategies were developed as part of program-level research plans following TRM 9.1 Volume 1 Protocol B4.

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While implementing the impact evaluations, issues that could introduce potential bias and uncertainty were addressed and minimized. Evaluations can have biases in their results for many reasons. It is important to assess that no significant systematic non-random errors are embedded in the data that would bias the evaluation results. The EM&V team made every effort to identify and address any potential biases occurring due to (1) measurement errors resulting from inaccurate meters or errors in recording data, (2) collection errors arising from non-representative sampling, (3) sampled participant's refusal to participate in an on-site visit, (4) biased responses or interpretation of responses, (5) poor questionnaire design, (6) failure to take behavioral factors into account, (7) modeling errors from the incorrect specification of relationships between variables, (8) improperly included or excluded information or data, and (9) other modeling deficiencies.

In addition to mitigating the biases, the impact evaluation activities conducted by the EM&V team increased the confidence of results and reduced uncertainty by employing appropriate sampling approaches and reporting confidence intervals. A confidence interval is a range of values that describes an estimate's uncertainty. Confidence intervals are one way to represent how good an estimate is; the more extensive a confidence interval for an estimate, the more caution is required when using the point estimate.

Demand-side management program evaluations routinely employ 90 percent confidence intervals with ±10 percent as the industry standard (90/10). The 90 percent in the confidence interval represents a level of certainty about the estimate. If we were to repeatedly obtain new estimates using the same procedure (by drawing a new sample, conducting new interviews, and calculating new estimates and new confidence intervals), the confidence intervals would contain the average of all the estimates 90 percent of the time. The EM&V team activities reflect a minimum confidence interval of 90 percent ±10 percent at the sector and program level for evaluated savings estimates. Achieved confidence levels are included in the Technical Appendix to this report.

2.3 PROCESS EVALUATION

Our approach to process evaluation activities for EAL's portfolio of programs was to:

- gain an in-depth understanding of program operations, challenges, and evaluation needs through staff interviews with EAL and the implementation contractors at the beginning and throughout the evaluation cycle, followed by biweekly calls to stay abreast of program status issues;
- document EAL's progress in incorporating recommendations identified during the PY2020−PY2022 evaluation following TRM 9.1 Volume 1, Protocol C;
- assess EAL's success in achieving the goals and objectives established in the APSC's Comprehensiveness Checklist;
- follow TRM 9.1 Volume 1, Protocol C, and conduct a comprehensive process evaluation for every program once over the three-year program cycle and assess other process evaluation needs annually;

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- assess and document the effectiveness of program quality assurance and quality control (QA/QC); and
- assess and document the effectiveness of integrating the CWA, highlighted in TRM 9.1 Volume 1, Protocol C1.

Savings and cost-effectiveness estimates alone do not entirely explain a program or portfolio's effectiveness. Other factors, including internal and external utility operations, program maturity, service provider and implementation contractor activities, and markets, can influence a program's effectiveness. Identifying program process improvements is an EM&V best practice.

In general, process evaluations assess organizational and procedural aspects of programs; they also provide feedback on aspects of programs functioning well or areas in need of improvement. The EM&V team consulted and followed TRM 9.1 Volume 1, Protocol C, annually to determine whether conducting a process evaluation was appropriate for a specific program and the appropriate timing for the process evaluation. Specifically, Protocol C defines the required process evaluation criteria and the criteria to justify conducting a process evaluation (Table 16 provides details on specific criteria that trigger a process evaluation). As noted earlier, each program received a complete process evaluation at least once during the three-year PY2020–PY2022 program cycle. Therefore, the process evaluation activities for BY2023 focused on customer research for the downstream residential programs and program design and delivery staff interviews across all programs.

Table 16. TRM 9.1 Volume 1, Protocol C: Process Evaluation Guidance

Criteria for process evaluations
Process evaluation is required if: • the program is new or modified, • no process evaluation has been undertaken during the current funding cycle, or • a change in program implementation occurred.
Process evaluation is potentially needed if: • program impacts are lower than expected, • goals (both informational and educational) are not being achieved, • rates of participation are lower or slower than expected, • the program's operational system is slow to get up and running, • cost-effectiveness of the program is less than expected, or • participants (both customers and market actors) report problems or low satisfaction rates with the program.

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In addition to all programs receiving a limited process evaluation through program staff interviews and program documentation review, for BY2023, the EM&V team conducted customer surveys for the following four residential downstream programs: Home Energy Solutions, Multifamily Solutions, Manufactured Homes Solutions, and Low-Income Solutions. While all programs have been stable in meeting goals and did not require full process evaluations through the criteria specified above, it was determined in conjunction with EAL staff and the IEM that there was value in updating the Act 1102 information for these programs as well as gather other process insight to inform the next program cycle of residential programs given the shift away from lighting.

2.4 EVALUATION PRIORITIZATION

A critical component of the EM&V process is to develop a prioritization process for the program-specific plans to meet the most appropriate level of rigor for each program following the guidance in TRM 9.1 Volume 1, Protocol D. Several factors feed into these decisions:

- percentage of program contribution to the portfolio savings,
- level of uncertainty in estimated savings (with higher uncertainty of savings resulting in high priority),
- level and quality of existing programmatic QA/QC and verification data from site visits and metering,
- the potential of risk for future portfolio performance, and
- adherence to Arkansas TRM protocols or updated needs.

The EM&V team's evaluation activities presented in the BY2023 Evaluation Plan[11] underpin the BY2023 results and reflect this prioritization process.

2.5 DATA COLLECTION ACTIVITIES

The data collection activities listed below were used to support the impact and process evaluations as relevant. All evaluation activities adhered to EM&V protocols, as defined in TRM 9.1 Volume 1. The majority of these activities collected primary data.

- **Program staff interviews.** The EM&V team interviewed EAL and implementation contractors' program staff as part of the evaluation planning process. Communication was maintained throughout the program cycle via biweekly meetings to understand program progress and any challenges or successes. Findings from these interviews informed the evaluation research, key findings, and recommendations (EM&V Protocol C3: Recommended Areas of Investigation in a Process Evaluation).
- **Participant interviews.** For the residential downstream programs, the EM&V team conducted participant surveys to collect data on program awareness and satisfaction, factors affecting participation, and demographic information, including the Act 1102

[11] Entergy Arkansas, LLC Bridge Year 2023 Evaluation Plan, Tetra Tech, July 2023.

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metrics (EM&V Protocol C3: Recommended Areas of Investigation in a Process Evaluation). For Home Energy Solutions, the interviews also included standardized enhanced self-report approach (SRA) batteries to estimate program attribution (EM&V Protocol B3: Recommended Protocols for Participant Net Impact Evaluation).

- **Database tracking review.** The EM&V team assessed each program's database and tracking information (EM&V Protocol A: Program Tracking and Database Development) and provided a census tracking system review of deemed savings measures against the applicable version of the TRM. This advance review also included information on non-energy benefits (NEB).
- **Sampling.** The EM&V team drew samples designed to meet precision levels at the program level for verification or a census of participants depending on the population size (EM&V Protocol B4: Sampling and Uncertainty Protocol).
- **Engineering and project file reviews.** This activity focused on the calculations and assumptions for savings, adherence to the TRM, and potential differences in the verified gross savings from the reported savings (EM&V Protocol D1: Using Deemed Savings Values and EM&V Protocol D2: M&V Protocols). The findings of the project file reviews informed the selection of commercial projects for additional on-site verification activities. After conducting the file reviews, a sample of sites was selected for on-site data collection, if applicable (EM&V Protocol B4: Sampling and Uncertainty Protocol). Factors that determine sampling and potential weighting include (1) the size of the projects relative to the average of the measure type population; (2) measure type contribution to the overall energy and demand savings; and (3) our experience with precision and confidence from prior EM&V. We factor other evaluation efforts, where available, for specific end-use measure groups.
- **Demand response programs.** There are no TRM protocols for demand response programs. Thus, the EM&V team followed industry-standard practices, essentially reviewing participant-interval-load data census. Periods ahead of, during, and following load interruption notices verify load reduction and persistence during demand-response events and provide comparisons to similar-condition non-interrupted baseline days to validate impact estimates. The Residential Direct Load Control (DLC), Smart DLC pilot, and the Agricultural Irrigation Load Control programs serve as load modifying resources for the Midcontinent Independent System Operator. We work with EAL to ensure consistency of evaluation across Arkansas utilities. Based on this work, the EM&V team will work with EAL to provide input to the IEM for a possible future TRM update.

On-site data collection, as well as data logging and spot measurements, are two primary data collection activities that we have leveraged in the past, and we recommend that EAL programs provide more extensive measurement and verification (M&V) activities. These data collection activities verify program impacts, as outlined in EM&V Protocol E: Protocols for Verification and Ongoing Modifications of Deemed Savings Values. Below, we summarize the data collected through on-site data collection, data logging, and spot measurements.

- **On-site data collection and independent verification.** Each site visit included a physical inspection of measures to gather information about the project for verification purposes. The site-specific M&V plan gathered detailed information and data specific to the project (EM&V Protocol D2: M&V Protocols). Inspection, monitoring, and interview results are included in the Technical Appendix of this report.

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- **Commercial stipulated annual operating hours (AOH) verification.** We emphasized selecting independent verification projects that used stipulated AOH through the desk review process and developed a supplemental AOH Verification Guide (Verification Guide). The Verification Guide identified the general site operating schedule, including holidays and shutdowns and lighting control type, and verified that the annual hours of operation (AOH) reported by the site contact do not vary from those originally reported. Individual room information is provided in the ArchEE data extract and project documentation, making verification possible down to this level. The guide also intends to identify and request additional documentation, such as photos and building automation system (BAS) data, which could further verify lighting AOH.
- **Data logging and spot measurements.** The data logging discussion below includes our general approach to fieldwork supporting M&V projects. It does not necessarily reflect the plan for each program, as this is only needed for measures and projects with higher levels of uncertainty in savings. For details by program, please refer to the program-specific approaches later in this document.

The EM&V team obtains spot measurements of critical parameters such as amps, kilowatts, temperatures, and flow rates for projects that operate mainly at a steady state. These projects may include constant-speed fans and pumps or process heating or cooling systems that serve a constant load (EM&V Protocol D2: M&V Protocols, Option B: Retrofit Isolation: All Parameter Measurement). For projects with significant fluctuations, data logging or trend data may be used over one to two weeks. These projects would include, for example, compressed air, variable frequency drives, and controls projects. Data may be logged to determine run times, or it may include interval metering, where the loads are recorded at specific intervals as they vary throughout the day or week (EM&V Protocol D2: M&V Protocols, Option B - Retrofit Isolation: All Parameter Measurement).

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3.0 PORTFOLIO PERFORMANCE

This report section presents results for the portfolio overall, measure trend analysis, and overviews the energy burden analysis in progress to help Entergy Arkansas, LLC (EAL) in future program planning, as well as results of the Comprehensiveness Checklist.

3.1 PORTFOLIO RESULTS

In BY2023, EAL offered a portfolio of 11 energy efficiency programs and 1 pilot. Also, through its residential programs, EAL implemented the consistent weather approach (CWA), which provided a comprehensive range of customer options focused on energy efficiency and demand reduction coupled with education and training activities. EAL seeks to provide customers with easy program entry points, flexible options for saving energy, and ongoing support for those who want to pursue deeper energy savings or demand reductions through its energy efficiency portfolio, which is discussed further in the Comprehensiveness Checklist.

EAL almost met its portfolio planning energy goals, achieving 99 percent (Figure 5). EAL fell short of its demand goals, meeting 55 percent of the demand goal (Figure 6). The performance difference between energy savings and demand goals is similar to last year and the year prior. A continuing recommendation is to investigate ways to better align energy savings and demand savings, though a majority of demand savings come from demand response programs in EAL's portfolio, which are highly weather-dependent for savings.

Individual program performance relative to program savings and demand goals varied. Four of the 12 programs[12] achieved their megawatt-hour savings goals; six other programs' energy savings goals ranged between 64 percent and 96 percent of their savings goals. Similarly, 3 of the 12 programs achieved their megawatt savings goals, with 1 additional program meeting 90 percent or more of the demand savings goal. The pilot only met 22 percent of its energy savings goals. The Point of Purchase Solutions and Agricultural Energy Solutions programs were the highest performers across energy savings and demand reductions relative to program goals (127 percent and 214 percent, respectively).

[12] Residential Direct Load Control and Agricultural Irrigation Load Control programs had no megawatt-hour savings goals.

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Figure 5. BY2023 Percentage of Net Energy Megawatt-Hour Savings Goals Achieved

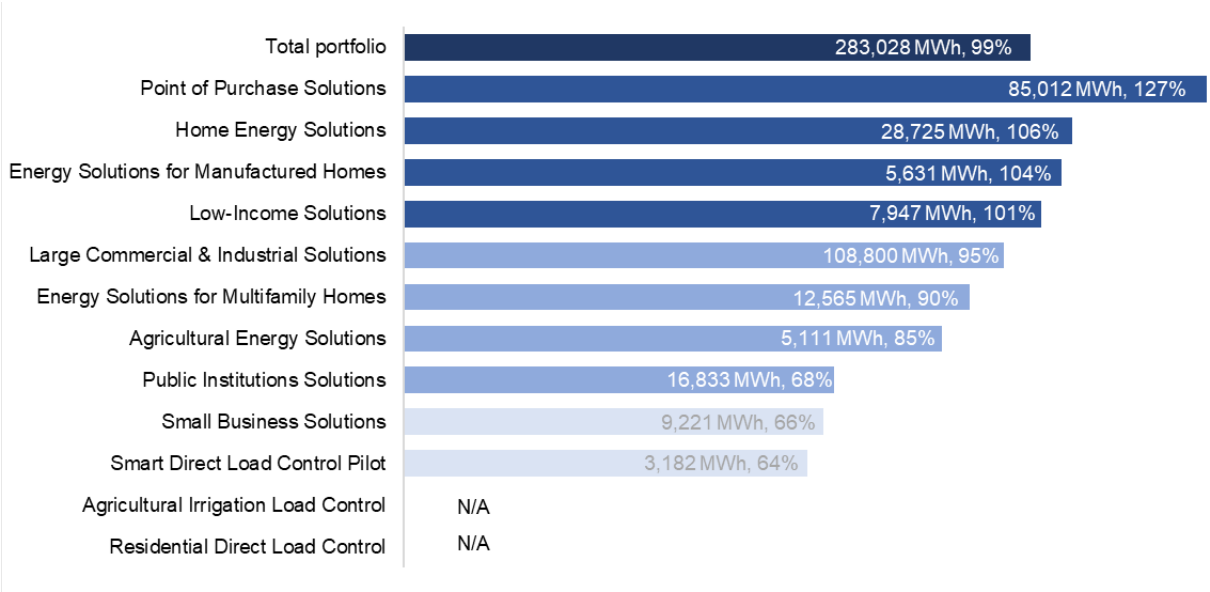
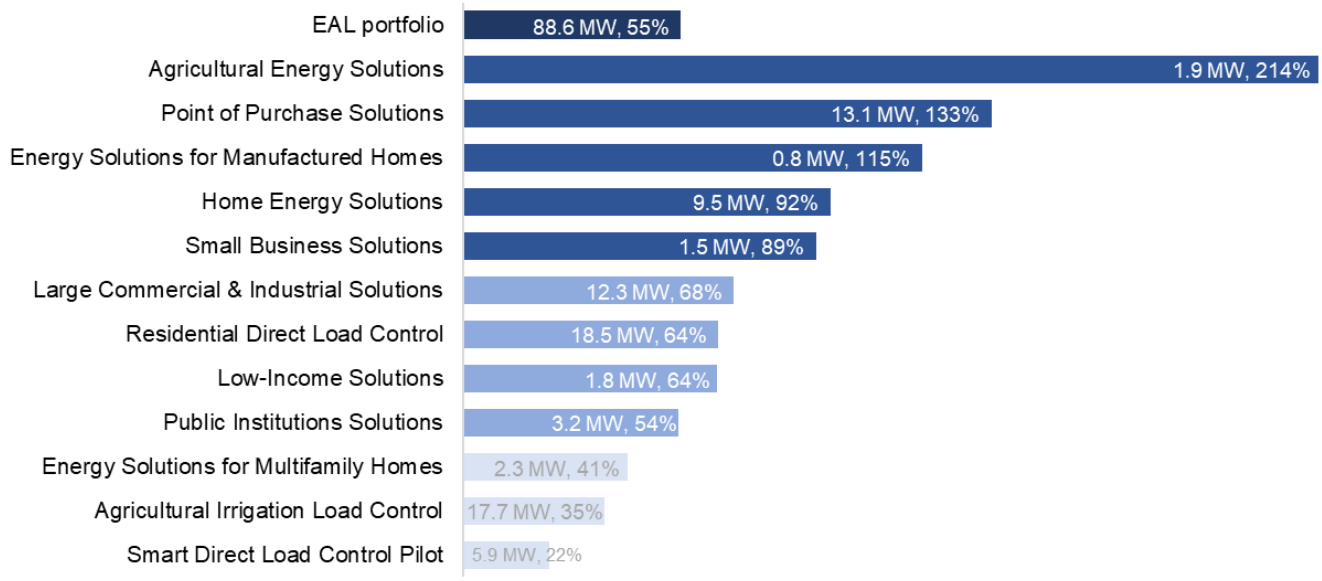


Figure 6. BY2023 Percentage of Net Demand Megawatt Savings Goal Achieved[13,14]



[13] Peak demand savings for all *non-load-control* measures and programs were determined using a peak demand definition of Monday—Friday, 1:00 p.m. to 8:00 p.m., June—September, determined in accordance with EAL.

[14] Demand-response program savings calculations follow the Midcontinent Independent System Operator's (MISO) methodology (explained in relevant event sections), which does not account for post-event snapback. Snapback is accounted for when calculating total energy savings.

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Overall, evaluated savings were slightly lower than claimed energy savings, with an overall portfolio gross realization rate of 97 percent for energy savings and 98 percent for demand reductions. Program-level gross realization rates ranged from 93 to 101 percent for energy savings and 88 to 101 percent for demand savings. Table 17 shows the reported and evaluated energy savings for EAL's portfolio, sectors, and programs for BY2023 and Table 18 shows the reported and evaluated savings for demand savings.

Table 17. EAL BY2023 Reported and Evaluated Energy Savings[15]

Program	Percentage portfolio net savings (kWh)	Reported energy savings (kWh)	Evaluated energy savings (kWh)	Gross realization rate (kWh)	Net-to-gross (NTG) ratio	Net evaluated energy savings (kWh)
Home Energy Solutions	10%	28,607,133	28,755,428	100.5%	100%	28,724,746
Energy Solutions for Multifamily Homes	4%	13,083,980	12,564,687	96.0%	100%	12,564,687
Energy Solutions for Manufactured Homes	2%	5,642,694	5,631,397	99.8%	100%	5,631,397
Low-Income Solutions	3%	7,946,285	7,947,477	100.0%	100%	7,947,477
Point of Purchase Solutions	30%	98,832,874	92,571,010	93.7%	92%	85,011,787
Large Commercial and Industrial Solutions	38%	105,059,917	103,371,891	98.4%	105%	108,799,928
Small Business Solutions	3%	9,934,578	9,222,040	92.8%	100%	9,221,327
Public Institutions Solutions	6%	17,057,952	16,930,362	99.3%	99%	16,832,595
Agricultural Energy Solutions	2%	5,198,600	5,162,908	99.3%	99%	5,111,279
Residential Direct Load Control*	N/A	0	0	N/A	100%	0
Smart Direct Load Control Pilot	1%	3,173,302	3,173,270	100.0%	100%	3,182,436
Agricultural Irrigation Load Control*	N/A	0	0	N/A	100%	0
Total portfolio	**100%**	**294,537,316**	**285,330,470**	**96.9%**	**99%**	**283,027,659**

* The Residential Direct Load Control and Agricultural Irrigation Load Control programs do not claim energy savings. Therefore, these cells are represented with a dash.

[15] Results rounded to the nearest whole number.

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Table 18 shows the reported and evaluated demand savings for EAL's portfolio, sectors, and programs for BY2023.

Table 18. EAL BY2023 Reported and Evaluated Demand Savings[16]

Program	Percentage portfolio net savings (kW)	Reported demand savings (kW)	Evaluated demand savings (kW)	Gross realization rate (kW)	NTG ratio	Net evaluated demand savings (kW)
Home Energy Solutions	11%	9,627.8	9,498.1	98.7%	100%	9,494.0
Energy Solutions for Multifamily Homes	3%	2,308.1	2,271.2	98.4%	100%	2,271.2
Energy Solutions for Manufactured Homes	1%	804.2	805.7	100.2%	100%	805.7
Low-Income Solutions	2%	1,858.9	1,847.1	99.4%	100%	1,847.1
Point of Purchase Solutions	15%	14,866.7	14,468.6	97.3%	91%	13,141.9
Large Commercial and Industrial Solutions	14%	11,946.1	11,808.0	98.8%	104%	12,257.1
Small Business Solutions	2%	1,722.8	1,507.0	87.5%	100%	1,506.8
Public Institutions Solutions	4%	3,180.1	3,191.5	100.4%	100%	3,176.3
Agricultural Energy Solutions	2%	1,950.6	1,949.5	99.9%	99%	1,930.0
Residential Direct Load Control	21%	18,423.0	18,535.8	100.6%	100%	18,535.8
Smart Direct Load Control Pilot	7%	6,559.2	5,942.1	90.6%	100%	5,942.1
Agricultural Irrigation Load Control	20%	17,710.8	17,710.8	100.0%	100%	17,710.8
Total portfolio	**100%**	**90,958.3**	**89,535.3**	**98.4%**	**99%**	**88,618.8**

Net savings are calculated based on multiplying evaluated gross savings by an NTG ratio that estimates the percentage of savings attributable to the program. NTG was calculated for all residential, commercial, and industrial programs (outside of demand response, deemed as industry standard practice) at least once throughout the program cycle, with the Home Energy Solutions NTG ratio updated in BY2023. NTG remains strong across all programs, with most savings directly attributable to the programs and an overall portfolio NTG ratio of 99 percent. The Point of Purchase Solutions (POPS) program had the lowest NTG ratio at 92 percent due to *lighting* having the lowest NTG ratio. However, this was largely counteracted by program efforts

[16] Results are rounded to the nearest whole number.

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to reach low-income communities. Large Commercial and Industrial Solutions saw over 100 percent NTG ratios due to reported spillover where participants installed additional energy efficiency measures due to the program and is the largest program contributor to overall portfolio savings in BY2023. Table 19 shows the NTG factor and source used in the net evaluated savings for EAL's BY2023 programs.

Table 19. BY2023 Net-to-Gross Summary

Program	NTG ratio[17]	Source
Home Energy Solutions	100%	BY2023 EM&V research—participant surveys and PY2020 market actor interviews
Energy Solutions for Multifamily Homes	100%	PY2020 EM&V research—participant surveys and market actor interviews
Energy Solutions for Manufactured Homes	100%	PY2020 EM&V research—participant surveys and market actor interviews
Low-Income Solutions	100%	PY2020 EM&V research—participant surveys and market actor interviews
Point of Purchase Solutions	92%	PY2021 EM&V research—participant surveys and market actor interviews
Large Commercial and Industrial Solutions	105%	PY2022 EM&V research—participant surveys and market actor interviews
Small Business Solutions	100%	PY2022 EM&V research—participant surveys and market actor interviews
Public Institutions Solutions	99%	PY2022 EM&V research—participant surveys and market actor interviews
Agricultural Energy Solutions	99%	PY2022 EM&V research—participant surveys
Residential Direct Load Control	100%	Stipulated at 1.0 as industry practice
Smart Direct Load Control Pilot	100%	PY2020 EM&V research—participant surveys and market actor interviews
Agricultural Irrigation Load Control	100%	Stipulated at 1.0 as industry practice
Total	**99%**	

3.2 MEASURE TREND ANALYSIS

This section presents an analysis to assist EAL with program planning. Each EAL program targets a specific sector or subset of EAL's customers; however, the portfolio provides a wide range of energy efficiency measures to all customer classes across EAL's territory. This section summarizes and analyzes the measures offered by EAL since 2017.

[17] NTG ratios are calculated based on the savings population. While kilowatt-hour and kilowatt NTG ratios are similar, the NTG calculated based on kilowatt-hours is shown.

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3.2.1 Key Findings

The percentage of portfolio net energy savings coming from *lighting* measures has steadily decreased since 2017, going from almost 68 percent in 2017 to 37 percent in 2023.[18] On the commercial side, *continuous energy improvement (CEI)* saw its largest savings in BY2023, 18 percent of total portfolio savings, as EAL and the program implementer work with a range of commercial customers to make operation and maintenance improvements in addition to capital improvements. *Duct sealing* was the next largest contributor, representing 13 percent of portfolio savings, and was successfully delivered to hard-to-reach sectors through EAL's downstream residential programs. Table 20 and

Table 21 provide net energy savings and annual portfolio contribution by measure and year, while Figure 7 and Table 22 provide the percentage of total portfolio net energy savings across major measure categories and years.

Table 20. Portfolio Net Energy Savings (MWh) by Year[19]

Measure	2017	2018	2019	2020	2021	2022	2023
Lighting	166,793	151,108	137,763	129,489	121,011	117,738	101,453
CEI[20]	0	0	0	0	46,282	35,718	50,694
Duct sealing (HVAC)	20,430	23,677	23,585	34,601	36,871	37,759	36,894
Custom other	22,386	28,155	24,420	54,643	24,833	35,983	22,126
Advance power strip (APS)	2,466	2,921	10,480	11,486	18,697	11,695	18,119
Variable frequency drive (VFD)	1	0	0	0	0	0	9,960
Smart thermostat	4,731	7,235	10,042	20,995	15,477	4,210	9,954
AC/HP TU	5,355	7,873	1,321	2,420	2,392	3,498	8,331
Ceiling insulation	3,975	4,301	5,009	5,673	5,272	4,968	5,036
Custom HVAC	5,386	5,602	2,166	5,460	8,253	1,065	4,338
Air infiltration	3,132	3,421	3,612	5,124	4,686	4,095	3,865
Custom lighting	7,609	6,929	4,938	13,313	13,426	11,143	3,506
Overhead door weather stripping	0	0	0	0	0	0	1,823
Controls	0	0	0	0	0	0	1,605
Com. door air infiltration	3,055	3,436	59	0	0	0	1,431
PTAC sealing	0	0	0	0	0	0	1,192
AC/HP replacement	6,451	0	7,877	0	12	90	1,062

[18] Lighting includes both *lighting* and *custom lighting* measures.
[19] All tables and figures in this section exclude energy savings from demand response programs.
[20] CEI savings were included in Custom Other until 2021.

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Measure	2017	2018	2019	2020	2021	2022	2023
Low-flow showerhead	208	181	195	269	203	404	565
Appliance recycling	0	0	0	0	0	0	477
Refrigeration	3,532	2,084	1,044	576	204	984	152
Faucet aerator	32	121	25	54	42	56	137
HVAC	962	1,874	1,597	507	238	17,250	131
DHW	354	221	211	166	319	315	56
Pool pumps	120	152	437	334	307	117	45
HEBC	0	0	0	0	0	0	32
Weather stripping for refrigerated spaces	0	0	0	0	0	0	16
Air purifier	0	4	11	25	57	14	16
Pre-rinse spray valves	0	0	0	0	0	0	8
Weatherization	0	0	0	0	0	2	3
Dehumidifier	0	7	4	5	3	3	1
Freezers	0	0	0	0	0	0	0
Envelope	0	0	8,415	7,857	9,271	5,820	0
Other	0	0	0	0	85	0	0
Battery chargers	80	5	160	209	0	0	0
Clothes washer	26	19	4	0	0	0	0
ECM	0	0	291	0	0	0	0
HPWH	5	0	0	0	0	0	0
Motors	0	56	0	0	0	0	0
Total	**257,089**	**249,381**	**243,666**	**293,208**	**307,942**	**292,926**	283,028

Table 21. Percentage of Portfolio Net Energy Savings by Measure and Year

Measure	2017	2018	2019	2020	2021	2022	2023
Lighting	64.9%	60.6%	56.5%	44.2%	39.3%	40.2%	35.8%
CEI	0.0%	0.0%	0.0%	0.0%	15.0%	12.2%	17.9%
Duct sealing	7.9%	9.5%	9.7%	11.8%	12.0%	12.9%	13.0%
Custom other	8.7%	11.3%	10.0%	18.6%	8.1%	12.3%	7.8%
APS	1.0%	1.2%	4.3%	3.9%	6.1%	4.0%	6.4%
Smart thermostat	1.8%	2.9%	4.1%	7.2%	5.0%	1.4%	3.5%
VFD	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%

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Measure	2017	2018	2019	2020	2021	2022	2023
AC/HP TU	2.1%	3.2%	0.5%	0.8%	0.8%	1.2%	2.9%
Ceiling insulation	1.5%	1.7%	2.1%	1.9%	1.7%	1.7%	1.8%
Custom HVAC	2.1%	2.2%	0.9%	1.9%	2.7%	0.4%	1.5%
Air infiltration	1.2%	1.4%	1.5%	1.7%	1.5%	1.4%	1.4%
Custom lighting	3.0%	2.8%	2.0%	4.5%	4.4%	3.8%	1.2%
Overhead door weather stripping	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Controls	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Com. door air infiltration	1.2%	1.4%	<0.1%	0.0%	0.0%	0.0%	0.5%
DHW	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	<0.1%
Pool pumps	0.0%	0.1%	0.2%	0.1%	0.1%	<0.1%	<0.1%
HVAC	0.4%	0.8%	0.7%	0.2%	0.1%	0.3%	<0.1%
Refrigeration	1.4%	0.8%	0.4%	0.2%	0.1%	0.3%	<0.1%
Low-flow showerhead	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	<0.1%
Air purifier	0.0%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Faucet aerator	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
AC/HP replacement	2.5%	0.0%	3.2%	0.0%	<0.1%	<0.1%	<0.1%
Dehumidifier	0.0%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Freezers	0.0%	0.0%	0.0%	<0.1%	<0.1%	<0.1%	<0.1%
Weatherization	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%	<0.1%
PTAC sealing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Appliance recycling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
HEBC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Weather stripping for refrigerated spaces	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Pre-rinse spray valves	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Envelope	0.0%	0.0%	3.5%	2.7%	3.0%	2.0%	0.0%
Battery chargers	<0.1%	<0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Clothes washer	<0.1%	<0.1%	<0.1%	0.0%	0.0%	0.0%	0.0%
ECM	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
HPWH	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Motors	0.0%	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	0.0%	0.0%	0.0%	0.0%	<0.1%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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Figure 7. Distribution of Portfolio Net Energy Savings by Measure Category and Year (2017−2023)

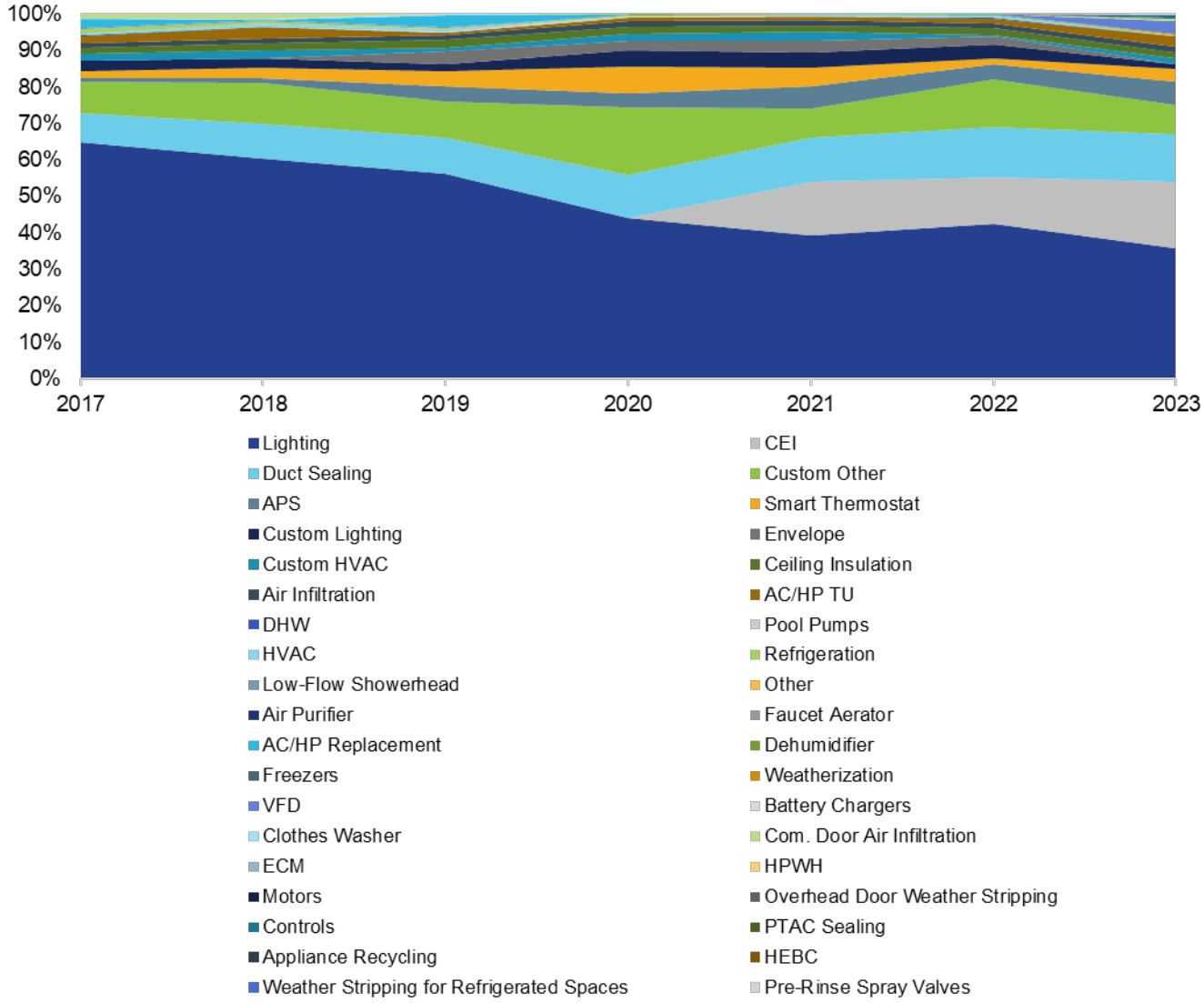


Table 22. Distribution of Portfolio Net Energy Savings by Measure Category and Year

Measure category	2017	2018	2019	2020	2021	2022	2023
Lighting	64.9%	60.6%	56.5%	44.2%	39.3%	40.2%	35.7%
HVAC	6.9%	6.9%	8.7%	9.1%	6.6%	21.4%	19.8%
CEI	0.0%	0.0%	0.0%	0.0%	15.0%	12.2%	17.9%
Custom other	8.7%	11.3%	10.0%	18.6%	8.1%	12.3%	10.0%
Other (APS)	1.0%	1.2%	4.3%	3.9%	6.1%	0.0%	6.4%
Envelope	10.6%	12.5%	16.5%	17.3%	17.5%	5.1%	4.8%
VFD	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%
Custom lighting	3.0%	2.8%	2.0%	4.5%	4.4%	3.8%	1.2%

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Measure category	2017	2018	2019	2020	2021	2022	2023
Appliance	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	4.0%	<0.1%
Compressed air	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Custom HVAC	2.1%	2.2%	0.9%	1.9%	2.7%	0.4%	<0.1%
DHW	0.3%	0.3%	0.4%	0.3%	0.3%	0.3%	<0.1%
Other (HEBC)	<0.1%	<0.1%	0.1%	0.1%	<0.1%	0.0%	<0.1%
Refrigeration	1.4%	0.8%	0.4%	0.2%	0.1%	0.3%	<0.1%
Motors	0.0%	<0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Com. door air infil.	1.2%	1.4%	<0.1%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.2.2 Commercial Sector

The commercial sector programs, much like the overall portfolio, had the most net energy savings coming from *lighting* measures and installations. However, the proportion of commercial savings coming from *lighting* decreased each year between 2017 and 2023, from a high point of 75 percent of sector savings to 36 percent in 2023. As of 2023, *CEI* projects now contribute over 31 percent of commercial sector energy savings each. Table 23 provides a full distribution of net energy savings by measure and year in the commercial sector, with Figure 8 and Figure 9 showing trends among commercial programs from 2017 through 2023.

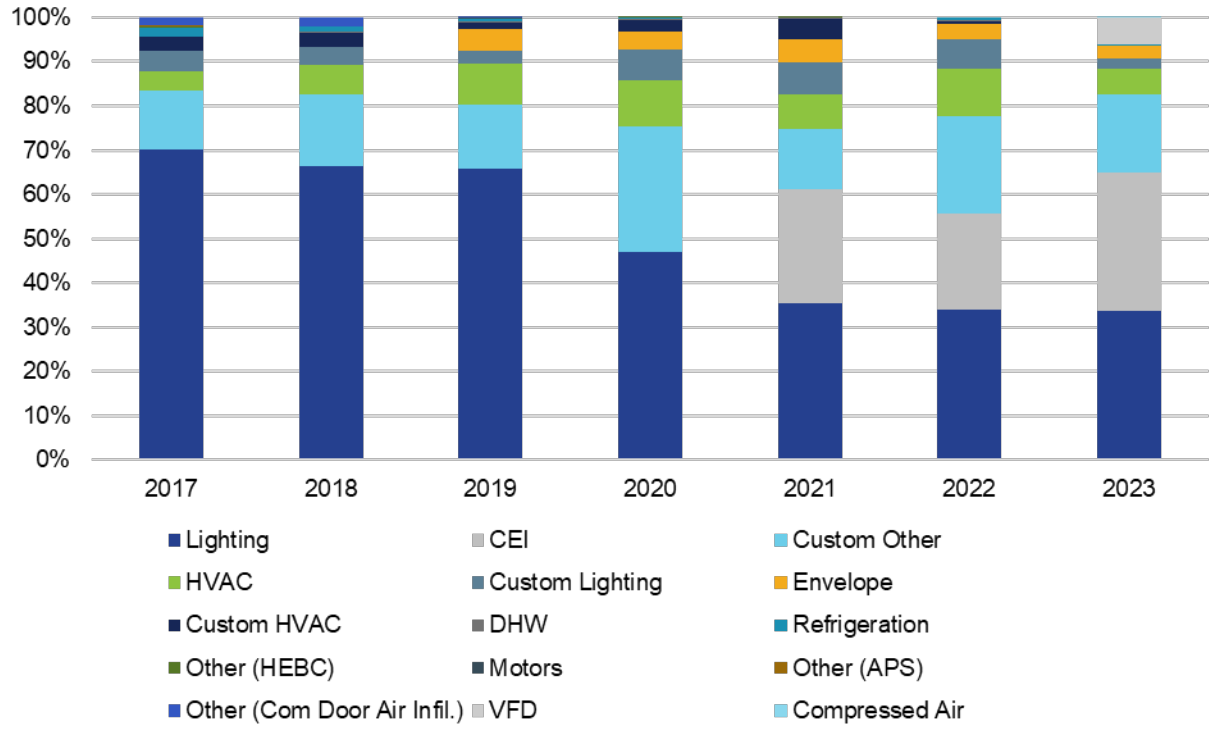
Table 23. Percentage of Net Energy Savings by Measure and Year (kWh)
Commercial Programs

Measure	Percentage of net energy savings by measure and year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
Lighting	70.2%	66.5%	65.9%	47.2%	35.6%	33.9%	33.9%
CEI	0.0%	0.0%	0.0%	0.0%	25.5%	21.6%	31.3%
Custom other	13.4%	16.2%	14.5%	28.2%	13.7%	21.8%	17.3%
VFD	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%
HVAC	4.2%	6.6%	9.2%	10.4%	7.8%	10.5%	6.1%
Envelope	0.0%	0.0%	5.0%	4.1%	5.1%	3.5%	2.8%
Custom lighting	4.6%	4.0%	2.9%	6.9%	7.4%	6.7%	2.2%
Compressed air	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Custom HVAC	3.2%	3.2%	1.3%	2.8%	4.6%	0.6%	<0.1%
DHW	0.2%	0.2%	0.3%	0.1%	0.2%	0.2%	<0.1%
Refrigeration	2.1%	1.2%	0.6%	0.3%	0.1%	0.6%	<0.1%
Other (HEBC)	<0.1%	<0.1%	0.1%	0.1%	<0.1%	0.0%	<0.1%
Motors	0.0%	<0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Other (APS)	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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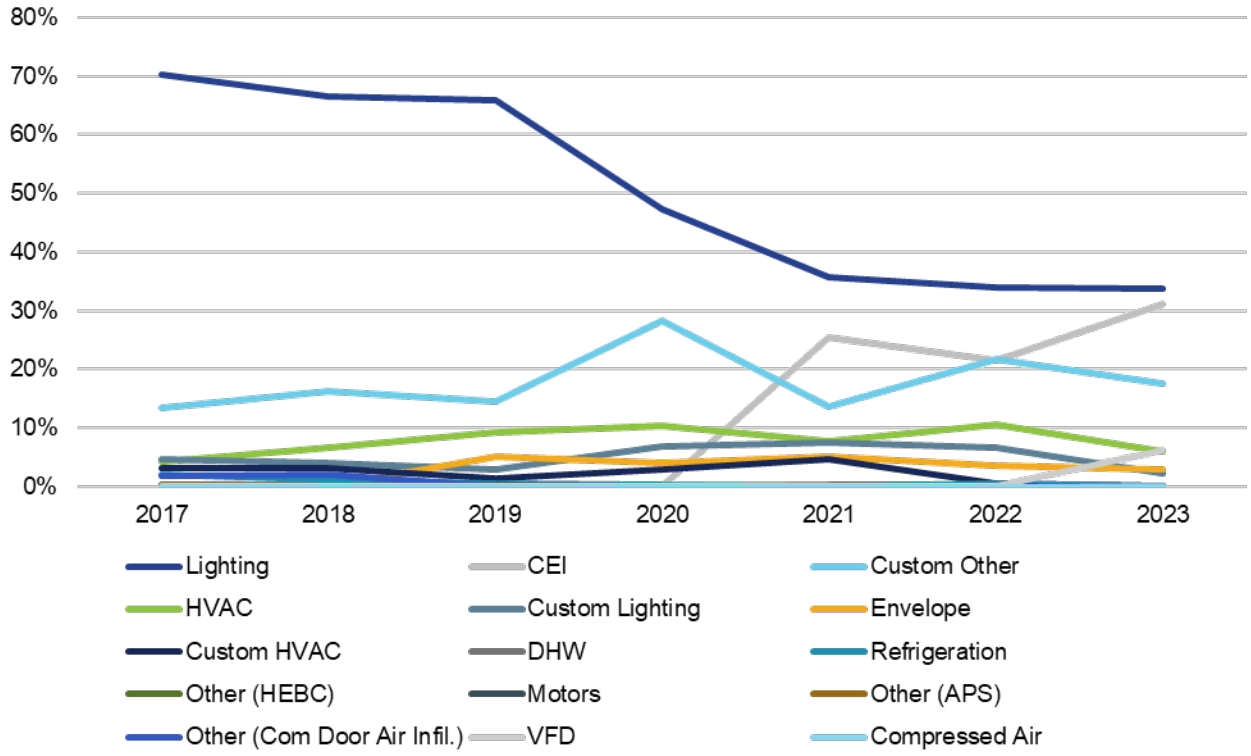
Measure	Percentage of net energy savings by measure and year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
Other (com door air infil.)	1.8%	2.0%	<0.1%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figure 8. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Commercial Programs



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Figure 9. Net Energy Savings by Measure and Year (2017−2023)
Commercial Programs



3.2.2.1 Agricultural Energy Solutions (AES)

Apart from 2019 and 2020, where one custom *VFD* project occurred in both years, all energy savings in the AES program came from custom lighting installations and retrofits until 2023, when several *lighting control* projects occurred, as shown in Table 24. The program implementer reports that they are still pursuing *VFD* projects as part of the program design.

Table 24. Net Energy Savings by Measure and Year (kWh)
AES Program

Measure	2017	2018	2019	2020	2021	2022	2023
Custom lighting	7,609,051	6,929,022	4,938,316	13,313,382	13,425,635	11,142,520	3,506,216
Custom VFD	0	0	37,461	24,669	0	0	0
Custom other	0	0	0	0	0	0	1,605,062
Total	**7,609,051**	**6,929,022**	**4,938,316**	**13,313,382**	**13,425,635**	**11,142,520**	**5,111,279**

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3.2.2.2 Public Institution Solutions (PIS)[21]

The PIS program has greatly decreased the amount of savings coming from *lighting* measures during the past five years. As shown in Figure 10, *lighting* savings in 2017 contributed more than 95 percent of total program savings; in 2023, this decreased to 40 percent. In 2020 and 2021, *HVAC* measures contributed the highest proportion of net energy savings in PIS; however, in 2022, *HVAC* only accounted for three percent of savings. In 2023, *lighting* (40 percent), *CEI* (30 percent), and *HVAC* (25 percent) projects accounted for more than 94 percent of net energy savings.

Figure 10. Distribution of Net Energy Savings by Measure and Year (2017−2023)
PIS Program

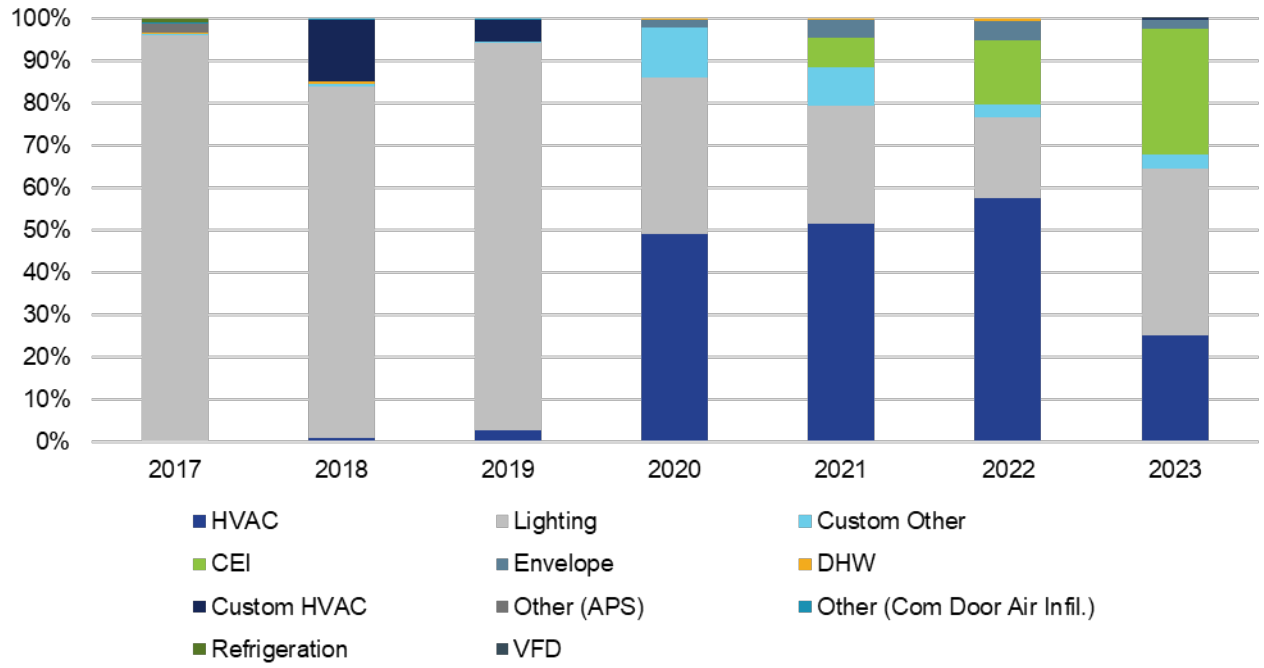


Table 25. Net Energy Savings by Measure and Year (kWh)
PIS Program

Measure	2017	2018	2019	2020	2021	2022	2023
Lighting	19,060,779	20,841,597	15,876,758	9,016,732	5,650,769	3,728,282	6,736,970
CEI	0	0	0	0	1,389,771	2,921,962	5,058,582
HVAC	61,100	222,801	433,319	11,972,620	10,431,055	11,030,222	4,276,197
Custom other	112,181	187,003	71,245	2,876,196	1,810,040	570,965	550,912
Envelope	0	0	0	392,840	916,969	847,075	158,330

[21] Includes CitySmart data pre-2020.

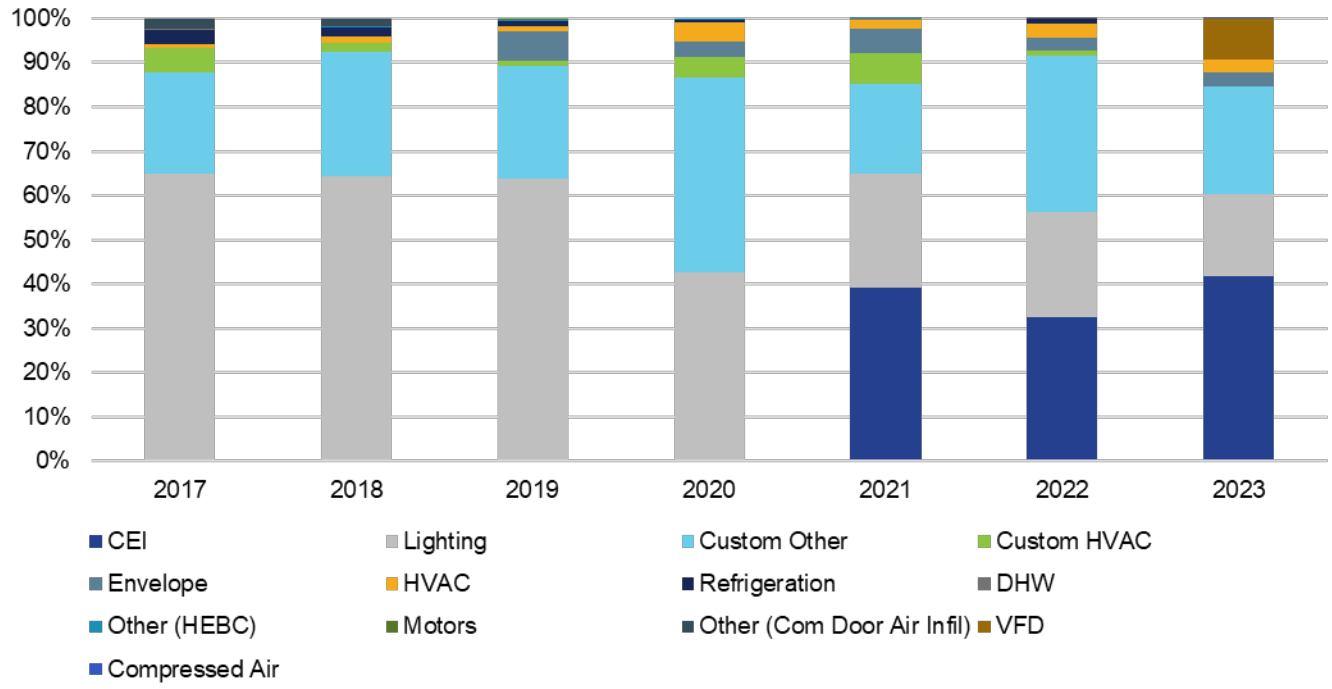
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Measure	2017	2018	2019	2020	2021	2022	2023
Custom HVAC	0	3,647,408	882,217	0	0	0	35,775
VFD	0	0	0	0	0	0	14,614
DHW	34,373	102,089	0	101,077	36,225	126,197	1,211
Other (APS)	418,009	0	0	0	0	0	0
Other (com door air infil.)	46,181	110,233	58,990	0	0	0	0
Refrigeration	208,080	0	0	0	0	0	0
Total	**19,940,702**	**25,111,131**	**17,322,529**	**24,359,465**	**20,234,829**	**19,224,703**	**16,832,595**

3.2.2.3 Large Commercial and Industrial Solutions (Large C&I)

The Large C&I program also witnessed a decline in *lighting* savings relative to other measures in 2023 compared to previous years. In 2017, 65 percent of the Large C&I program's net energy savings came from *lighting* measures; in 2023, this number dropped to 19 percent. Other custom projects have always provided a large portion of Large C&I savings, ranging from 20 to 44 percent in the past seven years. In 2023, *CEI* projects were the largest contributor of net energy savings in Large C&I, providing 42 percent of net energy savings. Figure 11 and Table 26 provide details on the distribution of savings among Large C&I measures between 2017 and 2023.

Figure 11. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Large C&I Program



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Table 26. Percentage of Net Energy Savings by Measure and Year (kWh)
Large C&I Program

Measure	2017	2018	2019	2020	2021	2022	2023
CEI	0.0%	0.0%	0.0%	0.0%	39.2%	32.6%	41.9%
Custom other	22.7%	28.0%	25.4%	44.0%	20.1%	35.2%	23.7%
Lighting	65.1%	64.4%	63.8%	42.7%	25.7%	23.7%	18.7%
VFD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%
Envelope	0.0%	0.0%	6.6%	3.4%	5.4%	3.1%	3.2%
HVAC	0.9%	1.6%	1.2%	4.5%	1.9%	3.2%	3.0%
Refrigeration	3.2%	2.0%	1.1%	0.5%	0.2%	1.0%	<0.1%
DHW	0.2%	0.1%	0.1%	<0.1%	0.1%	0.1%	<0.1%
Other (HEBC)	0.1%	<0.1%	0.2%	0.2%	0.1%	0.0%	<0.1%
Custom HVAC	5.5%	2.0%	1.3%	4.6%	7.2%	1.1%	<0.1%
Compressed air	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%
Motors	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%
Other (com door air infil.)	2.3%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.2.2.4 Small Business Solutions (Small Business)

The Small Business program remains dominated by *lighting* savings, with 82 percent of net savings coming from *lighting* installations in 2023. This trend has been relatively consistent over the past seven years, with *lighting* responsible for 67 to 96 percent of program savings. Figure 12 and Table 27 provide details on the distribution of savings among Small Business measures between 2017 and 2023.

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Figure 12. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Small Business Program

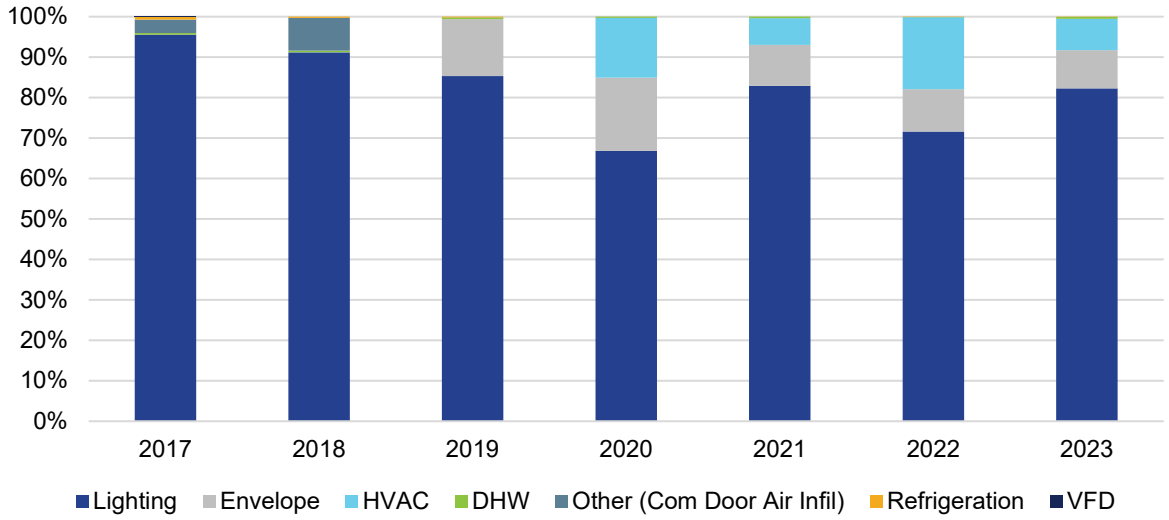


Table 27. Percentage of Net Energy Savings by Measure and Year (kWh)
Small Business Program

Measure	2017	2018	2019	2020	2021	2022	2023
Lighting	95.6%	91.2%	85.3%	66.9%	82.9%	71.7%	82.0%
Envelope	0.0%	0.0%	14.1%	18.1%	10.1%	10.5%	9.4%
HVAC	0.0%	<0.1%	0.0%	14.8%	6.6%	17.8%	7.7%
DHW	0.4%	0.4%	0.4%	0.3%	0.4%	0.1%	0.5%
Refrigeration	0.7%	0.3%	0.2%	0.0%	0.0%	<0.1%	<0.1%
Com door air infil.	3.3%	8.1%	0.0%	0.0%	0.0%	0.0%	0.0%
VFD	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	100.0%	100.0%

3.2.2.5 Point of Purchase Solutions (POPS)—Midstream

The Commercial Midstream program, which merged into the POPS program in 2020, provides measures to commercial customers through participating distributors. While the Commercial Midstream program offered customers rebates for additional, non-lighting measures (i.e., *VFDs*), the commercial portion of the POPS program focused solely on *lighting* in BY2023. The program continues exploring additional measures to offer through its commercial offering in future years. Table 28 summarizes the programs' net savings since 2017.

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Table 28. Net Energy Savings by Measure and Year (kWh)
Commercial Midstream Lighting/POPS Programs

Measure	2017	2018	2019	2020	2021	2022	2023
Lighting	12,312,436	13,282,892	21,346,170	19,256,550	11,866,983	16,052,790	20,233,949
Pumps	0	38,656	252,103	0	0	0	0
Total	**12,312,436**	**13,321,548**	**21,598,273**	**19,256,550**	**11,866,983**	**16,052,790**	**20,233,949**

3.2.3 Residential Sector

The residential sector programs had the most net energy savings from *HVAC* in 2023 (39 percent). This is a change from prior years where *lighting* measures and installations were always the highest savers. Starting at a high point of 55 percent of sector savings in 2017, *lighting's* contribution to residential energy savings decreased to 38 percent in 2023. Table 29 provides a full distribution of net energy savings by measure and year in the residential sector, with Figure 13 and Figure 14 showing trends among residential programs from 2017 through 2023.

Table 29. Percentage of Net Energy Savings by Measure Category and Year (kWh)
Residential Programs

Measure	2017	2018	2019	2020	2021	2022	2023
HVAC	11.8%	7.6%	7.5%	6.5%	5.0%	34.9%	38.7%
Lighting	55.1%	46.9%	35.5%	38.3%	44.6%	48.3%	37.7%
Other (APS)	2.3%	3.9%	14.0%	11.5%	14.7%	9.2%	15.1%
Envelope	30.3%	41.1%	42.4%	43.0%	35.1%	7.1%	7.4%
DHW	0.4%	0.4%	0.6%	0.7%	0.5%	0.4%	0.6%
Appliance	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	0.1%	<0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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Figure 13. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Residential Programs

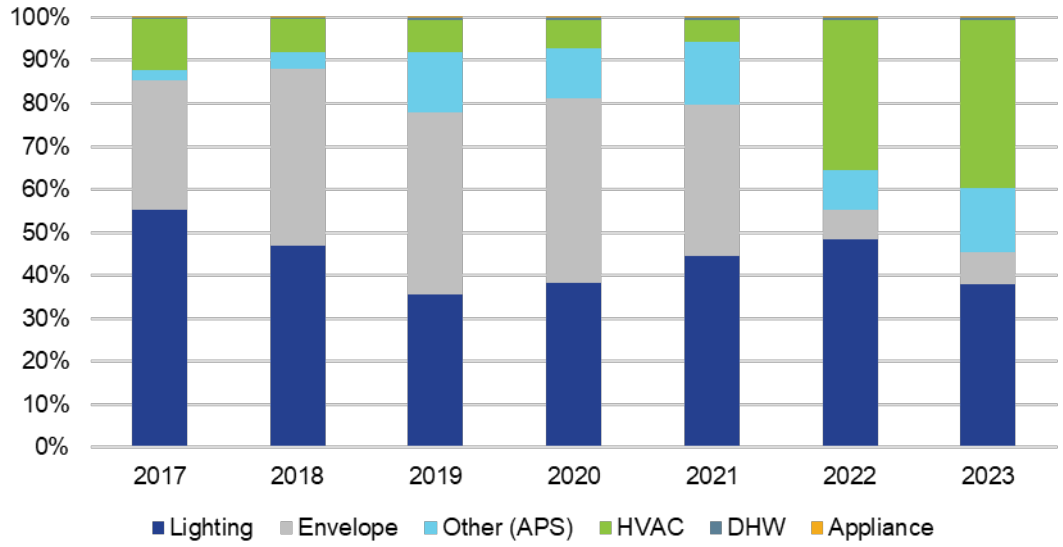
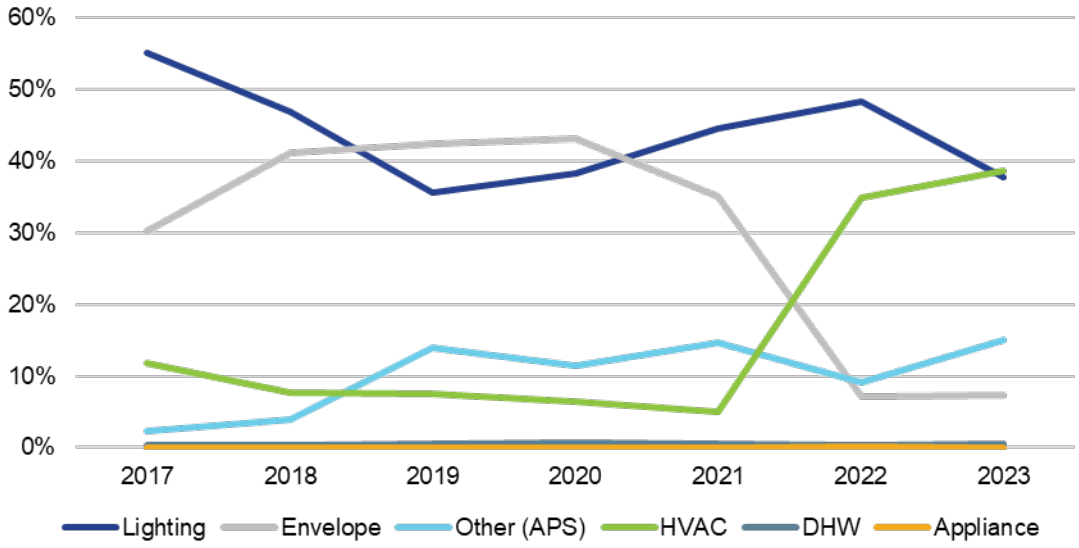


Figure 14. Net Energy Savings by Measure and Year (2017−2023)
Residential Programs



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3.2.3.1 Home Energy Solutions (HES)

The HES program was dominated by *envelope* savings between 2017 and 2021, contributing between 86 and 92 percent of HES savings each year. In 2023, much like 2022, *envelope* savings decreased greatly, accounting for 19 percent of HES savings in BY2023. More than 77 percent of HES savings in 2023 came from *HVAC* projects, the largest contributor. Figure 15 and Table 30 provide details on the distribution of savings among HES measures between 2017 and 2023.

Figure 15. Distribution of Net Energy Savings by Measure and Year (2017−2023)
HES Program

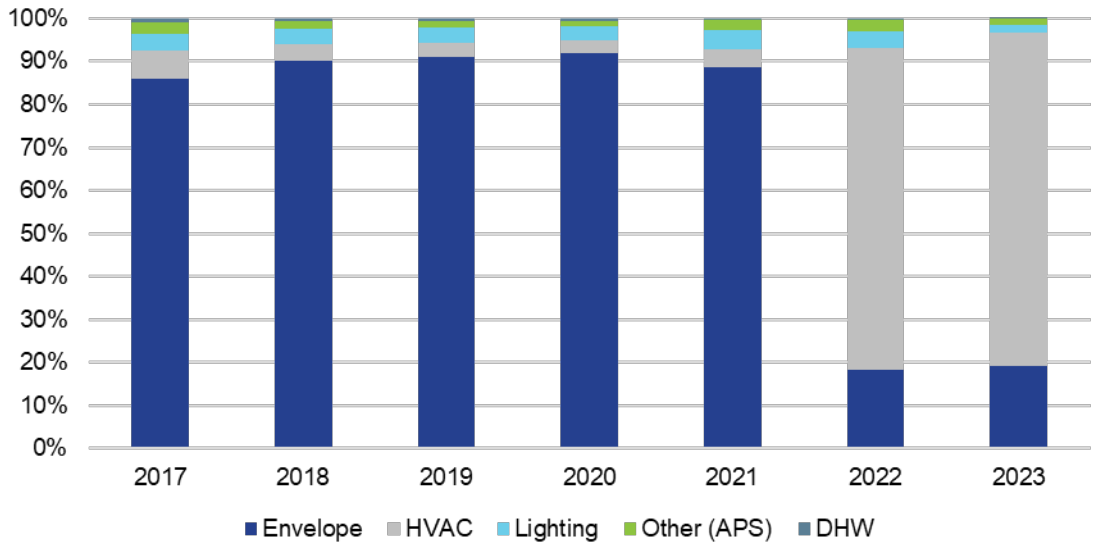


Table 30. Percentage of Net Energy Savings by Measure Category and Year (kWh)
HES Program

Measure	Percentage of net energy savings by measure and year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
HVAC	6.3%	3.8%	3.5%	3.0%	4.3%	74.7%	77.3%
Envelope	86.1%	90.2%	90.9%	92.1%	88.6%	18.3%	19.2%
Other (APS)	2.8%	1.8%	1.7%	1.4%	2.3%	2.6%	1.6%
Lighting	4.0%	3.5%	3.4%	3.1%	4.4%	4.1%	1.5%
DHW	0.8%	0.7%	0.5%	0.5%	0.4%	0.3%	<0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.2.3.2 Energy Solutions for Manufactured Homes (Manufactured Homes)

The Manufactured Homes program was dominated by *envelope* savings between 2017 and 2021, with at least 74 percent of net savings coming from *envelope* measures each of the five

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years. In 2023, only 5 percent of savings from manufactured homes projects came from *envelope* measures, while 94 percent came from *HVAC* projects. Figure 16 and Table 31 provide details on the distribution of savings among Manufactured Homes measures between 2017 and 2023.

Figure 16. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Manufactured Homes Program

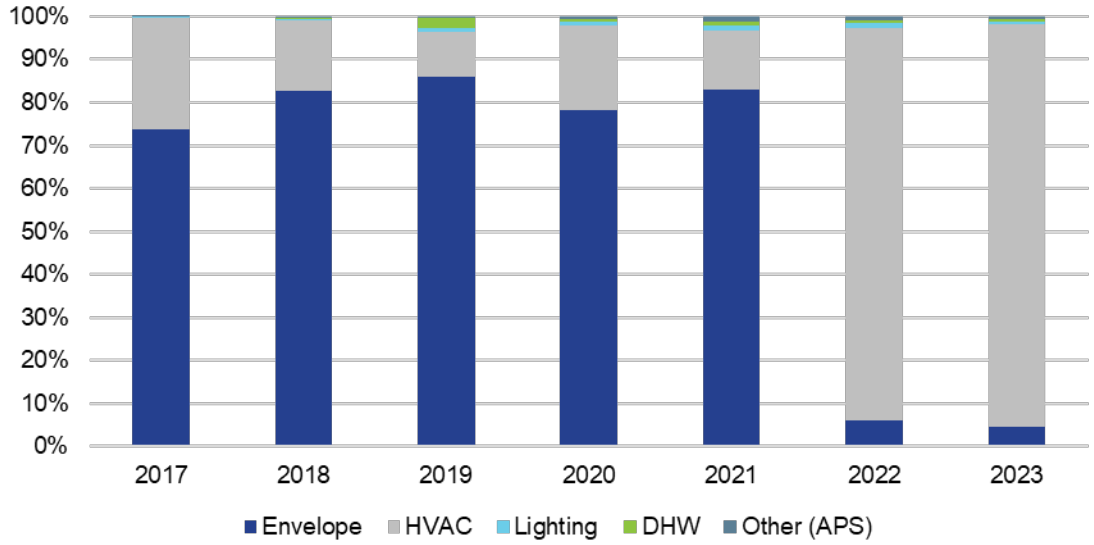


Table 31. Percentage of Net Energy Savings by Measure Category and Year (kWh)
Manufactured Homes Program

Measure	Percentage of net energy savings by measure and year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
HVAC	25.9%	16.6%	10.2%	19.7%	13.6%	91.1%	93.5%
Envelope	73.9%	82.6%	86.1%	78.3%	83.1%	6.2%	4.7%
DHW	0.1%	0.3%	2.2%	0.6%	0.8%	0.6%	0.8%
Lighting	0.1%	0.2%	1.1%	1.0%	1.4%	1.1%	0.5%
Other (APS)	<0.1%	0.3%	0.4%	0.5%	1.2%	1.0%	0.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.2.3.3 Energy Solutions for Multifamily Homes (Multifamily Homes)

The Multifamily Homes program has been dominated by *HVAC* and *envelope* savings for the past five years. In 2017, *HVAC* was responsible for 71 percent of the savings, and *envelope* measures 28 percent of savings. This trend shifted in the years after, where in 2021, 80 percent of program savings came from *envelope* measures and 16 percent from *HVAC*. In 2023, much

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like in 2022, this trend reverted, with HVAC measures accounting for 81 percent of Multifamily Homes savings and only 15 percent coming from *envelope* savings. Figure 17 and

Table 32 provide details on the distribution of savings among Multifamily Homes measures between 2017 and 2023.

Figure 17. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Multifamily Homes Program

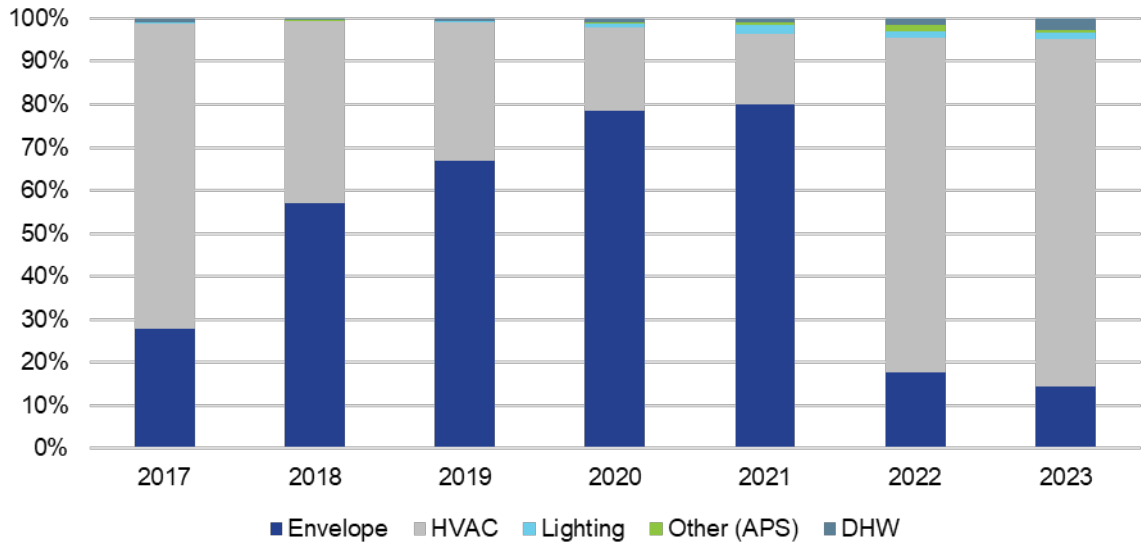


Table 32. Percentage of Net Energy Savings by Measure Category and Year (kWh)
Multifamily Homes Program

Measure	Percentage of net energy savings by measure and year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
HVAC	71.1%	42.2%	32.2%	19.4%	16.4%	77.8%	80.6%
Envelope	27.7%	57.1%	67.0%	78.4%	80.0%	17.6%	14.5%
DHW	0.9%	0.4%	0.5%	0.8%	0.8%	1.6%	2.7%
Lighting	0.1%	0.2%	0.3%	1.0%	2.0%	1.7%	1.6%
Other (APS)	0.1%	0.1%	<0.1%	0.4%	0.8%	1.3%	0.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

3.2.3.4 Point of Purchase Solutions (POPS)

The POPS program has had most of its savings come from *lighting* over the past seven years, with between 70 and 97 percent of POPS savings. In 2023, *Other (APS)* measures were the next largest contributor, with about 28 percent of net program savings. Figure 18 and Table 33 provide details on the distribution of savings among POPS measures between 2017 and 2023.

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Figure 18. Distribution of Net Energy Savings by Measure and Year (2017−2023)
Residential Lighting Appliances (RLA)/POPS Programs

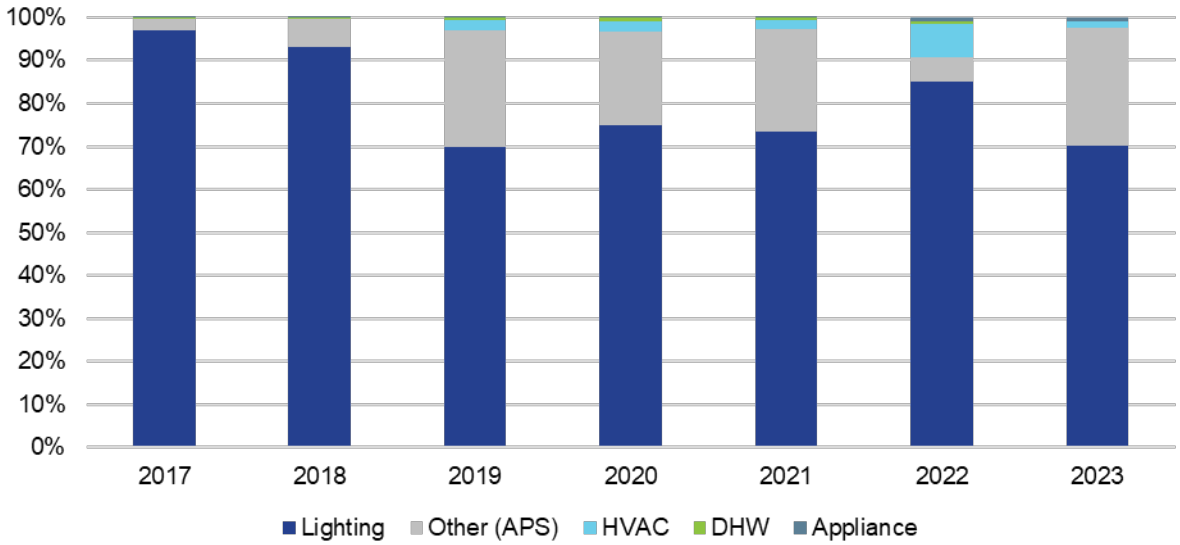


Table 33. Percentage of Net Energy Savings by Measure Category and Year (kWh)
RLA/POPS Programs

Measure	Percentage of Net Energy Savings by Measure and Year (kWh)						
	2017	2018	2019	2020	2021	2022	2023
Lighting	97.1%	93.2%	69.9%	74.8%	73.6%	84.9%	70.0%
Other (APS)	2.6%	6.4%	27.2%	21.9%	23.8%	5.8%	27.5%
HVAC	0.0%	0.0%	2.4%	2.5%	2.0%	7.7%	1.5%
Appliance	0.1%	0.1%	0.1%	0.1%	0.1%	1.0%	0.8%
DHW	0.2%	0.3%	0.5%	0.7%	0.5%	0.5%	<0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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3.2.3.5 Low-Income Solutions (LIS)

The LIS program was primarily driven by *envelope* savings in 2020 and 2021, with 74 and 76 percent of LIS net savings, respectively. In 2023, *envelope* savings only accounted for 16 percent of savings, while *HVAC* contributed to 80 percent of LIS savings. Figure 19 and Table 34 provide details on the distribution of savings among Low-Income Solutions measures between 2020 and 2023.

Figure 19. Distribution of Net Energy Savings by Measure and Year (2017−2023)
LIS Program

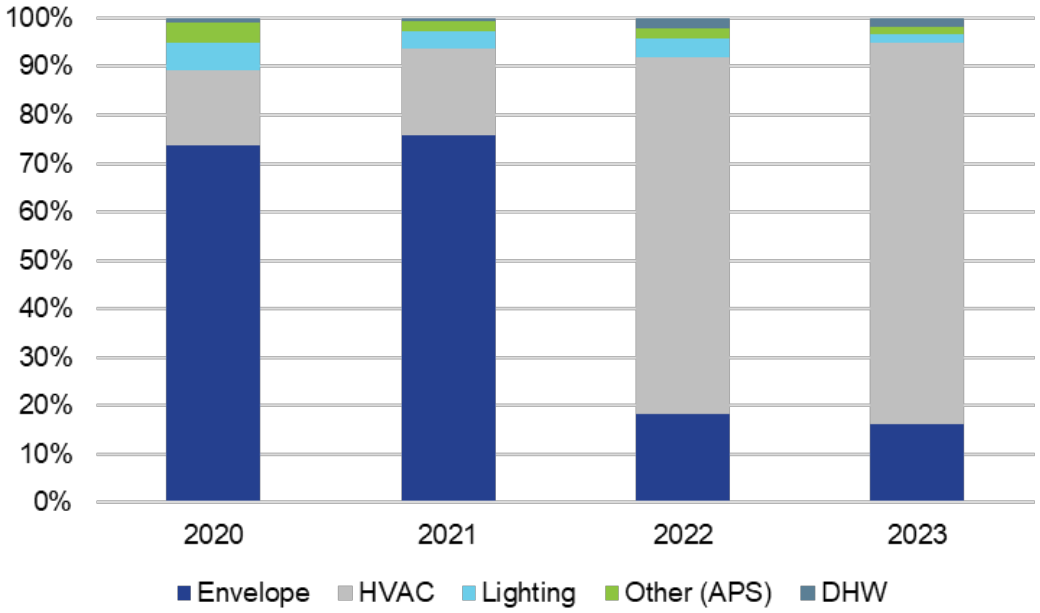


Table 34. Percentage of Net Energy Savings by Measure Category and Year (kWh)
LIS Program

Measure	2020	2021	2022	2023
HVAC	15.5%	18.1%	73.6%	78.5%
Envelope	73.8%	75.8%	18.3%	16.3%
DHW	1.0%	0.5%	2.1%	1.9%
Lighting	5.6%	3.4%	3.8%	1.8%
Other (APS)	4.1%	2.3%	2.2%	1.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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3.3 ENERGY BURDEN ANALYSIS

As part of the PY2022 EM&V research, Tetra Tech conducted portfolio-level EM&V research to support EAL in program planning. This research included a market trends study characterizing the market conditions in which the energy efficiency programs operate, as well as measure trend analysis, which was also updated through BY2023 as presented above. In addition, BY2023 presented another opportunity for forward-looking portfolio-level research to inform and support future program success. Through relationship-building in hard-to-reach communities, including partnerships with neighborhood stores and nonprofit organizations, focused outreach efforts for multifamily and manufactured homes, and including *health and safety* measures as part of its low-income offerings, EAL has effectively served vulnerable populations throughout its territory as defined by income, age and comprehensiveness metrics (see the Act 1102 information in Section 16). This success led to the question: *Could another metric also help identify and serve customers that can most benefit from energy efficiency improvements?*

Given the importance of energy burden in understanding energy affordability and serving one of the five states with the highest energy burden nationally, as calculated by the Department of Energy, EAL is leading the way for Arkansas in developing and tracking an electric-burden metric for each of its low-income customers. Utilizing Department of Housing and Urban Development (HUD) data overlaid on geographic information system mapping of its territory and analyzing billing data for each household in a HUD low-income qualified census tract, an average annual electric burden is being developed to inform program outreach efforts and monitor program outcomes. As this metric is in progress at the time of BY2023 reporting, future reporting will discuss the methodology used to develop EAL's customer electric burden metric and how program design and delivery strategies are being informed by customer electric burden in its 2024-2026 program cycle.

3.4 COMPREHENSIVENESS CHECKLIST

The EM&V effort includes an annual review of the Arkansas Public Service Commission's (APSC) Comprehensiveness Checklist (Comprehensive Checklist) to assess portfolio performance against the checklist's seven factors. From the EM&V team's assessment, EAL met the APSC's Comprehensiveness Checklist's objectives in BY2023 at the portfolio level, although there were opportunities for improvement identified for specific programs.

Comprehensiveness Factor 1
Whether the programs or portfolios provide, directly or through identification and coordination, the education, training, marketing, or outreach needed to address market barriers to adopting cost-effective energy efficiency measures.

The EM&V team assessed this factor through in-depth interviews with EAL's implementation contractors and a review of marketing and training materials. The EAL programs continued to provide education and outreach to trade allies and customers that address specific market barriers to adopting cost-effective efficiency measures. Trade ally technical training, upstream and midstream market actor engagement, and customer marketing and outreach remained foundational strategies. The following highlights specific efforts made to achieve this factor:

- **Program branding and all marketing materials continue to carry the *Entergy Solutions* logo.** Marketing collateral is reviewed, updated, and refreshed annually.

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- **Mass marketing, coupled with targeted marketing to specific segments, continued to raise awareness among customers.** In particular, the use of social media and emails has increased. Email blasts were reported as successful in raising awareness and motivating customers to participate. EAL and its implementation contractors sought out various education and giveaway opportunities through community events and conducted in-person visits to target markets. Remote outreach efforts included media buys (print and radio were the most common), direct mailings, telephone calls, and the email blasts previously referenced.
- **Trade ally education and training continued across all programs and expanded to meet specific measures; in particular, *HVAC tune-ups* increased in BY2023 across residential offerings.** For the commercial programs, a trade ally specialist position continued to focus on recruiting and training trade allies on all programs, measures, incentive levels, marketing, and project savings calculators. Trade ally summits were also held for educational purposes, and high-performing trade allies were recognized with awards to foster continued program participation. The upstream residential and midstream commercial components of the POPS program grew throughout the program cycle with more measures and expanded partnerships. In particular, POPS focuses on retailer and distributor outreach and training to help sales associates be subject-matter experts to best influence decision-making during the purchase. POPS was particularly successful in BY2023 in increasing the participation of retailers in low-income communities.
- **EAL solicited customer feedback to improve customer outreach and education.** Programs provided a toll-free telephone number to customers so they could speak directly with customer service representatives. Also, several programs in EAL's portfolio conducted periodic surveys to receive feedback about satisfaction directly from program participants. BY2022 EM&V surveys with residential participants found very high satisfaction with EAL programs.
- **Program staff dedicated marketing and outreach across all EAL territories.** EAL program managers and implementation contractor staff are program experts and provide education and outreach about programs, including other utilities' programs. Also, program staff recruit trade allies, retailers, and distributors that provide additional program reach across EAL's service territory and help them successfully achieve goals. Online purchasing tools expanded this program cycle, allowing customers to identify their rebated items online, verify eligibility, and obtain a scannable code for use at participating retailers, further increasing the accessibility and ease of participation. These online offerings are a preferred option for a segment, and EAL has continued to build on these efforts.
- **EAL continued substantial efforts to serve traditionally underserved households through specific efforts to reach multifamily, manufactured home, and low-income customers**. This was accomplished both through its downstream programs, which were successful in serving low-income and senior citizen households (as summarized in Section 16 of this report) and through its POPS Program. In addition to downstream program offerings, EAL and its implementation contractor partnered with various organizations that serve low-income customers, such as food banks, to deliver energy-efficient products to these households and increase the participation of retailers in low-income neighborhoods that participate in the POPS program. These multi-pronged offerings to low-income customers help address the substantial affordability

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barriers this sector faces.

Comprehensiveness Factor 2
Whether the program or portfolio has adequate budgetary, management, and program delivery resources to plan, design, implement, oversee, and evaluate energy efficiency programs.

The EM&V team assessed this factor through performance data provided by EAL and in-depth interviews with implementation contractors and program staff. Overall, the EM&V team found budgets and resources were sufficient to support program goals, including the plan, design, implementation, oversight, and evaluation of the programs. With lower avoided costs and increased goals in the program cycle, a myriad of challenges also arose during the pandemic. Inflationary pressures identified as specific program obstacles in the PY2022 EM&V research continued in BY2023, specifically delaying some customers' planned upgrades. To address these challenges, the programs continued to leverage the trade ally infrastructures coupled with expanded channels (upstream, midstream, online) to market the programs and deliver them to customers.

- **In most cases, program budgets were sufficient to implement the programs, but persistent inflation affecting material and staffing costs is a concern.** Program and implementation staff reported that they had enough budget to cover program implementation but also reported concern with continued increasing costs in PY2022 that persisted in BY2023. Pre-negotiated contracts helped maintain many costs, but there are concerns about future program years. EAL achieved its energy savings goals at a portfolio level but fell short of demand reduction targets while spending 84 percent of the planned budget, as some programs fell short of participation goals.
- **Budget flexibility is important for EAL to make allowable adjustments to deliver annual cost-effective energy efficiency that meets savings goals.** Arkansas utilities had additional budgetary flexibility in BY2023, with the ability to reallocate up to 20 percent of initial program budgets to other programs in the portfolio (adjustments are limited to 10 percent for Act 1102 pilots and programs). In BY2023, EAL revised the approved budget within the APSC's guidelines for budget flexibility, moving budgeted dollars from underachieving programs to programs seeing higher energy-saving projects and market acceptance, detailed in Table 35. This budget flexibility was critical to EAL meeting its overall portfolio savings goals in BY2023.

Table 35. BY2023 Budgets by Program/Category ($1,000s) (Initial vs. Actual)

Program/Category	Initial budget	Revised budget	Actual spend
Home Energy Solutions	$11,303	$11,158	$10,218
Energy Solutions for Multifamily Homes	$2,650	$2,790	$2,896
Energy Solutions for Manufactured Homes	$1,261	$1,406	$1,215
Low-Income Solutions	$4,958	$4,958	$3,796
Point of Purchase Solutions	$7,889	$9,163	$8,418
Large Commercial & Industrial Solutions	$21,779	$20,318	$15,017
Small Business Solutions	$2,581	$3,114	$2,123

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Program/Category	Initial budget	Revised budget	Actual spend
Public Institutions Solutions	$3,806	$3,459	$3,572
Agricultural Energy Solutions	$1,353	$1,638	$1,033
Residential Direct Load Control	$3,548	$3,548	$2,596
Smart Direct Load Control Pilot	$4,005	$3,580	$3,390
Agricultural Irrigation Load Control	$3,918	$3,918	$3,870
Energy Efficiency Arkansas	$303	$303	$30
Regulatory	$0	$0	$50
Total	**$69,355**	**$69,355**	**$58,224**

Comprehensiveness Factor 3
Whether the programs or portfolio reasonably address all major end-uses of electricity or natural gas, as appropriate.

The EM&V team assessed this factor through tracking system data analysis and interviews with EAL program managers and program implementers. This factor was found to be fully met as **program designs include measure offerings and incentives to promote all significant electricity end-uses,** as can be seen in the *Measure Trend Analysis* in Section 3.2 above, which details end-uses across EAL's portfolio**.** In particular, the *Measure Trends Analysis* demonstrates how the overall portfolio has diversified from primarily *lighting* to more comprehensive measures. On the commercial side, *CEI* has become the highest savings measure as EAL and its implementer works with customers to implement comprehensive operations and maintenance improvements across the whole facility. On the residential side, *HVAC* measures have increased as a percentage of savings alongside *envelope* measures. Most downstream programs have tiered incentives to encourage customers to undertake more comprehensive energy efficiency projects. The Home Energy Solutions and Low-Income Solutions programs' energy assessment identifies savings and provides education regarding all available significant electricity end-uses, including offerings through the CWA. The POPS program has expanded the number of measures incentivized by working directly with retailers and distributors. While the Small Business Solutions program has a generous incentive for *refrigeration* to encourage this measure, in addition to *lighting,* the program is still dominated by *lighting,* and *opportunities to pursue additional measures* was a process recommendation in BY2023. EAL continues to look for new cost-effective measure offerings to add to its program offerings, such as *ductless mini-splits* and *VFDs* for agricultural use. Large C&I has been consistently delivering a substantial percent of its savings through *custom* offerings tailored to customer needs as EAL and the program implementer work with customers to identify deeper sources of savings, including a range of operation and maintenance practices in addition to capital improvements.

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Comprehensiveness Factor 4
Whether the programs or portfolio, to the maximum extent reasonable, comprehensively address customers' needs at one time to avoid cream-skimming and lost opportunities.

The EM&V team assessed this factor through tracking system data analysis and interviews with EAL program managers and program implementers. EAL reported both program changes and continued program strategies to address customers' needs starting with identifying comprehensive savings options upfront to customers through energy assessments. The EM&V team conducted program participation analysis of how customers receive measures over the program cycle (PY2020-BY2023, the reader is referred to the Technical Appendix to this report for the detailed analysis results). The program cycle participation analysis found EAL is comprehensively addressing residential and small business customers' needs at one time, largely avoiding lost opportunities. Commercial customers' more complex energy needs require a different approach according to program staff interviews. It was reported more savings can be achieved once a customer relationship has been established. The program cycle participation analysis demonstrates the importance of a multi-year relationship for commercial customers served through the Public Institutions Solutions program. The Large C&I Solutions Program saw less multi-year participation this program cycle; however, EAL's increased CEI offerings as discussed above in the *Measure Trends Analysis* is expected to increase multi-year relationship building for the Large C&I Solutions customer segment in the next program cycle. In summary, the program cycle participation analysis supports the programs have gained traction in relation to this Comprehensive Factor. The majority of residential and small business customers' needs are addressed at one time while for commercial customers with more varied energy efficiency needs, EAL has built on past positive program experiences to do additional customer projects especially for the Public Institutions Solutions customer segment.

- **EAL continues to try to identify and serve customers comprehensively.** EAL staff and implementation contractors reported successfully implementing deeper savings as programs and customer relationships have become more established in the commercial sector. Across the residential programs and *direct-install* measures, more *envelope* and *AC tune-up* measures occur as *duct sealing* has become a significant source of savings identified through energy assessments. Another example of addressing multiple needs is the Large C&I program, where over one-half of the savings in PY2022 are from *custom* projects. The implementation contractor works closely with customers to comprehensively address facility needs.
- **Program staff seek to educate customers on all energy efficiency needs, completing comprehensive assessments when able.** One of the program staff's objectives is to comprehensively serve customers and foster strong customer relationships to educate customers on energy efficiency better and drive deeper savings. Field staff have developed customer relationships across EAL's territory, including in the harder-to-reach small business, agriculture, multifamily, manufactured homes, and low-income segments, with the objective of more comprehensively meeting their energy efficiency needs.

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Comprehensiveness Factor 5
Whether such programs take advantage of opportunities to address targeted customer sectors' comprehensive needs or leverage non-utility program resources.

The EM&V team assessed Comprehensive Factor 5 through in-depth interviews with EAL staff and implementation contractors, a review of outreach events, and participant characterization. Overall, the EM&V team found several strategic partnerships to reach targeted customer sectors and leverage non-utility program resources.

- **New and innovative partnerships led to increased outreach activities for the agriculture and commercial sectors.** Both the agriculture and commercial sectors have built a successful relationship with implementation staff. Partnerships were reported with several agencies and associations, including various trade associations. EAL reported partnering with the Arkansas Association of Energy Efficiency Engineers to co-fund training and seminars on HVAC, lighting technologies, and energy benchmarking. The AES program has partnered with the United States Department of Agriculture to serve this customer segment.
- **Non-utility program resources were leveraged for the residential sectors.** Arkansas weatherization and community action agencies were engaged to support the implementation of the LIS program. Working with the community action agencies also aimed to increase the geographic reach of the residential programs. In addition, a number of strategic partnerships were established and led to neighborhood sweeps, such as a partnership with Habitat for Humanity.
- **Programs continue to foster and increase partnerships with manufacturers, distributors, and trade allies.** The POPS program has increased participating distributors and retailers, expanded to new types of measures, and expanded partnerships to reach low-income segments. Implementors called all of the participating distributors who were considered inactive in the past year and provided additional training and tools.

Table 36 summarizes the customers served by programs through the approved four program years (PY2020−PY2022 and BY2023), demonstrating the effectiveness of efforts to meet various customer sectors' comprehensive needs through downstream, midstream, and upstream programs. While more energy savings accrue to commercial and agricultural customers, more than 40 percent of energy savings and 53 percent of demand reductions are delivered to thousands of residential customers.

Table 36. Distribution of Participating Customers by Program and Sector, BY2023

Program	Participating customers	Percentage of sector served	Percentage of portfolio
Residential			
Home Energy Solutions	7,437	22.2%	19.3%
Multifamily Homes	2,673	8.0%	6.9%
Manufactured Homes	625	1.9%	1.6%
Low-Income Solutions	1,654	4.9%	4.3%
Residential Direct Load Control	14,393	42.9%	37.4%

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Program	Participating customers	Percentage of sector served	Percentage of portfolio
Smart Direct Load Control Pilot	5,304	15.8%	13.8%
Point of Purchase Solutions[22]	1,449	4.3%	3.8%
Residential subtotal	**33,535**	**100.0%**	**87.1%**
Commercial			
Large C&I Solutions	311	9.3%	0.8%
Point of Purchase Solutions	679	20.3%	1.8%
Smart Direct Load Control Pilot	1671	49.9%	4.3%
Small Business	469	14.0%	1.2%
Public Institutions Solutions	216	6.5%	0.6%
Commercial subtotal	**3,346**	**100.0%**	**8.7%**
Agriculture			
Agricultural Energy Solutions	6	0.4%	0.0%
Agricultural Irrigation Load Control	1,605	99.5%	4.2%
Point of Purchase Solutions	2	0.1%	0.0%
Agriculture subtotal	**1,613**	**100.0%**	**4.2%**
Total[23]	**38,494**	**--**	**100.00%**

Table 37. Distribution of Participating Customers by Program and Sector, PY2020−BY2023 Cycle

Program	PY2020 participating customers	PY2021 participating customers	PY2022 participating customers	BY2023 participating customers	Total of all years	Percentage of sector served	Percentage of portfolio
Residential							
Home Energy Solutions	6,615	8,271	7,369	7,437	29,692	22.3%	19.8%
Multifamily Homes	2,567	1,669	2,348	2,673	9,257	7.0%	6.2%
Manufactured Homes	726	612	627	625	2,590	1.9%	1.7%
Low-Income Solutions	2,607	2,231	1,727	1,654	8,219	6.2%	5.5%

[22] Participant counts for POPS include only customers with account numbers and exclude all upstream measures, which accounted for 72 percent of overall POPS energy savings and 97 percent of residential savings.
[23] Due to the upstream nature of most program activity for POPS, it is impossible to identify unique participants. Accordingly, this total likely includes EAL customers that participated in multiple programs.

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Program	PY2020 participating customers	PY2021 participating customers	PY2022 participating customers	BY2023 participating customers	Total of all years	Percentage of sector served	Percentage of portfolio
Residential Direct Load Control	19,946	17,455	15,685	14,393	67,479	50.8%	44.9%
Smart Direct Load Control Pilot	945	2,200	1,734	5,304	10,183	7.7%	6.8%
Point of Purchase Solutions	1,417	1,518	1,066	1,449	5,450	4.1%	3.6%
Residential subtotal	**34,823**	**33,956**	**30,556**	**33,535**	**132,870**	**100.0%**	**88.4%**
Commercial							
Large C&I Solutions	689	483	521	311	2,004	18.1%	1.3%
Point of Purchase Solutions	891	553	617	679	2,740	24.7%	1.8%
Smart Direct Load Control Pilot	31	146	152	1,671	2,000	18.0%	1.3%
Agricultural Energy Solutions	59	28	15	6	108	1.0%	0.1%
Small Business	841	907	711	469	2,928	26.4%	1.9%
Public Institutions Solutions	435	392	263	216	1,306	11.8%	0.9%
Commercial subtotal	**2,946**	**2,509**	**2,279**	**3,352**	**11,086**	**100.0%**	**7.4%**
Agriculture							
Agricultural Irrigation Load Control	1,743	1,166	1,857	1,605	6,371	100.0%	4.2%
Point of Purchase Solutions	N/A	N/A	N/A	2	3	0.0%	0.0%
Agriculture subtotal	**1,743**	**1,166**	**1,857**	**1,607**	**6,374**	**100.0%**	**4.2%**

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Program	PY2020 participating customers	PY2021 participating customers	PY2022 participating customers	BY2023 participating customers	Total of all years	Percentage of sector served	Percentage of portfolio
Total[24]	**39,512**	**37,631**	**34,692**	**38,494**	**150,330**	**--**	**100.0%**

Comprehensiveness Factor 6

Whether the programs or portfolio enable the delivery of achievable, cost-effective energy efficiency within a reasonable period and maximize net benefits to customers and the utility system.

The EM&V team assessed this factor through the EAL program manager, implementer interviews, and data analysis. While EAL and implementers reported enough budget allocations to achieve the goal, they also reported the need to realize cost efficiencies to keep programs cost-effective given the challenges posed by inflation across a variety of materials and equipment. EAL also reported strategies to maximize net benefits, which they effectively achieve based on continual annual improvement of portfolio-level NTG ratios each program year: 90 percent in PY2020, 95 percent in PY2021, 97 percent in PY2022, and 99 percent in BY2023. Strategies are discussed below.

- **Program delivery aims to maximize NTG ratios.** EAL reports screening commercial customers during the application phase to ascertain whether the program would be instrumental in helping them move forward with energy efficiency instead of incentivizing the energy efficiency projects they were already going to do. The screening is primarily done during pre-inspections. Implementation contractors also report reviewing measure offerings to maximize net savings. Efforts successful in PY2022 continued in BY2023 to target measures to low-income segments through partnerships with organizations such as food banks and Habitat for Humanity and serving this sector through the LIS, Multifamily Homes, and Manufactured Homes programs. The EM&V research found 100 percent NTG for all of these programs. The PY2020 Large C&I NTG research also showed higher NTG values for *custom* projects, which have continued to be a substantial percentage of savings under this program, positively affecting the NTG ratio as Large C&I is the single largest contributor to overall portfolio savings in BY2023.
- **Strategies are used to keep programs cost-effective.** Although *residential lighting* was phased out of EAL's portfolio in BY2023 due to Energy Independence and Security Act baseline changes, *commercial lighting* continues to be a cost-effective, energy-saving action for many segments. Implementation strategies are used to minimize costs where possible. Two examples are (1) bundling service trips geographically to customers to minimize travel costs and (2) increasing online applications. The residential programs have been successful in substantially increasing *AC* and *heat pump tune-ups* in BY2023 as cost-effective measures.

[24] Due to the upstream/midstream nature of most program activity for POPS, it is impossible to identify unique participants. Accordingly, this total likely includes EAL customers that participated in multiple programs and vastly underestimates the total number of participants in POPS.

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Comprehensiveness Factor 7
Whether the programs or portfolios have EM&V procedures adequate to support program management and improvement, calculate energy, demand, revenue impacts, and resource planning decisions.

The EM&V team assessed this factor through program staff interviews and independent evaluation monitor (IEM) coordination. The EM&V team's impression is that a collaborative approach with EAL and implementation contractors—while maintaining the evaluation process's objectivity—results in program benefits that lead to healthy realization rates as savings differences are addressed proactively when possible. One example is the 100 percent realization rates for tracking system reviews as the EM&V team provides interim results mid-program-year to EAL and implementation contractors. Another example is ongoing technical reviews and assistance up-front, such as Large C&I Solutions and Public Institution Solutions programs' *custom* projects. At the same time, findings from the field inform savings adjustments. For example, the EM&V team found a 67 percent in-service rate (ISR) for *APSs* in low-income households and, therefore, adjusted savings accordingly. This ISR was also applied to give-away events targeting low-income households. Using this ISR from EM&V field work in next year's planning estimates will help EAL and the program implementer better plan to meet evaluated net savings for this measure in the next program cycle. Fieldwork ISR information is also provided to the IEM to inform Technical Reference Manual updates. In addition, the EM&V team:

- **Actively engaged with EAL, implementation contractors, and the IEM throughout the evaluation period.** The EM&V team met biweekly with implementation contractors to discuss program updates and project questions. The EM&V team provided up-front reviews and feedback on savings questions, QA/QC procedures, and information collected on participation forms. The EM&V team also met with EAL biweekly to discuss the progress of EM&V and issues needing resolution. The EM&V team submitted monthly status reports to the IEM and sought guidance as questions arose throughout the evaluation period.
- **Worked with EAL and the IEM for a final BY2023 EM&V Plan,[25] which included submitting sampling plans throughout the program year.** Following EAL's review and approval, the EM&V team sent a draft EM&V Plan to the IEM in July 2023. The IEM then provided comments and feedback throughout the draft plan. The EM&V team fully responded to all IEM comments and documented revisions to the plan according to the IEM comments in September 2023. The EM&V team also sent commercial sampling memos to the IEM as detailed sampling based on the population of projects that occurred throughout the program year.
- **Shared interim results for review and comment before submitting the final results.** The EM&V team provided draft interim results to each EAL program manager and implementation contractor manager as EM&V was completed to provide time to review and discuss results and recommendations before formal reporting. The EM&V team also submitted a draft of this final report to the IEM for review before finalizing this document.

[25] Entergy Arkansas, LLC Program Year 2022 Evaluation Plan, Tetra Tech, September 2023.

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4.0 HOME ENERGY SOLUTIONS

The objectives of the Home Energy Solutions (HES) Program are to (1) help Entergy Arkansas, LLC (EAL) customers achieve cost-effective electricity savings, (2) educate homeowners and/or renters on the efficiency and inefficiency of their electricity usage, (3) identify opportunities for energy savings in both common areas and individual homes through no-cost energy audits, and (4) install/perform no-cost energy efficient measures/services to homeowners and/or renters. HES is also a delivery mechanism for the *consistent weatherization approach* (CWA) and includes all cost-effective measures following the CWA protocols.

In BY2023, the program incented *ceiling insulation*, *air infiltration* measures, *duct sealing*, *AC/HP tune-ups*, and *smart thermostats* while providing direct installation of *faucet aerators*, *low-flow showerheads*, *advanced power strips (APS)*, and *lighting* measures at no cost.

The evaluation, measurement, and verification (EM&V) team conducted program staff interviews, participant surveys, tracking system reviews, desk reviews, and on-site verifications for a subset of projects to support the evaluation. Table 38 below summarizes the Home Energy Solutions evaluation activities.

Table 38. Home Energy Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site verification	Metered data analysis[26]
BY2023 EM&V research—participant surveys	Program staff interviews (1) Materials review Participant surveys (72) Update Act 1102 Update NTG	Census	50	10	None

4.1 KEY FINDINGS

In BY2023, HES achieved 28,607 MWh in gross energy savings and 9.6 MW in gross demand savings, as shown in Table 39. HES's gross evaluated savings were slightly higher than reported energy savings but lower for demand savings. These adjustments resulted in realization rates of 100.5 percent megawatt-hours and 98.7 percent megawatts. The EM&V team's adjustments drive these results during the tracking system review, project-level engineering desk reviews, and on-site verifications. The program was highly influential in helping customers install equipment and receive program services, and customers were greatly satisfied with the services they received.

[26] This column refers to EAL customer meter data provided to the EM&V team instead of primary metered data collected as part of the on-site measurement and verification (M&V).

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Table 39. Home Energy Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio[27]	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	28,607	28,755	100.5%	100%	28,725	10.1%
Demand savings (MW)	9.6	9.5	98.7%	100%	9.5	10.7%

Table 40. Home Energy Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	27,136	28,725	105.9%
Demand savings (MW)	10.3	9.5	92.2%

4.2 RECOMMENDATIONS

The EM&V team identified seven recommendations, shown in Table 41, for EAL's consideration from the evaluation activities.

Table 41. Home Energy Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Continue to increase the internal quality assurance/quality control (QA/QC) process on the *duct sealing* measure for gas and heat pump heating types to ensure all cooling and heating efficiency values are captured correctly.	While the EM&V team made no realized adjustments for units with *electric resistance heating*, discrepancies were found for the gas and heat pump heating types. The *duct sealing—electric cooling* measure resulted in realization rates of 98.2 percent and 98.2 percent for energy and demand savings, respectively. The *duct sealing—heat pump* measure resulted in slight energy savings discrepancies, with realization rates of 99.8 percent and 100.0 percent for energy and demand savings, respectively. These adjustments were entirely attributed to a difference in efficiency values.
	Recommendation 2: Increase the internal QA/QC process to ensure that all *ceiling insulation* variables are captured correctly.	The EM&V team found multiple instances where the home had a different heating type compared to the project documentation. The EM&V team also found an instance where the total average R-value was not calculated for an attic with multiple spaces, insulation types, and insulation thicknesses. Lastly, the EM&V team also reduced the ceiling area for one of the projects due to home size.

[27] Based on the BY2023 process evaluation.

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Type	Recommendation	Key finding
	Recommendation 3: Increase the internal QA/QC process for *smart thermostats* to ensure that all variables are captured correctly.	The EM&V team found two different projects where the incorrect existing thermostat type was used within the calculations. Also, the documentation in one of the projects used only a portion of the floor area of the home for the calculation, but there was no documentation confirming the reason for the use of the smaller floor area. Better documentation would vastly help the *smart thermostat* measure.
	Recommendation 4: Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program. Given the nature of the measure, it is recommended the Arkansas Technical Reference Manual (TRM) add an in-service rate for Tier 1 *APS* in the next update process.	The EM&V team found instances where the photo of the *APS* showed the *APS* in a non-descriptive installation location and could not verify the home entertainment system or home office.
BY2023 process recommendations	**Recommendation 5:** The implementation of the QA/QC process should include a comprehensive review of documentation materials provided by the trade allies and compare them with the documentation collected during the QA/QC to verify all key parameters in tracking data.	The EM&V ride-alongs during the implementation QA/QC showed that photos of key attributes are taken while on-site but are not checked against the project tracking data to ensure accuracy in key parameters, such as heating type.
	Recommendation 6: Ensure that customers receive a hard-copy Home Energy Assessment Report.	Some respondents indicated that they did not receive an assessment or that they received a verbal assessment only. A printed assessment report outlining any energy efficiency recommendations may reduce confusion as to whether one was received and help customers take the next step to make energy efficiency upgrades.
	Recommendation 7: Provide customers with guidance on how to implement recommendations.	A few customers said it would be helpful to receive guidance on taking the next steps toward implementing the energy efficiency recommendations received. Suggestions included providing customers with a list of contractors who provide the specified services and pointing customers toward online or other resources where they could learn to do upgrades on their own.

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Status of prior year recommendations	
PY2020 impact recommendations	• Continue developing an efficient, transparent, and straightforward method for selecting weather stations. ○ Complete.
	• For *duct sealing* projects, consistently evaluate savings using actual units, if available, rather than default TRM baselines. ○ Continuing.
	• Ensure contractors are consistently submitting essential savings project documentation. ○ Continuing.
PY2020 process recommendations	• Investigate ways to improve rebate processing times for contractors. ○ In progress.
	• Consider expanding eligible direct-install vendors. ○ Continuing.
PY2021 impact recommendations	• Increase the internal QA/QC process on the *duct sealing* measure for all heating types to ensure all cooling and heating variables are captured correctly. ○ In progress.
	• Continue to collect actual efficiencies for HVAC systems for *duct sealing* projects, if available, rather than TRM baselines. ○ Continuing.
	• Ensure contractors are consistently submitting key savings project documentation. ○ In progress.
PY2021 process recommendations	• Increase customer service training for contractors. ○ Continuing.
	• Consider a ±10 percent QA/QC threshold for *ceiling insulation* square footage. ○ Complete
PY2022 impact recommendations	• Increase the internal QA/QC process on the *duct sealing* measure for all heating types to ensure all cooling and heating variables are captured correctly. ○ In progress. • Generally, homes with multiple HVAC systems should use the more conservative option when calculating savings for measures that have heating- and cooling-type-dependent factors. Documentation should confirm which system types are present and that both are in operation. ○ Continuing. • Follow the guidance set forth in the memo: *EAL Tune-ups Methodology Recommendations for Residential Programs.* ○ In progress. • Ensure contractors are consistently submitting key savings project documentation. ○ In progress.

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4.3 METHODOLOGY

The following sections present an overview of the impact evaluation methodologies.

4.3.1 Impact Evaluation

The evaluated savings results, established at the project level, are based on savings calculations and adjustments made during the tracking system review, 50 engineering desk reviews, and 10 on-site visits. The final evaluated savings account for the tracking system review and desk review level adjustments for all measure categories.

4.3.1.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review referenced TRM 9.1 for measure-level savings assumptions; the EM&V team checked the tracking systems' linkage to TRM deemed savings and methods used to estimate savings.

Our review accomplished three primary objectives: (1) identify initial high-level tracking system concerns, (2) verify whether the savings estimates in the tracking system are consistent with the savings algorithms' results as outlined in TRM 9.1, and (3) assess the tracking system's ability to support QA/QC activities, including future evaluation needs.

4.3.1.2 Desk Reviews

In addition to verifying the use of equations based on the TRM and inputs used to calculate deemed savings, the EM&V team also examined inputs into the tracking system based on a sample of projects. The implementation team provided project files and documentation for sampled projects, and the EM&V team compared parameter values in the project files with those entered into the program's tracking system.

Based on the program's tracking system extract from the tracking system database, BY2023 participant records were assigned measure categories, and the EM&V team created a sample of 40 projects for desk-review-only completes[28]. Participants receiving non-direct-install measures (i.e., *envelope* and *HVAC* projects) were prioritized and selected from the data extract. Table 42 provides details on sampled savings by measure category for the program.

[28] Based on the distinct count of account numbers sampled for desk review only. Site visits were part of a separate sample.

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Table 42. Home Energy Solutions—Summary of Desk Review Sampled Savings by Measure Category[29]

Measure category	Reported kWh	Sampled kWh	Percentage kWh sampled	Reported kW	Sampled kW	Percentage kW sampled
Appliance	523,134	2,270	0.4%	62.1	0.3	0.4%
Domestic hot water	93,107	0	0.0%	9.7	0	0.0%
Envelope	5,226,205	31,198	0.6%	2,899.3	19.6	0.7%
HVAC	22,305,896	110,853	0.5%	6,586.1	32.3	0.5%
Lighting	458,790	4,127	0.9%	70.6	0.6	0.9%
Totals	**28,607,133**	**148,448**	**0.5%**	**9,627.8**	**52.8**	**0.5%**

4.3.1.3 On-Site Verification

Ten projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. The EM&V team did not perform testing but rather made process observations and verified measure installation. Almost all the participants who received on-site verifications had multiple measures installed. Table 43 details the ten projects that received on-site verification in BY2023.

Table 43. Home Energy Solutions—Summary of On-Site Verification Sampled Savings by Measure Category

Measure category	Number of sites*	Reported kWh	Reported kW
Appliances	1	252	0.03
Envelope	7	10,611	10.7
HVAC	7	11,536	4.9
Total*	**10**	**22,400**	**15.6**

*A single site may have multiple measures.

4.3.2 Process Evaluation

In addition to program staff interviews, participating customer surveys were conducted and are discussed below.

4.3.2.1 Survey Methodology

The participant survey was used to inform the process evaluation of the program's rebate components based on Arkansas TRM Volume 9.1 EM&V Protocols guidance. The participant survey included a series of questions exploring whether participants installed program-discounted energy-efficient upgrades and the importance of program discounts on those

[29] The data extract was obtained on January 30, 2024.

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decisions. The participant survey investigated awareness and preferred communication methods, participation experiences, program satisfaction, and demographics to support the process evaluation. In addition to questions supporting the process evaluation, the survey also asked questions related to program influence in the customer decision-making process of purchasing energy-efficient equipment.

4.3.2.2 Sampling Methodology

The participant survey sample consisted of program participants between January 2022 and September 2023[30], stratified by the three participation periods and low-income and non-low-income participants within each period. We asked spillover questions to participants who installed energy-efficient upgrades in the first two periods to allow more time for potential spillover effects to occur (January 2022 to December 2022 and January 2023 to May 2023). The most recent participants (June 2023 to September 2023) did not receive spillover questions. Table 6 shows the population counts, savings by participation period, and indicators for which strata received free-ridership and spillover questions as applicable.

Table 44. Home Energy Solutions—NTG/Process Participant Survey Sample Plan

Participation period	Income type	Count of participants in population*	Reported (ex-ante) kWh	Estimated completed surveys	Installation verification	Survey questions		
						Free-ridership	Spillover	Process
January 2022–December 2022	Not low-income	380	1,650,226	12	✓	×	✓	✓
	Low-income	110	397,382	12				
	Total	**490**	**2,047,608**	**24**				
January 2023–May 2023	Not low-income	2,093	8,898,029	12	✓	✓	✓	✓
	Low-income	573	2,299,180	12				
	Total	**2,666**	**11,197,209**	**24**				
June 2023–September 2023	Not low-income	1,829	6,862,995	12	✓	✓	×	✓
	Low-income	470	1,629,114	12				
	Total	**2,299**	**8,492,109**	**24**				
Total		**5,455**	**21,736,926**	**72**				

*Aggregated by *AccountNumber*.

Based on an estimated response rate of 36 percent, 319 measures were selected for sampling to complete 72 surveys. Table 45 summarizes the selected sample and the number and types of measures installed for each sampling stratum. Two rebated measures were selected per

[30] Project dates were identified using ArchEE database field *InstallationDate*, the date after which kilowatt and kilowatt-hour savings are typically measured.

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participant for inclusion in the survey if a sampled participant installed more than one energy-efficient upgrade through the program. All directly installed measures—including *faucet aerators*, *low-flow showerheads*, *APSs*, and *lighting* measures—were aggregated into one measure called *Direct Install Measures*.

Table 45. Home Energy Solutions—Sample by Measure Category

Participation period	Measure installed	Measure 1*	Measure 2*	Total measures
January 2022–December 2022	AC/HP tune-up	1	0	1
	Air sealing	6	5	11
	Ceiling insulation	6	3	9
	Direct install	14	13	27
	Duct sealing	35	11	46
	Smart thermostats	4	1	5
	Total	**66**	**33**	**99**
January 2023–May 2023	AC/HP tune-up	6	1	7
	Air sealing	6	6	12
	Ceiling insulation	13	2	15
	Direct install	16	19	35
	Duct dealing	29	17	46
	Smart thermostats	0	2	2
	Total	**70**	**47**	**117**
June 2023–September 2023	AC/HP tune-up	11	1	12
	Air sealing	9	6	15
	Ceiling insulation	7	0	7
	Direct install	14	15	29
	Duct sealing	26	13	39
	Smart thermostats	1	0	1
	Total	**68**	**35**	**103**
Total**		**204**	**115**	**319**

*Measures 1 and 2 are aggregated by *AccountNumber*.

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4.4 DETAILED IMPACT EVALUATION RESULTS

This section presents the results of evaluation activities and details findings from the desk reviews and on-site verifications. Results are reported at the measure level and program level based on the EM&V activities.

4.4.1 Tracking System Review

Overall, the Home Energy Solutions program evaluated tracking system review, which resulted in savings identical to those calculated by the program implementer. The realization rates were 100 percent for both energy and demand savings.

Table 46. Home Energy Solutions—BY2023 Tracking System Energy Savings and Realization Rates by Measure Category

Measure	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW
Appliances	523,134	62.1	523,134	62.1	100.0%	100.0%
Domestic hot water	93,107	9.7	93,107	9.7	100.0%	100.0%
Envelope	5,226,205	2,899	5,226,205	2,899	100.0%	100.0%
HVAC	22,305,896	6,586	22,305,896	6,586	100.0%	100.0%
Lighting	458,790	70.6	458,790	70.6	100.0%	100.0%
Grand total	**28,607,133**	**9,628**	**28,607,133**	**9,628**	**100.0%**	**100.0%**

4.4.2 Desk Review Results

The EM&V team conducted desk reviews of 50 projects, including projects that received site visits, to compare values recorded on project documentation with those available in the tracking system. The sites that received desk reviews reported 170,848 kWh in energy savings and 68.4 kW in demand savings. The EM&V team found discrepancies leading to adjustments in savings. Desk review findings from projects that did not receive 100 percent realization rates are detailed below.

4.4.2.1 Heating/Cooling Type Discrepancies

- **Participant ID: 312008.** This project consists of an *A/C tune-up* that was completed for a single-family home. The EM&V team determined that the heating type was a *heat pump* based on the photos provided and specification sheets found online. The implementer made adjustments to the reported project savings. After the update, this adjustment resulted in an overall project-level realization rate of 93 percent and 100 percent energy and demand savings, respectively.
- **Participant ID: 412008.** This project consists of the installation of *ceiling insulation* for a single-family home. A site visit was conducted for this participant. During the site visit, the EM&V team determined the heating type to be a *heat pump* rather than *electric*

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resistance. This adjustment resulted in an overall project-level realization rate of 216.1 percent and 100 percent energy and demand savings, respectively. The implementer did not adjust the project savings, so the project results and realization rates were not updated.

- **Participant ID: 412012.** This project consists of the installation of *ceiling insulation* for a single-family home. A site visit was conducted for this participant. During the desk review and site visit, the EM&V team determined that the outdoor unit was a *packaged system with electric heat* rather than a *heat pump.* Also, the EM&V team adjusted the floor area from *1,200* square feet to *912* square feet based on the home size. These adjustments resulted in an overall project-level realization rate of 148 percent and 76 percent energy and demand savings, respectively. The implementer did not adjust the project savings, so the project results and realization rates were not updated.

4.4.2.2 Insulation R-Value Discrepancies

- **Participant ID: 112004.** This project includes the installation of *LED lighting*, an *APS*, *smart thermostats*, *ceiling insulation*, *air infiltration*, and *duct sealing* measures for a single-family home with an AC with gas heat. The EM&V team adjusted the *ceiling insulation* R-value from *4* to *5* based on the photos provided. The EM&V team also adjusted the seasonal energy efficiency ratio (SEER) value from *13* to *14.5* for the *duct sealing* measures. Lastly, the EM&V team rounded the post-cubic-feet-per-minute (CFM) value up to *110*. These adjustments resulted in an overall project-level realization rate of 81.2 percent and 77.5 percent for energy and demand savings, respectively.
- **Participant ID: 212008.** This project consists of the installation of *ceiling insulation* in a single-family home. The EM&V team found that the insulation average calculator was not used despite the attic having two different areas with different insulation types and thicknesses. Using the ICF Consulting (ICF) calculator to determine the average R-value, the EM&V team adjusted the R-value to *9.5*. This adjustment resulted in an overall project-level realization rate of 89.5 percent and 90.5 percent energy and demand savings, respectively.

4.4.2.3 Smart Thermostat Discrepancies

- **Participant ID: 212005.** This project consists of the installation of a *smart thermostat* for a single-family home. The EM&V team found that the existing thermostat was a *digital, non-programmable* thermostat. This adjustment resulted in an overall project-level realization rate of 398.5 percent energy savings.
- **Participant ID: 212007.** This project consists of the installation of a *smart thermostat* for a single-family home. The EM&V team adjusted the floor area from *1,050* to *2,086* based on the Zillow floor area and photos outside the home. While the floor area adjustment was made, the floor area controlled by the thermostat, along with thermostats not replaced, should be noted within the project documentation. Also, the EM&V team determined that the existing thermostat type was a *programmable thermostat* rather than a manual thermostat based on the provided photos. These adjustments resulted in an overall project-level realization rate of 49.9 percent energy savings.

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4.4.2.4 Tracking System and Documentation Discrepancies

- **Participant ID: 212001.** This project consists of an *A/C tune-up* for a single-family home. The EM&V team found that the cooling capacity shown in the tracking system (*8,890 British thermal units (Btu)/hr*) did not match the savings found in the tune-up test (*36,368 Btuh*). The EM&V team ultimately used the results from the documentation. The reported savings were calculated using the capacity found in the documentation, and thus, no savings adjustments were made.

4.4.2.5 APS Discrepancies

- **Participant ID: 112007.** This project consists of *duct sealing*, *lighting*, and a *APS* for a single-family home. Based on the photos provided, the EM&V team found that not all of the plugs were moved from the old power strip to the new power strip. The EM&V team made no savings adjustments.
- **Participant ID: 212012.** This project consists of *air infiltration*, *duct sealing*, an *APS*, and an *A/C tune-up* for a single-family home. The EM&V team found that the documentation did not verify the smart strip location as a *home entertainment system,* and only one item was plugged into the 'always on' outlet, resulting in zero savings. This adjustment resulted in an overall project-level realization rate of 91.0 percent and 98.2 percent energy and demand savings, respectively.

4.4.2.6 Heating and Cooling Efficiency Discrepancies

- **Participant ID: 112008.** This project consists of *duct sealing*, *lighting*, and *air sealing* for a single-family home. The EM&V team adjusted the SEER value from *10* to *11.5* since the model number on the nameplate was illegible, and therefore, the efficiency could not be determined. This adjustment resulted in an overall project-level realization rate of 93.6 percent and 90.4 percent for energy and demand savings, respectively.
- **Participant ID: 212004.** This project consists of *duct sealing* and *air sealing* for a single-family home. The EM&V team adjusted the SEER value from *14* to *19* based on the Air Conditioning, Heating and Refrigeration Institute (AHRI) certificate. This adjustment resulted in an overall project-level realization rate of 73.6 percent and 73.7 percent energy and demand savings, respectively.
- **Participant ID: 212014.** This project consists of the installation of *ceiling insulation* and *duct sealing* for a single-family home. The EM&V team adjusted the SEER value from *14* to *18* based on the specification sheets and the AHRI certificate. This adjustment resulted in an overall project-level realization rate of 95.7 percent and 92.2 percent energy and demand savings, respectively.
- **Participant ID: 412005.** This project consists of *duct sealing* for a single-family home. The EM&V team adjusted the heating seasonal performance factor (HSPF) from *8.2* to *8.5* based on the indoor and outdoor model numbers and the specification sheets. This adjustment resulted in an overall project-level realization rate of 97.6 percent and 100 percent energy and demand savings, respectively.

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Overall, program-level realization based on desk reviews was 100.9 percent and 98.2 percent for energy and demand savings, respectively, due to the adjustments discussed above. See Table 47.

Table 47. Home Energy Solutions—Desk Review Results[31]

Measure	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Energy realization rate	Demand realization rate
9 W LED (60 w equivalent) – indoor	2,415	0.4	2,415	0.4	100.0%	100.0%
Air conditioner tune-up – Manifoldi measurement	13,129	5.7	12,798	5.7	97.5%	100.0%
Air infiltration	8,049	3.6	8,049	3.6	100.0%	100.0%
Ceiling insulation	33,761	26.7	36,378	25.9	107.8%	97.3%
Duct replacement – heat pump	3,168	0.5	2,948	0.4	93.1%	77.8%
Duct sealing – AC with resistance heat (tested)	9,631	0.8	9,631	0.8	100.0%	100.0%
Duct sealing – electric cooling (tested)	36,552	20.0	35,889	19.6	98.2%	98.2%
Duct sealing – heat pump (tested)	58,269	10.1	58,176	10.1	99.8%	100.0%
LED bulbs BR30 8w (indoor)	631	0.1	631	0.1	100.0%	100.0%
LED bulbs BR30 8w (outdoor)	96	-	96	-	100.0%	-
LED bulbs candelabra 4w (indoor)	985	0.2	985	0.2	100.0%	100.0%
APSs (direct install)	2,522	0.3	2,270	0.3	90.0%	90.0%
Smart thermostats	1,640	-	2,148	-	131.0%	-
Total	**170,848**	**68.4**	**172,414**	**67.2**	**100.9%**	**98.2%**

4.4.3 On-Site Verifications

Ten projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. The EM&V team did not perform testing but made process observations and verified measure installation. On-site projects also received a desk review to compare documentation to data collected on-site. The on-site results and realization rates are included in the overall desk review results.

While on-site, the EM&V team gathered customer feedback on their experience with the program. Overall, customers stated they were satisfied with the program. Some stated they had

[31] No savings are represented with a – in the table.

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felt a significant difference in their comfort level. Most customers did not notice a change in their heating/cooling bill.

Overall, program-level realization-based on-site visits were 113.8 percent for energy savings and 99.1 percent for demand savings, as detailed in Table 48. Findings from projects that did not receive 100 percent realization rates are detailed in the *Desk Review Results* section above (Section 4.4.2).

Table 48. Home Energy Solutions—On-Site Verification Results

Measure category	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Realization rate	Realization rate
Appliances	252	0.0	252	0.0	100.0%	100.0%
Envelope	10,611	10.7	13,784	10.5	129.9%	98.7%
HVAC	11,536	4.9	11,444	4.9	99.2%	100.0%
Total	**22,400**	**15.6**	**25,480**	**15.5**	**113.8%**	**99.1%**

4.5 DETAILED PROCESS EVALUATION RESULTS

As part of the BY2023 evaluation, the EM&V team completed 72 telephone surveys with program participants accounting for 115 measures. The participant survey included a series of questions to collect process information to inform improvements and assess free-ridership and participant spillover. Not all 72 participants provided a response for every question asked, and some of the results reported will be based on responses from fewer than 72 respondents.

4.5.1 Respondent Characteristics

Participating respondents were most likely to live with one other person and be 65 years of age or older. Among 70 respondents, the average number of people living in a household was about three, with most homes having two people (29 percent). The respondents' largest age demographic was 65 or older, which was 34 percent of all respondents, followed by 45 to 54 years old (23 percent). In general, respondents were highly educated; 30 percent of respondents earned a college degree or graduate studies, and an additional 36 percent had completed some college-level courses.

4.5.2 Decision-Making

Respondents were asked about the factors they considered for up to two items when deciding whether to purchase the service or install the equipment through the program. Saving money on their utility bill was a driver in their decision to install the equipment (39 percent), followed by reducing their energy consumption (26 percent). Table 49 shows the factors that influenced respondents' decisions to purchase the service or install the equipment through the program.

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Table 49. Home Energy Solutions—Decision-Driving Factors (n=70)

Decision-driving factors	Percentage of respondents*
Lowering utility bill	39%
Reducing energy consumption	26%
Enhance performance/make repairs	17%
Contractor's recommendation	16%
It was free/It was included in the assessment	13%
Don't know/other	11%

*Multiple responses were allowed; therefore, response totals may sum to over 100 percent.

Some specific comments included the following:

> *To make my home more energy efficient.*
>
> *To save money save energy and reduce carbon footprint.*
>
> *I think it was very important with my old house and I would get a savings. My air conditioner was running weird, the gentleman came out to look at, and said we needed the tune-up. And that's why we did it. It made a massive difference in how it ran; our energy bill came down some. It is amazing.*

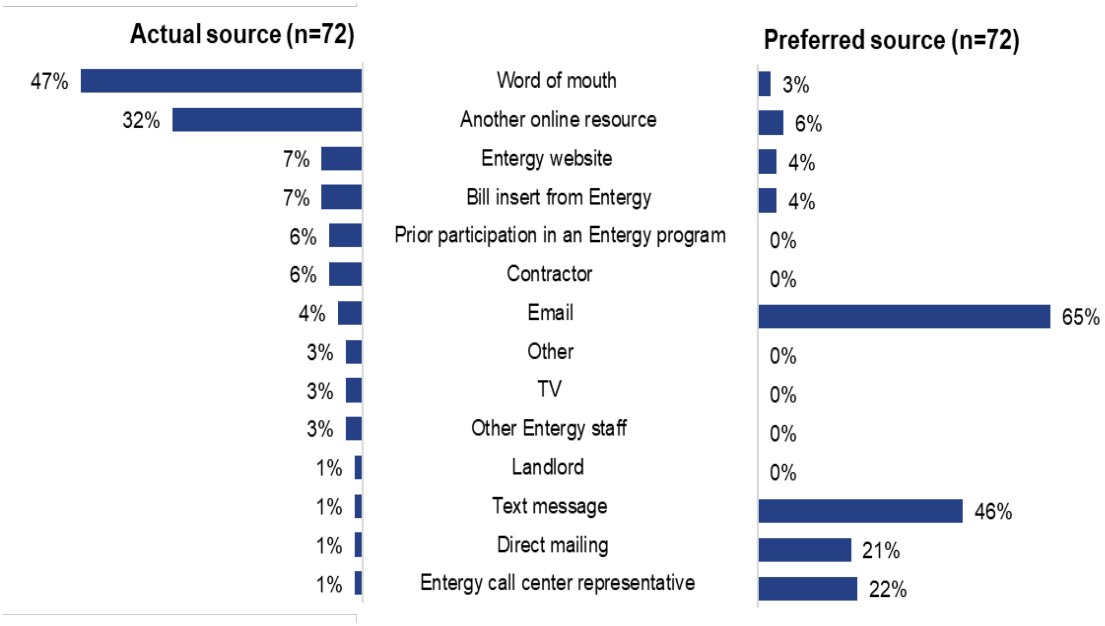
4.5.3 Program Marketing

Nearly half of respondents reported learning about the program through word-of-mouth (47 percent). The following most frequently mentioned source was an online resource other than the EAL website (32 percent). The online source cited most frequently was Facebook. In addition to how they learned about the program, the survey also asked respondents how they would prefer to receive information about EAL's energy efficiency programs in the future. The most frequently mentioned preferred communication channel was through email (mentioned by 65 percent of respondents), followed by a text message (46 percent), then EAL call center representative (22 percent), and direct mailing (21 percent).

Figure 20 illustrates how respondents learned about the program and how they prefer to receive communication about programs in the future.

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Figure 20. Home Energy Solutions—Sources of Actual and Preferred Home Energy Solutions Program Awareness



Source: Participant Survey Questions A1 and A2
*Multiple responses were allowed.
** *Don't know* and *refused* responses are excluded.

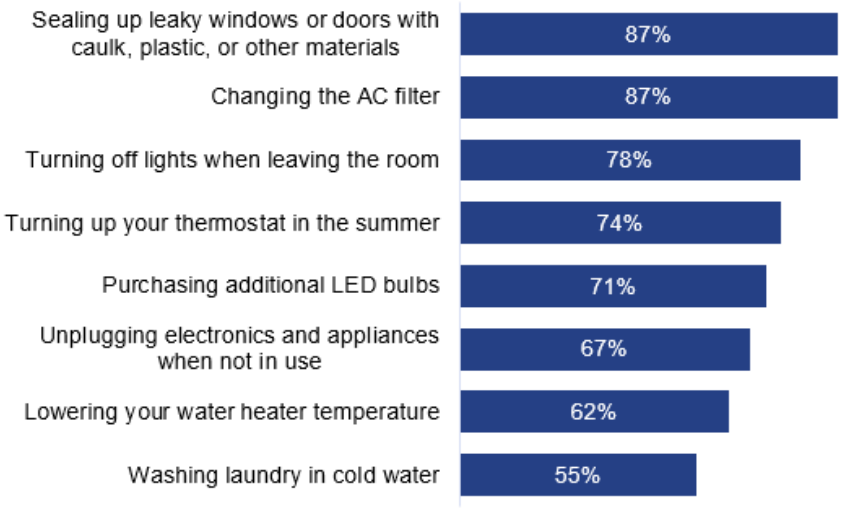
4.5.4 Participant Experience

All respondents were asked if they received an energy audit as part of their participation in the program; this would have been where a technician came to the home to install energy-efficient items and provided a report containing recommendations on ways to save energy. Over one-half of respondents (55 percent) said they did not receive an energy audit as part of their program participation. Because an energy audit is required to receive upgrades, this suggests that some respondents may not be clear about what was included as part of the visit.

For respondents stating they received an audit and answered the follow-up questions (24 respondents), one-half waited less than one week to receive their audit, while another 38 percent waited two weeks or less. Regarding the information discussed during the visit, most respondents recalled talking about the benefits of the items they were prompted with. Sealing leaky windows and doors and changing the air conditioner filter were the items respondents recalled the most (87 percent each).

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Figure 21. Home Energy Solutions—Energy-Saving Tips Discussed During Audit Visit (n=24)



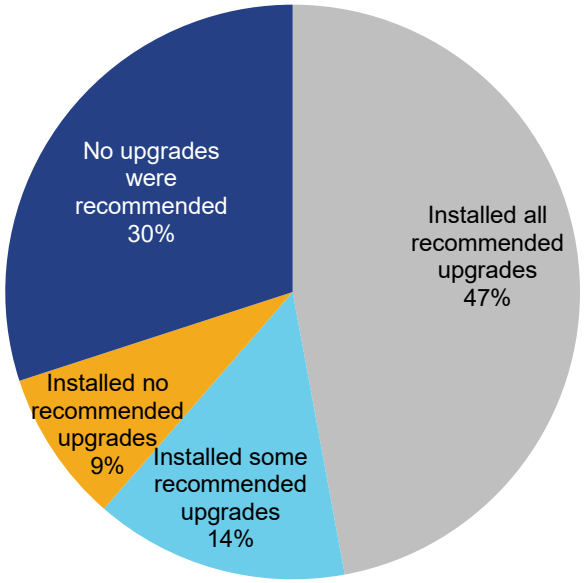
Source: Participant Survey Questions PE3

When asked about their knowledge of the different ways to save energy, 70 percent of respondents reported being either *very knowledgeable* or *extremely knowledgeable*. As a result of program participation, 46 percent of respondents reported being more knowledgeable about energy savings since participation, which is likely due to respondents feeling saving energy has become more important over the last two years.

Regarding the recommendation provided through the program, respondents were asked whether they ultimately installed *all*, *some*, or *none* of the program's recommended energy-efficient upgrades, which were either presented by the contractor or via the program's Home Energy Assessment Report. Most respondents reported installing *all* the upgrades recommended to them (47 percent), while nine percent said they installed *none* of the recommended improvements. Thirty percent of respondents reported that the contractor did not have any recommended upgrades. Figure 22 details the complete breakdown of respondent upgrade behavior.

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Figure 22. Home Energy Solutions—How Many Respondents Made Recommended Upgrades (n=70)

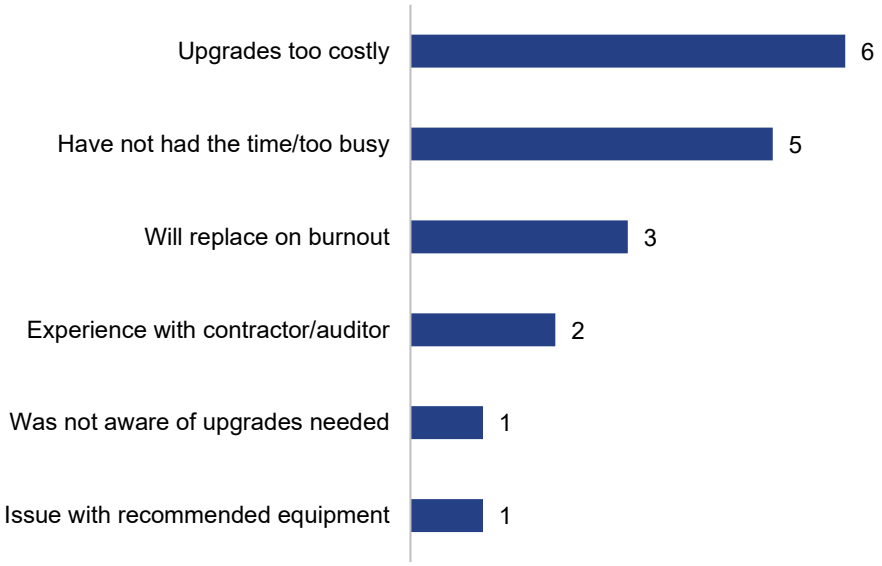


Source: Participant Survey Question Sat5

The most frequently mentioned reason why people did not make recommended upgrades was that the upgrades were too costly (6 out of 18 respondents). Five of 18 respondents did not install upgrades because they had not had the time or were too busy (2 of the 5 cited having health and wellness issues). Three respondents will replace their equipment upon burnout, and two mentioned their experience with the contractor/auditor. Of the two who mentioned their contractor, one of these respondents stated that recommendations for attic windows and doors were made, but when they called EAL to follow up, they were told there were no recommendations. The second stated that they were “waiting on insulation” (no other details were provided). Figure 23 details all the reasons respondents have not yet installed energy upgrades.

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Figure 23. Home Energy Solutions—Why Respondents Have Not Made Energy Efficiency Upgrades (n=18)



Source: Participant Survey Question Sat5a

Table 50 shows the categorized responses for what respondents liked best about the energy audit. Thirty-five percent of respondents indicated that the educational information they received was what they liked best. This education included information on how to save energy, upgrades they can make to their home, and the status of their equipment, such as estimated remaining life. Sixteen percent said they liked that their air leaks were fixed. Fourteen percent indicated that they did not receive a report or that the report was verbal only. Ensuring all participants receive a physical copy with a summary of the information discussed during the audit may improve participant education and understanding.

Table 50. Home Energy Solutions—Responses When Asked What They Liked Best About the Energy Audit and Report (n=51)

Audit feature	Count	Percentage
Education	18	35%
Fixing of air leaks	8	16%
Did not receive a report	7	14%
Duct sealing	4	8%
Don’t know/did not specify	4	8%
Customer service	3	6%
Energy savings	2	4%
LEDs	1	2%
Power strip	1	2%

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Audit feature	Count	Percentage
Through EAL	1	2%
It was a free service	1	2%
Dissatisfied with installed measure	1	2%
Total	**51**	**100%**

Source: Participant Survey Question Sat3.

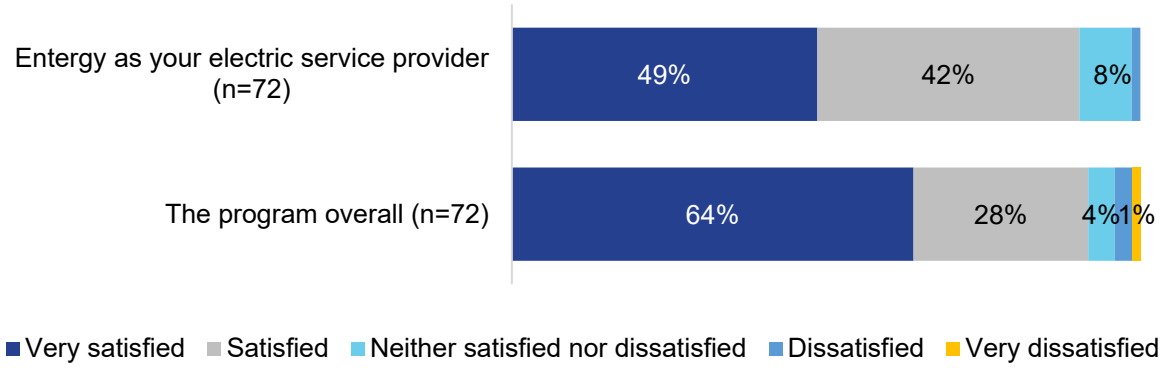
When asked if any additional information would make the assessment report more valuable, 13 respondents (23 percent) said they did. Four of the 13 respondents said they would like to receive a physical copy of the audit findings or a breakdown of recommended upgrades. Three respondents mentioned that they would like to receive guidance on making the upgrades, such as a list of contractors and how-to resources for doing projects on their own. Two respondents mentioned receiving more follow-up and better communication about their audit results, including callback information for the contractor.

4.5.5 Participant Satisfaction

Overall, respondents rated their satisfaction with EAL as an electric service provider highly. Forty-nine percent of respondents said they were *very satisfied*, and 42 percent said they were *satisfied* with EAL overall as an electric service provider.

Respondents' high satisfaction with EAL was also seen in their satisfaction with the Home Energy Solutions program. Sixty-four percent of respondents said they were *very satisfied* with the Home Energy Solutions program overall, and an additional 28 percent of respondents said they were *satisfied* (46 and 20 respondents, respectively). Only two respondents (three percent) said they were *dissatisfied*, and one participant said they were *very dissatisfied*, stating that the *duct sealing* started to fall off after a week. When those who were less than *very satisfied* with the program were asked if there was anything EAL could have done to improve their program experience, approximately two-thirds said *no* (65 percent, 17 respondents). Figure 24 shows the detailed satisfaction results for the program overall and EAL as their electric provider.

Figure 24. Home Energy Solutions—Participant Satisfaction with the Program Overall and EAL as Electric Service Provider

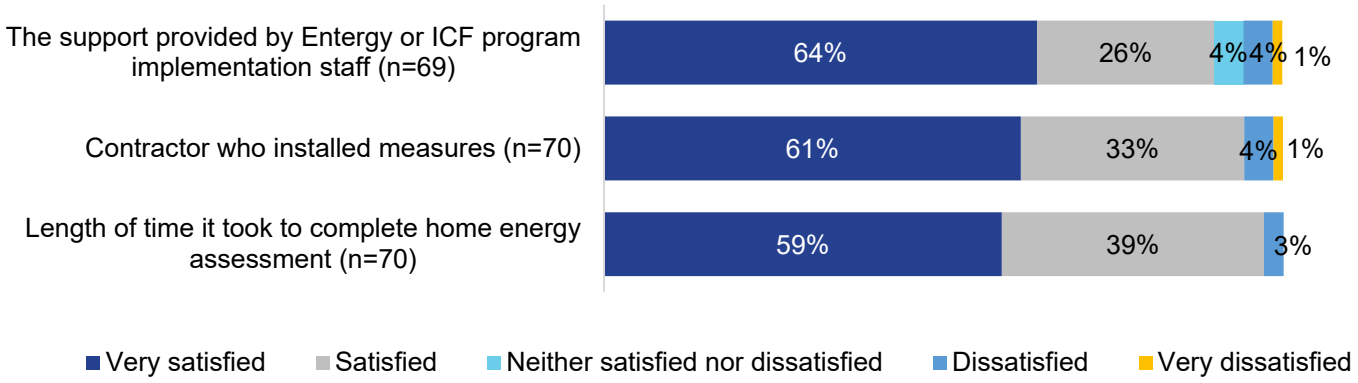


Source: Participant Survey Questions Sat10 and Sat7

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Figure 25 shows satisfaction ratings relating to specific aspects of respondents' experiences with the program, including the support provided by EAL or implementation staff, the contractor who installed program measures, and the length of time it took to complete the home energy assessment. Mirroring overall program satisfaction, ratings were high across all specific program aspects queried in the survey. Ninety percent of respondents said they were *very satisfied* or *satisfied* in each aspect. Satisfaction ratings were generally consistent between income groups and measure categories. One respondent said they were *very dissatisfied* with the contractor who installed the equipment and support provided by EAL or ICF staff. The respondent stated that *insulation* was recommended for their attic windows and doors, and the contractor said they would be back in two weeks to do the installation. The customer called EAL to follow up and was told that no insulation was ever recommended. A printed assessment that includes the recommendations for energy efficiency upgrades may help prevent future misunderstandings.

Figure 25. Home Energy Solutions—Participant Satisfaction with Program Aspects



Source: Participant Survey Questions Sat1c, Sat1e, and Sat1f

Of 72 respondents, the vast majority (92 percent) stated they experienced no obstacles or barriers when participating in the program. Those who experienced challenges noted challenges associated with contractors, including not providing all the upgrades or services offered (three respondents), contractors rescheduling (two respondents), or having a language barrier (one respondent).

Another indicator of program satisfaction is customers' propensity to recommend the program to others. Almost all respondents (96 percent) said they would recommend EAL's Home Energy Solutions program to others if provided the opportunity.

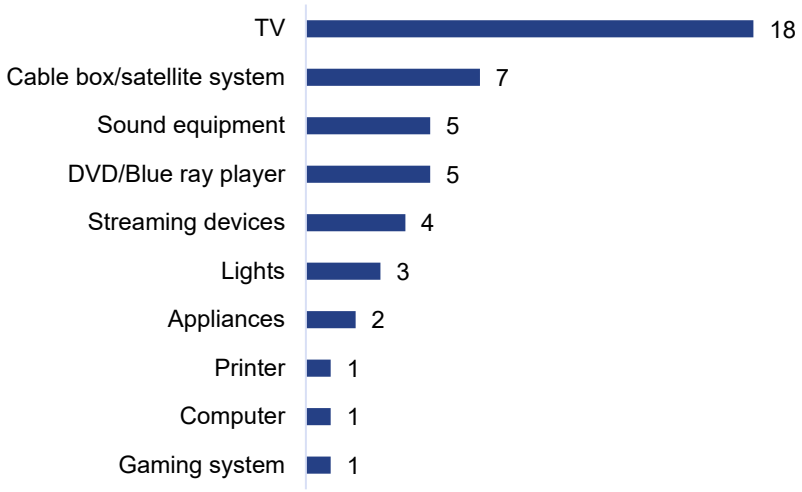
4.5.6 Advanced Power Strips

To better understand how customers are using *APSs*, respondents who received at least one *APS* through the program were asked how they are using the device. When asked in which room they were using the *APS*, the living room and the bedroom were common locations (16 and 8 respondents, respectively). When asked what appliances were plugged into the *APS*,

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the most frequently cited appliance was a television (18 respondents), followed by a cable box/satellite system (7 respondents). Figure 26 illustrates how program-provided *APSs* are being used.

Figure 26. Home Energy Solutions—Uses of Program-Provided Advanced Power Strips (n=27)



Source: Participant Survey Question Pwr1 and Pwr1c07o
Multiple responses were allowed.

4.5.7 HVAC Tune-Ups

Respondents who received *HVAC tune-ups* were asked about their experience. Of eight respondents, six reported that the technician cleaned and inspected both their air conditioner or heat pump's indoor and outdoor components. One reported that the technician cleaned and inspected only the outdoor components. Four were informed about adjustments made to the refrigerant levels. Most respondents (six of eight respondents) said that the technician provided an overview of their work, and three of nine respondents stated that the technician made recommendations for improvements to their air conditioner or heat pump system.

4.6 NET-TO-GROSS RESULTS

4.6.1 Net-to-Gross (NTG) Methodology

The EM&V team assessed NTG via self-reports through the participant customer survey based on the guidance outlined in Protocol F of Arkansas TRM Volume 9.1. The sample frame for the survey consisted of customers who installed energy-saving upgrades for qualifying measures between January 2022 and September 2023. Free-ridership questions were asked of respondents who installed energy-efficient upgrades in the most recent two periods (January 2022 to May 2023 and May 2023 to September 2023) for recall purposes. Spillover was assessed for respondents who installed energy-efficient upgrades in the first two periods to allow more time for potential spillover effects to occur (January 2022 to December 2022 and January 2023 to May 2023).

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In total, 54 respondents were surveyed on free ridership, and 42 respondents were surveyed on spillover based on their date of participation. Table 51 summarizes the number of participants in the sample, the number who completed surveys by participation period, and the number of measures ultimately evaluated.

Table 51. Home Energy Solutions—Summary of Participant Survey Respondents by Participation

Participation period	Income type	Count of measures in population	Count of unique participants	Gross kWh	Survey questions	
					Free-ridership	Spillover
January 2022–December 2022	Not low-income	18	11	44,230	✗	✓
	Low-income	11	7	9,626		
January 2023–May 2023	Not Low-income	22	14	34,168	✓	✓
	Low-income	17	10	20,623		
June 2023–September 2023	Not low-income	23	15	31,186	✓	✗
	Low-income	24	15	43,861		
Total		**115**	**72**	**183,694**		

The survey included a series of structured questions about the participant's decision to pursue rebated energy-efficient upgrades to estimate free-ridership. As the Arkansas TRM does not allow for *partial free riders*, participants were either classified as *full free riders* (100 percent free-ridership) or *nonfree riders* (0 percent free ridership) in their responses to these decision-making questions. Table 52 below shows the survey questions that were used to classify free riders.

Table 52. Home Energy Solutions—Self-Report Free-Ridership Survey Questions

Survey question	Response options
FR2. Before learning about the <PROGRAM>, were you already planning to purchase and install the <MEASURE> in <YEAR>?	01 Yes
	02 No
	88 Don't know
	99 Refused
FR3. If the program rebate had not been available, would your <YEAR> budget have accommodated the full cost of the <MEASURE>?	01 Yes
	02 No
	88 Don't know
	99 Refused
FR4. If the incentive or other assistance from the program had not been available, would you still have purchased the exact same <MEASURE>, or would you have purchased something different?	01 Same *[SKIP TO FR7]*
	02 Different
	88 Don't know

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Survey question	Response options
	99 Refused
FR5. *[ASK IF FR4 <> 1]* Would you have purchased any <MEASURE> at all?	01 Yes
	02 No
	88 Don't know
	99 Refused
FR6. [SKIP IF EFFICIENCY DOES NOT APPLY– SKIP IF MEAS = 1, 2, 3] [IF MEASURE=5 OR 7 SHOW "Would you have purchased a service or product of the same level, higher level, or lower level?" ELSE SHOW "Would it have been the same level of efficiency, higher efficiency, or lower efficiency?"]	01 Same level or efficiency
	02 Higher level or efficiency
	03 Lower level or efficiency
	88 Don't know
	99 Refused
FR7. [ASK IF FR4 = 01 OR FR5 = 01] If the assistance from the program had not been available, when would you have purchased [IF MEAS <> 5 or 7, SHOW "and installed"] the <MEAS>? Would you have purchased [IF MEAS <> 5 or 7, SHOW "and installed"] it… [READ LIST]	01 At the same time or sooner
	02 Within one year
	03 One to two years later
	04 Three to five years later
	05 More than five years later
	88 Don't know
	99 Refused

For consistency and comparability across all program evaluations, we used the same criteria to classify free riders. To be classified as a *full free rider*, respondents must have indicated all the following conditions; any respondent that did not meet all three of these conditions was classified as a *nonfree rider*:

- were already planning to purchase and install the project in the same year before learning about the program (FR2=1),
- the budget would have accommodated the project's full cost in the absence of the program rebate (FR3=1), and
- would have purchased the same or higher efficiency measure within one year in the absence of the program ((FR4=1 OR (FR6=1 OR 2)) AND (FR7=1 OR 2)).

The participant survey also included several consistency checks to verify a participant's free-ridership status. These consistency checks are intended to provide additional information about the participant's decision to install the program-provided measures and are used to substantiate their classification as a *full free rider* or *nonfree rider*. Consistency check questions include whether the participant received a recommendation to install a piece of equipment, how influential that recommendation was on their decision, and how influential the program incentive and other program assistance were in installing the efficient measure.

To assess spillover, the survey asked if recent installations of any additional energy-efficient improvements since program participation were made *without* EAL's financial assistance. Respondents were then asked how important their experience in the Home Energy Solutions program was in their decision to install these additional improvements.

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Free-ridership and spillover rates were estimated for each respondent using the methodology described above. Individual free-ridership and spillover rates were then weighted to adjust for proportional sampling differences, non-response, and gross energy savings to calculate overall estimates representative of the program population. NTG ratios were then calculated using the following equation:

$$NTG\ Ratio = 1 - Free\text{-}Ridership + Spillover$$

4.6.2 Detailed Retrospective Net-to-Gross Results

The participant survey resulted in an overall NTG ratio of over 99 percent, including free-ridership and spillover. While there was evidence of spillover, the savings were small, resulting in less than one percent. Respondents reported they would have installed the same measures without the program for only 3 out of 115 measures; all three were direct install projects (two of which were *LED bulbs*, and one was an *APS*).

Table 53. Home Energy Solutions—Summary of Net-to-Gross Results—BY2023

Free-ridership	Spillover	NTG
1%	0%	99%

4.6.3 Free-Ridership

Feedback from respondents suggests that the program was highly influential in their decision to install energy-efficient measures, resulting in low free-ridership being detected. Twenty-five of 31 respondents (80 percent) said they were *not* planning to purchase and install their rebated energy efficiency measures in the same year before learning about the program. Out of 71 respondents, 72 percent said their budget would *not* have accommodated the upgrades' full cost had the program rebate not been available. Only 19 respondents said they would have purchased the exact same upgrade in the absence of the program. Table 54 presents free-ridership results by measure.

Table 54. Home Energy Solutions—Free-Ridership Results by Measure

Measure	Population gross kWh	Surveyed (n)	Free-ridership
Ceiling insulation	2,912,123	9	0.0%
Air sealing	1,183,421	16	0.0%
Duct sealing	14,399,892	45	0.0%
Smart thermostat	237,438	2	0.0%
Air conditioner tune-up	1,218,844	5	0.0%
Direct install equipment	954,846	35	3.1%
Heat pump tune-up	830,363	3	0.0%
Total	**21,736,926**	**115**	**1.0%**

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4.6.4 Spillover

Ten respondents interviewed for spillover reported installing additional energy-efficient equipment that did not receive an EAL rebate and that the program was influential in them installing additional equipment. We removed any equipment that is incentivized through the midstream Point of Purchase Solutions (POPS) program so as not to double-count any potential savings. Customers may not know they received the equipment at a discount; therefore, we were conservative and removed *smart thermostats*, *weather stripping*, and *APSs*. Of the remaining equipment, *LEDs*, *washers*, *dryers*, and *dishwashers*, the evaluation team determined there was less than one percent spillover attributable to the program. Table 55 presents the spillover results from the participant survey.

Table 55. Home Energy Solutions—Participant Spillover Results

Surveyed (n)	Spillover
10	0%

4.6.5 Net-to-Gross for 2024−2026

Starting in 2024, the Home Energy Solutions program will no longer offer *LED bulbs*. *LED bulbs* made up less than two percent of the 2023 population savings. To determine the NTG for the next program cycle (2024−2026) until NTG is once again updated, the survey responses were analyzed, excluding the kilowatt-hour savings for *LED bulbs*. Table 56 presents the summary of NTG results for the upcoming year.

Table 56. Home Energy Solutions—2024 Recommended Net-to-Gross Results

Free-ridership	Spillover	NTG
0%	0%	100%

4.7 OVERALL SAVINGS ESTIMATES

The EM&V team used the desk reviews and on-site verification measurements to calculate the program-level realization rates. Program realization rates indicate that the Home Energy Solutions program achieved similar energy and demand savings as reported. Adjustments based on desk reviews or on-site verifications were incorporated into realization rates, ultimately resulting in realization rates of 100.5 percent and 98.7 percent for energy and demand savings, respectively.

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Table 57. Home Energy Solutions—Weighted Desk Review and On-Site Verification Results[32]

Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
9 w LED (60 w equivalent) – indoor	285,047	44.8	285,047	44.8	100.0%	100.0%	Desk review and tracking system review
Air conditioner tune-up – Manifoldi measurement	2,156,552	1,174.2	2,102,116	1,174.2	97.5%	100.0%	Desk review and tracking system review
Air infiltration	1,506,718	501.8	1,506,718	501.8	100.0%	100.0%	Desk review, on-site verification, and tracking system review
Ceiling insulation	3,719,487	2,397.6	4,007,858	2,331.8	107.8%	97.3%	Desk review, on-site verification, and tracking system review
Duct replacement – heat pump	51,340	8.8	47,773	6.8	93.1%	77.8%	Desk review and tracking system review
Duct sealing – AC with resistance heat (tested)	1,912,093	181.5	1,912,093	181.5	100.0%	100.0%	Desk review and tracking system review
Duct sealing – electric cooling (tested)	5,638,384	3,065.4	5,536,023	3,009.5	98.2%	98.2%	Desk review, on-site verification, and tracking system review
Duct sealing – heat pump (tested)	10,433,486	1,777.5	10,416,986	1,777.5	99.8%	100.0%	Desk review, on-site verification, and tracking system review

[32] No savings are represented with a – in the table.

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Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
LED (retail): outdoor, general purpose, all wattages	937	-	937	-	100.0%	-	Tracking system review
LED bulbs BR30 8w (indoor)	47,333	7.4	47,333	7.4	100.0%	100.0%	Desk review and tracking system review
LED bulbs BR30 8w (outdoor)	7,096	-	7,096	-	100.0%	-	Desk review and tracking system review
LED bulbs candelabra 4w (indoor)	118,232	18.4	118,232	18.4	100.0%	100.0%	Desk review and tracking system review
LED bulbs candelabra 4w (outdoor)	144	-	144	-	100.0%	-	Tracking system review
Low flow faucet aerator	10,501	1.1	10,501	1.1	100.0%	100.0%	Tracking system review
Low flow showerheads	82,606	8.6	82,606	8.6	100.0%	100.0%	Tracking system review
Residential central air conditioner tune-up	16,465	9.0	16,465	9.0	100.0%	100.0%	Desk review and tracking system review
Residential heat pump tune-up	1,810,004	369.6	1,810,004	369.6	100.0%	100.0%	Tracking system review
Smart strip (direct install)	523,134	62.1	470,820	55.9	90.0%	90.0%	Desk review, on-site verification, and tracking system review
Smart thermostats	287,572	-	376,675	-	131.0%	-	Desk review and tracking system review
Grand total	**28,607,133**	**9,627.8**	**28,755,428**	**9,498.1**	**100.5%**	**98.7%**	

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4.8 QUALITY ASSURANCE/QUALITY CONTROL PROCESSES

The implementation team randomly selects properties to receive post-installation verification as part of the program's QA/QC process, verifying measurements taken by trade allies or performing non-invasive visual inspections of work. When work is deemed insufficient, trade allies must typically revisit the site with the implementation team and perform additional work to bring the site's performance up to program standards. For projects that fail the QA/QC *blower door* or *duct sealing* testing, the trade ally also has the option to accept the QA/QC tested result rather than return to the customer's home. If the trade ally returns to the home, additional documentation of the new work and test results is collected and applied to the project. Once the QA/QC process is complete, the project is processed. However, the EM&V team observed that two Home Energy Solutions projects sampled for ride-alongs with the implementation QA/QC were processed, and tracking data were uploaded before adjustments even though discrepancies in *heating type* were found during QA/QC. The EM&V team brought these up to the implementation team to address. The implementation team updated some of the savings with the EM&V team QA/QC adjustments, and the EM&V team updated the results based on these adjustments. The realized adjustments for the savings that were not updated by the implementation team still remain.

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5.0 ENERGY SOLUTIONS FOR MULTIFAMILY HOMES

The Energy Solutions for Multifamily Homes (Multifamily Homes) program aims to provide cost-effective energy efficiency measures to residents of multifamily buildings with at least five units throughout Entergy Arkansas, LLC's (EAL) service territory. Participating customers receive no-cost audits, direct installation of energy-efficient measures (e.g., *lighting*, low-*flow showerheads*, *faucet aerators*, and *advanced power strips (APS))*, and incentives for more in-depth services designed to improve efficiency. In BY2023, the program incented *tune-ups of air conditioners* and *heat pump systems* and the installation of *air infiltration* and *duct sealing*. Faucet aerators, *low-flow showerheads, APS,* and *lighting* measures were directly installed at no cost.

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team conducted a tracking system review, desk reviews on a randomly selected sample of 31 projects, and on-site measurement and verification (M&V) of six projects. Table 58 details the evaluation activities completed for the program in BY2023.

Table 58. Energy Solutions for Multifamily Homes—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site verification	Metered data analysis[33]
PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (50) Update Act 1102	Census	31	6	None

5.1 KEY FINDINGS

In BY2023, the Multifamily Homes program achieved 12,565 MWh in gross energy savings and 2.3 MW in gross demand savings, as shown in Table 59. The Multifamily Homes program's gross savings were slightly lower than reported energy savings and demand savings, resulting in realization rates of 96.0 percent and 98.4 percent (megawatt-hours (MWh) and megawatts (MW), respectively). The EM&V team's adjustments drive these results during the tracking system review, project-level engineering desk reviews, and on-site verifications.

[33] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site M&V.

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Table 59. Energy Solutions for Multifamily Homes—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	13,084	12,565	96.0%	100.0%	12,565	4.4%
Demand savings (MW)	2.3	2.3	98.4%	100.0%	2.3	2.6%

Table 60. Energy Solutions for Multifamily Homes—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	14,010	12,565	89.7%
Demand savings (MW)	5.5	2.3	41.3%

Overall, tenants and landlords are highly satisfied with all aspects of the program included in the survey. Eighty-eight percent, 23 out of 26 respondents, said they were *very satisfied* or *satisfied* with the program overall. The majority of respondents, over 80 percent, implemented *some* or *all* of the upgrades recommended. The information provided about saving energy and fixing air leaks was cited as the most helpful aspect of the energy audit or assessment. Landlords mentioned the information received as being the most valuable, far more so than tenants.

5.2 RECOMMENDATIONS

The EM&V team identified seven recommendations, shown in Table 61, for EAL's consideration from the evaluation activities.

Table 61. Energy Solutions for Multifamily Homes—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Increase the internal quality assurance/quality control (QA/QC) process on the *duct sealing* measure for all heating types to ensure all cooling and heating variables are captured correctly.	The *duct sealing—AC with resistance heat* measure evaluation resulted in realization rates of 92.8 percent and 98.1 percent for energy and demand savings, respectively, and the *duct sealing—heat pump* measure evaluation resulted in realization rates of 99.4 percent and 100.0 percent for energy and demand savings, respectively, largely due to discrepancies in reported capacity and/or efficiency.
	Recommendation 2: Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program. Given the nature of the measure, it is recommended the Arkansas	The EM&V team found instances where the photo of the *APS* showed the *APS* still in the packaging or a non-descriptive installation location. In other instances, the EM&V team observed that the APS was plugged into the wall, but nothing was plugged into the 'switched' setting, resulting in no savings coming from the APS.

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Type	Recommendation	Key finding
	Technical Reference Manual (TRM) add an in-service rate for the Tier 1 *APS* in the next update process.	
	Recommendation 3: Utilize the rated or measured capacity to calculate *AC/HP tune-up* savings.	The EM&V team found that the nominal capacity was used to calculate savings in some instances. However, TRM 9.1 stipulates that the rated or measured capacity is used to calculate savings.
	Recommendation 4: Heating type documentation should be collected for all projects where savings are dependent on heating type.	The EM&V team found that although the cooling type is documented through nameplate photos, the heating type is not documented in the same manner. Heating savings for several measures are based on the fuel type and the system type of a *central heating system* and should be documented and verifiable.
BY2023 process recommendations	**Recommendation 5:** Continue to share information directly with customers about the Multifamily Homes program via email and direct mailing when possible.	Word of mouth was the most cited source for how customers learned about the program, although customers preferred email and direct mail for receiving information about the Multifamily Homes program.
	Recommendation 6: Ensure contractors are appropriately trained and correct any problems that occur during program services.	Several customers reported problems in their homes after the contractor had provided services. Two respondents had minor repairs, with one needing to hire an electrician to fix the problem; one respondent had issues with the *AC* and the sealing around their doors, and one respondent noted that the technician who came to install insulation fell through the ceiling. Additionally, one respondent said that the contractor was over-scheduled and had to schedule a second visit to finish the service.
	Recommendation 7: Provide a written audit report to ensure that customers understand what is included in the audit, the recommendations, information on other programs, and contact information.	Several customers reported not receiving an audit as part of the program and responded *don't know* when asked whether they implemented the recommendations, suggesting that there may be confusion about what an audit entails. Two respondents said they would have liked more information: one believes that their electric bill has increased since the *AC tune-up*, and another wanted to have a better understanding of the condition of their *AC* unit.

Table 62. Energy Solutions for Multifamily Homes—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Capture all cooling and heating variables to increase the internal QA/QC process on the *duct sealing* measure for all heating types. ○ Continuing.
	• Continue to accurately track cooling capacity in ArchEE for *duct sealing* measures since it is a critical parameter in calculating savings.

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Status of prior year recommendations	
	○ Continuing.
	• Ensure that all documentation is legible and that critical parameters, such as model number, are identifiable. ○ Continuing.
PY2020 process recommendations	• Consider revising demand savings goals to align energy and demand savings goals better. ○ In progress.
	• Work with the evaluator to determine a QA/QC threshold for *blower door testing* variance. ○ Complete.
	• Explore opportunities to expand projects in common areas. ○ Continuing.
PY2021 impact recommendations	• Increase the internal QA/QC process on the *duct sealing* measure for all heating types to ensure all cooling and heating variables are captured correctly. ○ Continuing.
	• Continue to accurately track cooling capacity in ArchEE for *duct sealing* measures since it is a key parameter in calculating savings. ○ Continuing.
	• Ensure all documentation is available and legible and key parameters, such as model number, insulation level, and flow rate, are identifiable. ○ Continuing.
PY2021 process recommendations	• Increase customer service training for contractors. ○ Continuing.
	• Work with the program implementer to ensure timely responses to trade allies. ○ Continuing.
	• Discuss quarterly allocations with trade allies to ensure an understanding of the process and how exceptions are handled to keep trade allies engaged in the program. ○ Continuing.
PY2022 impact recommendations	• Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program. ○ In progress • Follow the Building Performance Institute (BPI) standards for minimum ventilation rate when performing *blower door* tests. ○ Continuing • Utilize the rated or measured capacity to calculate *AC/HP tune-up* savings. ○ In progress • Ensure contractors are consistently submitting key savings project documentation. ○ Continuing

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5.3 METHODOLOGY

The following sections present an overview of the impact and process evaluation methodologies.

5.3.1 Impact Evaluation

The evaluated savings results, established at the project level, are based on savings calculations and adjustments made during the tracking system review, 31 engineering desk reviews, and six on-site visits. Final evaluated savings account for the tracking system review and desk-review-level adjustments for all measure categories.

5.3.1.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review began using Arkansas TRM 9.1 as a reference in our review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to TRM deemed savings and methods used to estimate savings.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings algorithms' results outlined in TRM 9.1. Third, it assessed the tracking system's ability to support QA/QC, including future evaluation needs.

The ArchEE tracking system, which supplied all participant and claimed savings and many of the inputs needed to verify savings calculations, was used to check for systemic errors across a participant census.

5.3.1.2 Desk Reviews

In addition to verifying the use of equations based on the TRM and inputs used to calculate deemed savings, the EM&V team also examined inputs into the tracking system based on a sample of projects. The implementation team provided project files and documentation for sampled projects, and the EM&V team compared parameter values in the project files with those entered into the program's tracking system.

Based on the program's tracking system extract from the tracking system database, BY2023 participant records were assigned measure categories, and the EM&V team created a sample of 25[34] projects for desk reviews. Participants receiving non-direct-install measures (i.e., envelope and HVAC projects) were prioritized and selected from the data extract. Table 63 provides details on sampled savings by measure category for the program.

[34] Based on the distinct count of account numbers sampled for desk review only. Site visits were part of a separate sample.

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Table 63. Energy Solutions for Multifamily Homes—Summary of Sampled Savings by Measure Category[35]

Measure category	Reported kWh	Sampled kWh	Percentage kWh sampled	Reported kW	Sampled kW	Percentage kW sampled
Appliances	142,474	2,522	1.8%	16.9	0.3	1.8%
Domestic hot water	329,110	3,605	1.1%	34.2	0.4	1.1%
Envelope	1,826,319	18,138	1.0%	427.5	5.7	1.3%
HVAC	10,585,357	76,200	0.7%	1,801.8	18.5	1.0%
Lighting	200,719	915	0.5%	27.7	0.1	0.5%
Total	**13,083,980**	**101,379**	**0.8%**	**2,308.1**	**25.1**	**1.1%**

5.3.1.3 On-Site Verification

Six projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. The EM&V team did not perform testing but made process observations and verified measure installation. Almost all the participants who received on-site verifications had multiple measures installed. Table 64 details the six projects that received on-site verification in BY2023.

Table 64. Energy Solutions for Multifamily Homes—Summary of Sampled Savings by Measure Category

Measure category	Number of sites	Reported kWh	Reported kW
Envelope	3	3,454	0.3
HVAC	6	27,146	4.8
Total*	**6**	**30,600**	**5.1**

*A single site may have multiple measures.

5.3.2 Process Evaluation

In addition to program staff interviews, participating customer surveys were conducted. Survey results are discussed below.

5.3.2.1 Survey Methodology

The participant survey was used to inform the process evaluation of the program's rebate components based on Arkansas TRM Volume 9.1 EM&V Protocols guidance. NTG evaluations were conducted in 2021, and NTG was not measured during this bridge year, so free-ridership and participant spillover sections were skipped in the participant survey. The purpose of the participant survey was to evaluate the process by collecting data on sources of awareness and preferred methods of communication, participation experiences, program satisfaction, and

[35] The data extract was obtained on January 19, 2024.

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demographics. Similarities in program structure and implementation between the Multifamily and Manufactured Homes programs allowed the EM&V team to develop one survey to assess the above-identified metrics for both programs, although participants in each program were selected, identified, and reported separately.

5.3.2.2 Sampling Methodology

The sample frame for the participant survey consisted of customers who participated in the program between June 2022 and July 2023. Table 65 illustrates the number of Multifamily Homes program participants, their kilowatt-hour savings, the number sampled, and the number of estimated completed surveys. Multifamily Homes participants are commonly building managers overseeing the installation of energy-efficient measures for common spaces, while individual tenants are listed for individual units. Multifamily Homes participants—detailed below—are represented by unique account numbers corresponding with the individual that triggered participation in the Multifamily Homes programs, be it a landlord, property manager, or tenant.

Table 65. Energy Solutions for Multifamily Homes—Process Participant Survey Sample Plan

Participation period	Count of participants in population	Reported (ex-ante) kWh for population	Count of participants sampled	Estimated completed surveys
June 2022–July 2023	1,641	7,086,533	100	30

Based on an estimated response rate of 30 percent, 100 customers from the Multifamily Homes program were selected for sampling. Table 66 details measures received among the entire program population, and Table 67 details measures received among the 100 customers contacted for surveying.

Table 66. Energy Solutions for Multifamily Homes—Population by Measure Category

Participation period	Measure installed	Count of measures installed
June 2022–July 2023	HVAC	1,239
	Envelope	908
	Direct install	850
Total		**2,997**

Table 67. Energy Solutions for Multifamily Homes—Sample by Measure Category

Participation period	Measure installed	Measure
	HVAC	39

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Jun 2022–July 2023	Envelope	25
	Direct install	36
Total		**100**

5.4 DETAILED IMPACT EVALUATION RESULTS

This section presents the results of evaluation activities and details findings from the desk reviews and on-site verifications. Results are reported at the measure level and program level based on the EM&V activities.

5.4.1 Tracking System Review

The Multifamily Homes program evaluated tracking system savings resulted in identical savings (100.0 percent kilowatt and kilowatt-hour realization rates) to those calculated by the program implementer.

Table 68. Energy Solutions for Multifamily Homes—BY2023 Tracking System Energy Savings and Realization Rates by Measure Category

Measure category	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW
Appliances	142,474	16.9	142,474	16.9	100.0%	100.0%
Domestic hot water	329,110	34.2	329,110	34.2	100.0%	100.0%
Envelope	1,826,319	427.5	1,826,319	427.5	100.0%	100.0%
HVAC	10,585,357	1,801.8	10,585,357	1,801.8	100.0%	100.0%
Lighting	200,719	27.7	200,719	27.7	100.0%	100.0%
Total	**13,083,980**	**2,308.1**	**13,083,980**	**2,308.1**	**100.0%**	**100.0%**

5.4.2 Desk Review Results

The EM&V team conducted desk reviews of 31 projects, including projects that received site visits, to compare values recorded on project documentation with those available in the tracking system. The sites that received desk reviews reported 131,978 kWh in energy savings and 30.1 kW in demand savings. The EM&V team found discrepancies leading to adjustments in savings. Desk review findings from projects that did not receive 100 percent realization rates are detailed below.

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5.4.2.1 HVAC Measure Discrepancies

- **Participant ID: 114008.** The project included a *heat pump tune-up* at a multifamily home. The EM&V team adjusted the capacity from the reported nominal capacity, *24,000 Btuh,* to match the measured cooling capacity, *21,959 Btuh,* since the rated heating capacity was not available. The measured or rated cooling capacity can be used as a proxy over the nominal system capacity when the measured or rated heating capacity is not available. This adjustment resulted in an overall project-level realization rate of 94.7 percent and 91.5 percent for energy and demand savings, respectively.
- **Participant ID: 214001.** The project included an *AC tune-up* at a multifamily home. The EM&V team found the *capacity* and EER_{post} in the tracking data (and used for savings) did not match the *capacity* and EER_{post} in the documentation. The EM&V team adjusted *capacity* and EER_{post} to match the documentation. This adjustment resulted in an overall project-level realization rate of 68.6 percent for both energy and demand savings.
- **Participant ID: 214005.** The project included *air infiltration* and *duct sealing* of a *heat pump system*. Based on the model number and specification sheet, the EM&V team found the heating efficiency to be *7.7 HSPF* rather than the *7.3 HSPF* reported. The EM&V team adjusted the *HSPF* value, resulting in an overall realization rate of 96.8 percent and 100.0 percent for energy and demand savings, respectively.
- **Participant ID: 314002.** The project included *air infiltration*, *duct sealing*, and a *heat pump tune-up* at a multifamily home. The EM&V team adjusted the capacity from the reported nominal capacity, *24,000 Btuh*, to match the measured capacity, *22,781 Btuh*, as stipulated in the TRM. This adjustment resulted in an overall project-level realization rate of 99.3 percent and 97.7 percent for energy and demand savings, respectively.
- **Participant ID: 314004.** The project included two low-flow faucet aerators, two *low-flow showerheads*, one *LED*, one *APS*, *air infiltration*, *duct sealing*, and a *heat pump tune-up* at a multifamily home. The EM&V team adjusted the capacity from the reported nominal capacity, *30,000 Btuh*, to match the measured capacity, *30,522 Btuh*, as stipulated in the TRM. The EM&V team also could not verify the installation location of the *APS* based on the documentation and adjusted the location from *home entertainment center* to *APS average*. These adjustments resulted in an overall project-level realization rate of 99.3 percent and 100.0 percent for energy and demand savings, respectively.
- **Participant ID: 414001.** The project included *air infiltration* and *duct sealing* of an *AC with electric resistance heat*. The reported capacity was *2 tons*, which limited the pre-retrofit leakage to the maximum allowed by the TRM, 320 CFM. However, the EM&V team found that it was a *1.5 ton* system, which would decrease the leakage allowance to 240 CFM. The EM&V team also found the cooling efficiency was *10.5 SEER* rather than the *13 SEER* reported. The EM&V team adjusted the CFM_{pre} and SEER value, resulting in an overall realization rate of 65.3 percent and 75.5 percent for energy and demand savings, respectively.

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- **Participant ID: 414002.** The project included *air infiltration* and *duct sealing* of an *AC with electric resistance heat*. Based on the model number and specification sheet, the EM&V team found the cooling efficiency was *10.5 SEER* rather than the *12 SEER* reported. The EM&V team adjusted the SEER value, resulting in an overall realization rate of 102.0 percent and 111.4 percent for energy and demand savings, respectively.
- **Participant ID: 414004.** The project included a *heat pump tune-up* at a multifamily home. The EM&V team found the EER_{post} in the tracking data (and used for savings) did not match the EER_{post} in the documentation. The EM&V team also found the $HSPF_{post}$ did not match the TRM methodology. The EM&V team adjusted EER_{post} and $HSPF_{post}$ accordingly. These adjustments resulted in an overall project-level realization rate of 80.0 percent and 95.9 percent for energy and demand savings, respectively.

5.4.2.2 Advanced Power Strip Discrepancies

- **Participant ID: 114001.** The project included one *APS*, *air infiltration*, and *duct sealing* of an *AC with gas heat*. Based on the documentation, the EM&V team could not verify the installation location of the *APS* and adjusted the location from *home entertainment center* to *APS average*. This adjustment resulted in an overall project-level realization rate of 95.9 percent and 98.9 percent for energy and demand savings, respectively.
- **Participant ID: 114002.** The project included seven *LEDs*, one *APS*, *air infiltration*, and *duct sealing* of an *AC with gas heat*. Based on the documentation, the EM&V team confirmed the *APS* was invoiced but was still in the packaging, resulting in no savings. These adjustments resulted in an overall project-level realization rate of 93.8 percent and 98.5 percent for energy and demand savings, respectively.
- **Participant ID: 114004.** The project included three *low-flow faucet aerators*, one *low-flow showerhead*, one *APS*, *air infiltration*, and *duct sealing* of a *heat pump system*. Based on the documentation, the EM&V team could not verify the installation location of the *APS* and adjusted the location from *home entertainment center* to *APS average*. This adjustment resulted in an overall project-level realization rate of 98.6 percent and 98.9 percent for energy and demand savings, respectively.
- **Participant ID: 114005.** The project included three low-flow faucet aerators, two *low-flow showerheads*, one *APS*, and *duct sealing* of a *heat pump system*. Based on the documentation, the EM&V team could not verify the installation location of the *APS* and adjusted the location from *home entertainment center* to *APS average*. The EM&V team also adjusted the flow rate for two of the low-flow faucet aerators from *1.5 GPM* to *1.0 GPM* based on the invoice. These adjustments resulted in an overall project-level realization rate of 99.2 percent for both energy and demand savings.
- **Participant ID: 214002.** The project included two *low-flow faucet aerators*, two *low-flow showerheads*, one *APS*, *air infiltration*, and *duct sealing* of a *heat pump system*. Based on the documentation, the EM&V team could not verify the installation location of the *APS* and adjusted the location from *home entertainment center* to *APS average*. This adjustment resulted in an overall project-level realization rate of 98.7 percent and 99.0 percent for energy and demand savings, respectively.

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- **Participant ID: 214006.** The project included two *low-flow faucet aerators*, one *APS*, *air infiltration*, and *duct sealing* of a *heat pump system*. Based on the documentation, the EM&V team could not verify the installation location of the *APS* and adjusted the location from *home entertainment center* to *APS average*. This adjustment resulted in an overall project-level realization rate of 98.3 percent and 98.7 percent for energy and demand savings, respectively.
- **Participant ID: 214009.** The project included *ceiling insulation*, one *APS*, *air infiltration*, and *duct sealing* of an *AC with gas heat*. Based on the documentation, the EM&V team confirmed the *APS* was present, but there was nothing plugged into it, resulting in no savings. This adjustment resulted in an overall project-level realization rate of 74.6 percent and 95.1 percent for energy and demand savings, respectively.

Overall, program-level realization based on desk reviews was 96.2 percent and 98.1 percent for energy and demand savings, respectively, due to the adjustments discussed above. See Table 69.

Table 69. Energy Solutions for Multifamily Homes—Desk Review Results

Measure	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Energy realization rate (kWh)	Demand Realization rate (kW)
9 w LED (60 w equivalent) – indoor	610	0.1	610	0.1	100.0%	100.0%
Air conditioner tune-up – manifold measurement	12,676	7.2	12,245	6.9	96.6%	96.4%
Air infiltration	15,955	3.4	15,955	3.4	100.0%	100.0%
Ceiling insulation	5,636	2.6	5,636	2.6	100.0%	100.0%
Duct sealing – AC with resistance heat (tested)	29,727	2.9	27,596	2.8	92.8%	98.1%
Duct sealing – electric cooling (tested)	6,426	3.4	6,426	3.4	100.0%	100.0%
Duct sealing – heat pump (tested)	40,443	6.7	40,186	6.7	99.4%	100.0%
LED bulbs candleabra 4w (indoor)	304	0.0	304	0.0	100.0%	100.0%
Low flow faucet aerator	632	0.1	674	0.1	106.7%	106.6%
Low flow showerheads	2,972	0.3	2,968	0.3	99.9%	99.9%
Residential heat pump tune-up	14,073	3.1	12,997	3.0	92.3%	95.8%
Smart strip (direct install)	2,522	0.3	1,424	0.2	56.5%	54.3%
Total	**131,978**	**30.1**	**127,023**	**29.4**	**96.2%**	**98.1%**

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5.4.3 On-Site Verification Results

Six projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. On-site projects also received a desk review to compare documentation to data collected on-site. The on-site results and realization rates are included in the overall desk review results.

While on-site, the EM&V team gathered customer feedback on their experience with the program. Customers stated they were satisfied with the program and indicated they would not have done this work without it. Some stated they felt a significant difference in their bills and/or comfort level. However, contractors should take care while on-site to ensure all pertinent information is clearly communicated with the customer.

Overall, program-level realization rates based on on-site verifications were 90.1 percent and 98.1 percent for energy and demand savings, respectively, as detailed in Table 70. Findings from projects that did not receive 100 percent realization rates are detailed in the desk review results section above.

Table 70. Energy Solutions for Multifamily Homes—On-Site Verification Results

Measure category	Reported savings (kWh)	Evaluated savings (kWh)	Reported savings (kW)	Evaluated savings (kW)	Energy realization rate	Demand Realization rate
Envelope	3,454	0.3	3,454	0.3	100.0%	100.0%
HVAC	27,146	4.8	24,106	4.7	88.8%	98.0%
Total	**30,600**	**5.1**	**27,559**	**5.0**	**90.1%**	**98.1%**

5.5 DETAILED PROCESS EVALUATION RESULTS

As part of the BY2023 evaluation, the EM&V team completed 27 telephone surveys with program participants. Responses included a mix of respondents, including tenants (10respondents) and landlords/property managers (17 respondents). The tracking data typically had individual tenant contact information, but during phone calls, many tenants indicated they were not responsible for the decision to participate and referred the evaluation team to their landlord or property manager. The participant survey included a series of questions to collect process information to inform improvements. Not all 27 participants responded to every question asked; therefore, some of the results reported will be based on fewer responses.

5.5.1 Respondent Characteristics

Participating respondents, tenants, and landlords included a mix of ages and education levels. Respondents were most likely to be 65 years of age or older. The respondents' largest age demographic was 65 or older (31 percent, or 8 of 26 respondents), followed by 45 to 54 years old (27 percent, 7 respondents). The average number of people living in a household was almost two, with most households having either one or two people (4 of 10 respondents each, respectively). The population is highly educated; 39 percent (10 of 26 respondents) completed a college degree, and an additional 27 percent (7 respondents) completed graduate studies. Table 71 below shows the breakdowns by respondent type.

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Table 71. Demographics by Respondent Type

Demographic category	Tenant	Landlord	Overall
Age			
18 to 24	0%	0%	0%
25 to 34	20%	6%	12%
35 to 44	20%	13%	15%
45 to 54	10%	38%	27%
55 to 64	10%	19%	15%
65 or older	40%	25%	31%
Respondents	**10**	**16**	**26**
Education level			
Less than high school	10%	0%	4%
High school graduate	10%	13%	12%
Vocational/technical school	0%	19%	12%
Some college	20%	0%	8%
Completed college	40%	38%	39%
Graduate studies or advanced degree	20%	31%	27%
Respondents	**10**	**16**	**26**

Source: Participant Survey Questions d2 and d3
Don't know responses have been removed.

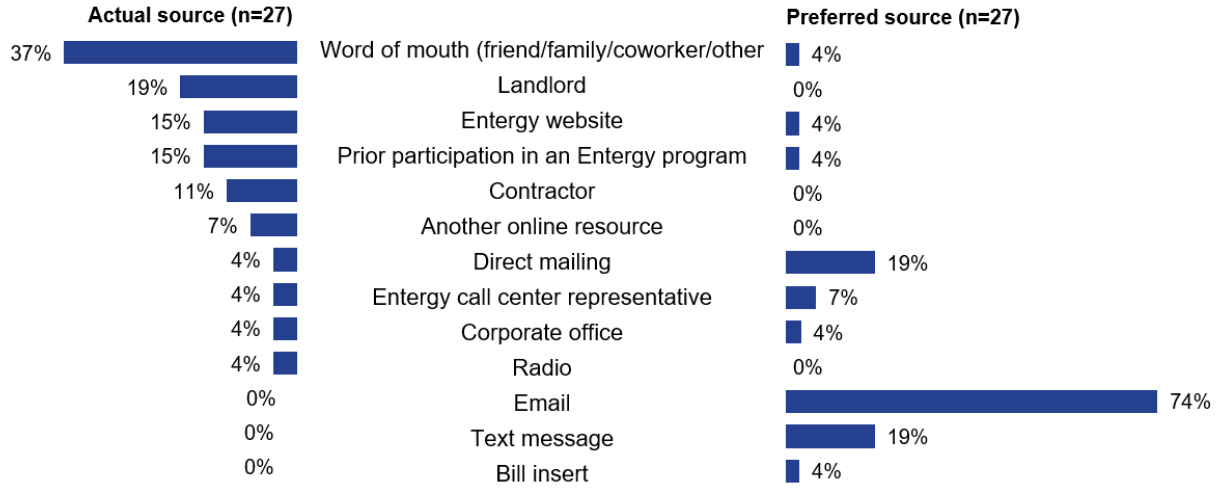
In talking with landlords, six reported that their properties are 100 percent occupied. When asked what percentage of their units participated in the program, 15 landlords provided responses: 10 reported that 100 percent of their properties participated, 3 reported 65 to 75 percent of their properties participated, and 2 reported under 25 percent of their properties participated. Five landlords responded when asked how likely they are to participate for their other properties. Four said they are *very likely* and one said *somewhat likely*.

5.5.2 Program Marketing

Over one-third of respondents reported learning about the program through word-of-mouth (37 percent). The following most frequently mentioned source was the property landlord (19 percent), followed by the EAL website (15 percent). One respondent specified that Facebook was the online source where they learned about the program. In addition to how they learned about the program, the survey also asked respondents how they would prefer to receive information about EAL's energy efficiency programs in the future. The most frequently mentioned preferred communication channel was through email (74 percent), followed by direct mailing (19 percent), and text message (19 percent). Figure 37 illustrates how respondents learned about the program and how they prefer to receive communication about programs in the future.

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Figure 27. Sources of Actual and Preferred Multifamily Homes Program Awareness



Source: Participant Survey Questions A1 and A2
*Multiple responses were allowed.

There are differences in how tenants and landlords found out about the program. Tenants found out about the program from four sources: their landlord (50 percent), word of mouth (40 percent), the EAL website (10 percent), and direct mailing (10 percent). Word of mouth was the most cited source for landlords as well, followed by prior participation in an EAL program (25 percent), a contractor (18 percent), and the EAL website (18 percent). Both landlords and tenants indicated that email was the preferred source of information (77 percent and 70 percent, respectively), followed by text message (12 percent and 30 percent, respectively).

5.5.3 Participant Experience

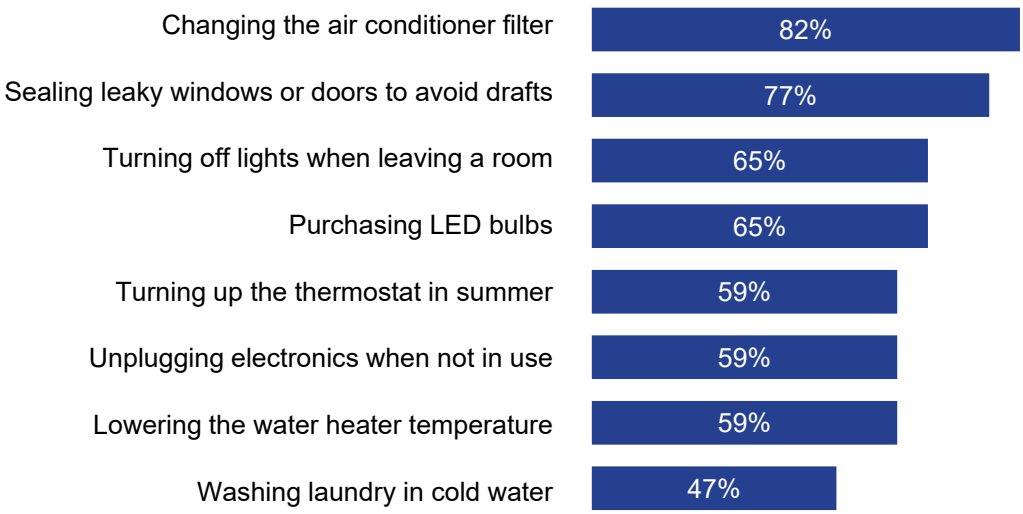
Respondents were asked if they received an energy audit as part of their participation in the program. This would have been where a technician came to the home to install energy-efficient items and provided a report containing recommendations on ways to save energy. Over 25 percent of respondents said they did not receive an energy audit as part of their program participation (both tenants and landlords) and an additional 11 percent answered *don't know* (all landlords). There was a mix of tenants and landlord respondents who indicated they did not receive an audit. Because an energy audit is required to receive upgrades, this suggests that some respondents may not be clear about what was included as part of the visit, or tenants may not be aware an audit was performed.

Of the 17 respondents who stated they received an audit, 7 waited less than one week to receive it, while 4 waited between one and two weeks. Three respondents reported waiting more than four weeks. Regarding the information discussed during the visit, most respondents recalled talking about the benefits of the items they were prompted with. Changing the air conditioner filter and sealing leaky windows and doors were the tips respondents recalled the most (82 percent and 77 percent, respectively). Figure 38 details the percentage of respondents who reported receiving each energy-saving tip during the audit. When asked if there were any other ways about ways to save energy in the home that we did not ask about, two respondents

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specified sealing up air leaks and one respondent said that ceiling insulation was recommended.

Figure 28. Energy Solutions for Multifamily Homes—Energy-Saving Tips Discussed During the Audit (n=17)



Source: Participant Survey Questions

PE3a, PE3b, PE3c, PE3d, PE3e, PE3f, PE3G, PE3h

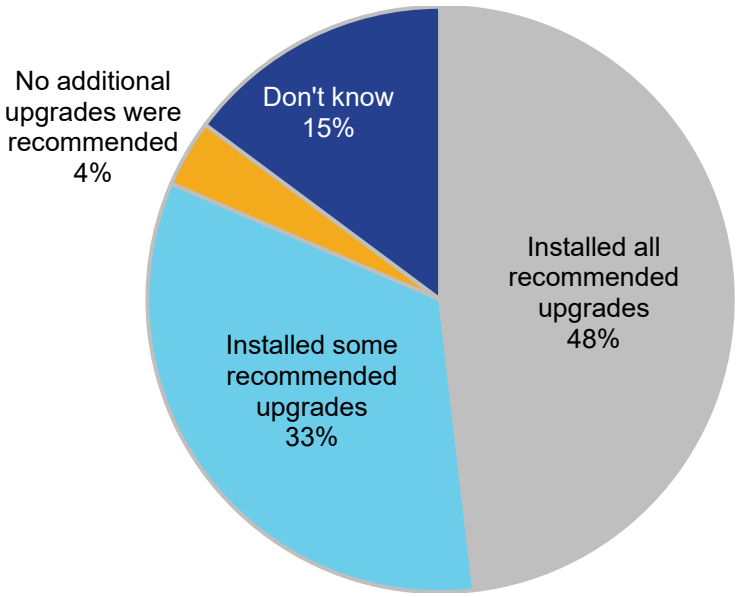
When asked about their knowledge of the different ways to save energy in their home or property, 48 percent of respondents reported being *somewhat knowledgeable,* and an additional 15 percent of respondents reported being *very knowledgeable*. Only two respondents (seven percent), who were both tenants, said they were *not at all knowledgeable.* As a result of program participation, 52 percent of respondents reported being *more knowledgeable* about energy savings since participation. Tenants were slightly more likely to report becoming *more knowledgeable* (60 percent compared to 47 percent of landlords). Both respondent groups felt that saving energy has become *more important* over the last two years (78 percent of respondents).

Regarding the recommendation presented by the contractor or via the program's home energy assessment report, respondents were asked whether they ultimately completed *all*, *some*, or *none* of the program's recommended energy-efficient upgrades. Almost one-half of respondents reported installing *all* the upgrades recommended to them (48 percent), 33 percent installed *some* of the upgrades, and 15 percent answered *don't know*. Four percent of respondents reported that the contractor did not recommend any upgrades. Responses were generally mixed between tenants and landlords, each indicating they have made improvements. Of the nine respondents who only installed some of the recommended upgrades, two cited there being an issue with the recommended equipment, and only one cited cost as an obstacle. The reasons provided by the remaining six were: not having the time (two respondents) and difficulty getting the resident involved (one respondent). One respondent said they "haven't felt like it", and two respondents could not provide a reason for not making the upgrades. Figure 39 details the

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breakdown of respondent upgrade behavior.

Figure 29. Energy Solutions for Multifamily Homes—Percentage of Respondents Who Made Recommended Upgrades (n=27)



Source: Participant Survey Question Sat5

Table 72 shows the categorized responses for what respondents liked best about the energy audit. Twenty percent of respondents indicated that the educational information they received was what they liked best. This information included how to save energy and upgrades they can make to their home. Seventeen percent said they did not know or did not provide a response. Thirteen percent said they liked that their air leaks were fixed. Thirteen percent indicated that they did not receive a report or that the report was verbal only. Ensuring all participants receive a physical copy with a summary of the information discussed during the audit may improve participant education and understanding.

Out of the six responses indicating that the information received was what they liked best about the energy audit and report, five were from landlords. These five respondents cited information about the thermostat, insulation, and unplugging items when not in use. One landlord commented:

"What I found useful was the knowledge provided to me and my residents to save energy and to save money. The staff was wonderful, their customer service was phenomenal, and they worked fast."

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Table 72. Energy Solutions for Multifamily Homes—Responses When Asked What They Liked Best About the Energy Audit and Report (n=27)

Audit feature	Count of responses	Percentage
Information about how to save energy	6	20%
Fixing air leaks	4	13%
Did not receive a report	4	13%
Customer service	3	10%
Duct sealing	2	7%
Smart thermostat	2	7%
LEDs	1	3%
It was a free service	1	3%
AC tune-up	1	3%
Smart power strip	1	3%
Don't know/Did not specify	5	17%
Respondents	**30**	**100%**

Source: Participant Survey Question Sat3
Multiple responses were allowed.

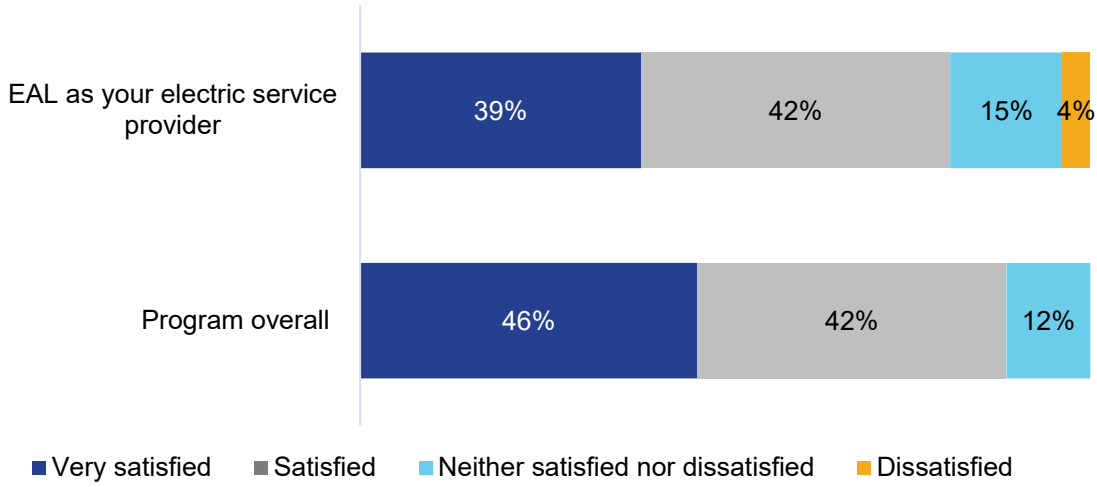
When asked if any additional information about their property/home's energy use that would make the program more valuable, two respondents said *yes*. One respondent, who received *duct sealing*, said they would like to have a better understanding of how their fireplace affects energy and costs. The other said that their energy bill has increased since receiving their *AC tune-up* and they would have liked to have known that before participating. Both respondents were tenants.

5.5.4 Participant Satisfaction

Overall, respondents rated their satisfaction with EAL as an electric service provider highly. Thirty-nine percent of respondents said they were *very satisfied*, and 42 percent said they were *satisfied* with EAL overall as an electric service provider. Respondents' high satisfaction with EAL was also seen in their satisfaction with the Multifamily Homes program. Forty-six percent of respondents said they were *very satisfied* with the Multifamily Homes program overall, and 42percent of respondents said they were *satisfied*. No respondents reported being *dissatisfied* with the program and satisfaction was similar between tenants and landlords. When those who were less than *very satisfied* with the program were asked if there was anything EAL could have done to improve their program experience, 79 percent said *no* (11 respondents). Of the remaining three respondents, two who received *AC tune-ups* said they would have liked more information on the program and the condition of their AC unit. One respondent said they would have liked a discount on their bill. Figure 40 shows the detailed satisfaction results for the program overall and EAL as their electric provider.

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Figure 30. Energy Solutions for Multifamily Homes—Participant Satisfaction with EAL as Electric Service Provider and the Program Overall (n=27)



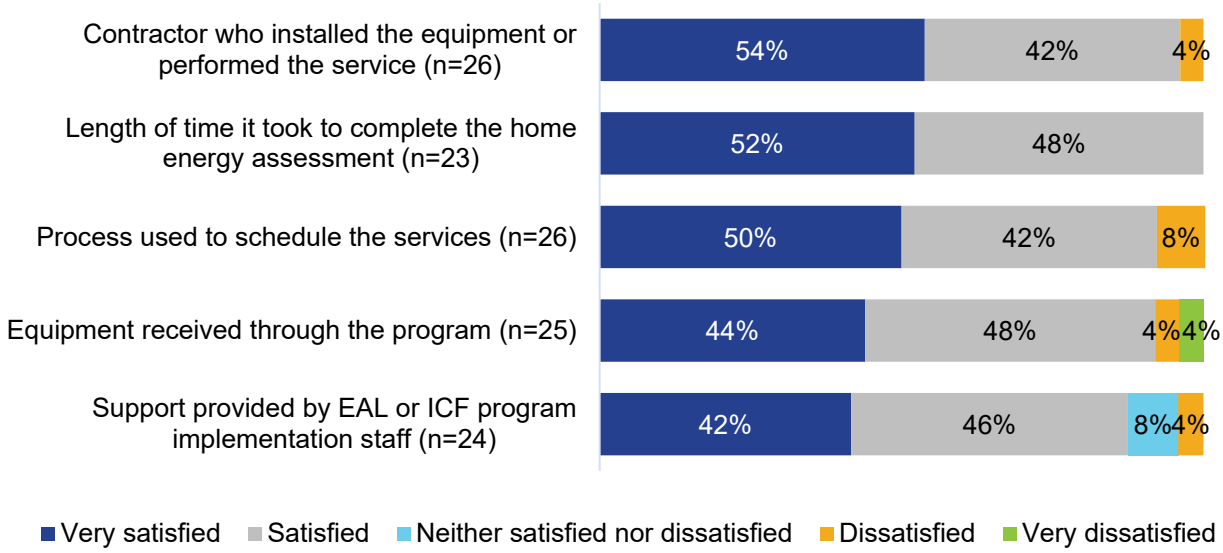
Source: Participant Survey Questions Sat10 and Sat7

Figure 41 shows satisfaction ratings relating to specific aspects of respondents' experiences with the program, including the support provided by EAL or implementation staff, the contractor who installed program measures, the process used to schedule the services, and the equipment received. Mirroring overall program satisfaction, ratings were high across all specific program aspects queried in the survey. Over 92 percent of respondents said they were *very satisfied* or *satisfied* in each aspect.

One respondent reported being *dissatisfied* with both the contractor who installed the equipment or performed the service and with the equipment received through the program. This respondent indicated that the technician who came to install the insulation fell through their ceiling. One respondent was *very dissatisfied* with the equipment received and said, "They installed better light bulbs, but they missed one. I like the light bulbs they installed". This respondent received an *AC tune-up* and also said that their bill had increased since. The same respondent reported being *dissatisfied* with the process used to schedule services but did not indicate why. One additional respondent reported being *dissatisfied* with the process used to schedule services and indicated that they did not receive an audit report. One respondent reported being *dissatisfied* with the support provided by EAL or ICF Consulting (ICF) program implementation staff but did not provide a reason why. This respondent reported being *very satisfied* with the other aspects of the program.

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Figure 31. Energy Solutions for Multifamily Homes—Participant Satisfaction with Program Aspects



Source: Participant Survey Questions Sat1a, Sat1b, Sat1c, Sat1d, Sat1f

When asked if they experienced any obstacles or barriers to participating in the program, three respondents reported *yes.* One respondent who received *ceiling insulation* said that the contractor was over-scheduled, so another appointment had to be scheduled; they said that "*everything else was very smooth*." Another respondent who received an *AC tune-up* said they had to make minor repairs after the technician, such as reconnecting a breaker, but that it was "*nothing major*." The third respondent, who received *air infiltration sealing*, said that they had issues with the technician, stating that the technician unplugged the lighting in their home and that they had to hire an electrician to fix it.

When asked if they would recommend the program to others, 26 participants said they would. Respondents were asked if they had additional comments that they would like to share. Out of the six respondents who provided feedback, four expressed appreciation for the program. One respondent asked why their energy bill was high and about the taxes included in the bills. One respondent described problems they had with the *air infiltration sealing* work that was done, saying there were nails caught and cracks in the ceiling, registers put back incorrectly, and problems with the seals installed around the doors. They added that the contractors *"were nice people and worked really hard; they just were not really skilled."* Below are a few comments provided:

"I am very satisfied with what Entergy did and how they helped with Entergy energy-saving deals.

"They are very good."

"I think it's a wonderful program."

"It's a good program. It helps everyone."

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"The interviewer's customer service was immaculate, and I love it."

5.5.5 Tune-Ups

Respondents who received *AC* or *heat pump tune-ups* were asked about their experience. Four respondents provided answers to questions regarding their experience. Three reported that the technician cleaned and inspected both the unit's indoor and outdoor components, and one reported that the technician cleaned and inspected the unit's indoor components only. Two said that they were informed about adjustments made to the refrigerant levels. Three reported that the technician provided a brief overview of the work and two said the technician provided recommendations for improvements to their AC or heat pump system.

5.6 OVERALL SAVINGS ESTIMATES

The EM&V team used the desk reviews and independent verifications to calculate the program-level realization rates. Program realization rates indicate that the Multifamily Homes program achieved similar energy and demand savings. Adjustments based on desk reviews or on-site verifications were incorporated into realization rates, resulting in 96.0 percent for energy savings and 98.4 percent for demand savings.

Table 73. Energy Solutions for Multifamily Homes—Weighted Desk Review and Site Visit Results[36]

Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
9 w LED (60 W equivalent)—indoor	109,589	18.3	109,589	18.3	100.0%	100.0%	Desk review and tracking system review
Air conditioner tune-up—manifoldi measurement	342,633	194.6	330,990	187.5	96.6%	96.4%	Desk review, on-site verification, and tracking system review
Air infiltration	1,286,273	206.0	1,286,273	206.0	100.0%	100.0%	Desk review, on-site verification, and tracking system review
Ceiling insulation	540,046	221.5	540,046	221.5	100.0%	100.0%	Desk review and tracking system review
Commercial central air conditioner (tune-up)	25,788	10.6	25,788	10.6	100.0%	100.0%	Tracking system review
Commercial Wi-Fi thermostat	15,561	-	15,561	-	100.0%	100.0%	Tracking system review
Duct sealing—AC with resistance heat (tested)	4,266,774	429.1	3,960,917	421.1	92.8%	98.1%	Desk review, on-site verification, and tracking system review
Duct sealing—electric cooling (tested)	225,377	122.2	225,377	122.2	100.0%	100.0%	Desk review and tracking system review

[36] No values are represented with a – in the table.

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Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
Duct sealing—heat pump (tested)	4,177,117	704.2	4,150,592	704.2	99.4%	100.0%	Desk review and tracking system review
Exit signs	2,320	0.3	2,320	0.3	100.0%	100.0%	Tracking system review
LED (Retail): outdoor, general purpose, all wattages	54	-	54	-	100.0%	100.0%	Tracking system review
LED bulbs BR30 8w (indoor)	1,352	0.2	1,352	0.2	100.0%	100.0%	Tracking system review
LED bulbs BR30 8w (outdoor)	294	-	294	-	100.0%	100.0%	Tracking system review
LED bulbs Candleabra 4w (indoor)	29,955	5.0	29,955	5.0	100.0%	100.0%	Desk review and tracking system review
LED bulbs Candleabra 4w (outdoor)	159	-	159	-	100.0%	100.0%	Tracking system review
Lighting measures	56,995	3.8	56,995	3.8	100.0%	100.0%	Tracking system review
Low flow faucet aerator	65,224	6.8	69,566	7.2	106.7%	106.6%	Desk review and tracking system review
Low flow showerheads	263,886	27.4	263,521	27.4	99.9%	99.9%	Desk review and tracking system review
Residential heat pump tune-up	1,532,107	341.1	1,414,891	326.6	92.3%	95.8%	Desk review, on-site verification, and tracking system review
Smart strip (direct install)	142,474	16.9	80,445	9.2	56.5%	54.3%	Desk review and tracking system review
Total	**13,083,980**	**2,308.1**	**12,564,687**	**2,271.2**	**96.0%**	**98.4%**	

5.7 QUALITY ASSURANCE/QUALITY CONTROL PROCESSES

The implementation team randomly selects properties to receive post-installation verification as part of the program's QA/QC process, verifying measurements taken by trade allies or performing non-invasive visual inspections of work. When work is deemed insufficient, trade allies must typically revisit the site and perform additional work to bring the site's performance up to program standards. For projects that fail the QA/QC *blower door* or *duct sealing* testing, the trade ally also has the option to accept the QA/QC tested result rather than return to the customer's home. If the trade ally returns to the home, additional documentation of the new work and test results is collected and applied to the project. Once the QA/QC process is complete, the project is processed.

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6.0 ENERGY SOLUTIONS FOR MANUFACTURED HOMES

The Energy Solutions for Manufactured Homes (Manufactured Homes) program's objective is to provide cost-effective energy efficiency measures to manufactured home communities throughout Entergy Arkansas, LLC's (EAL) service territory. Participating customers receive no-cost audits, direct installation of energy-efficient measures (e.g., *lighting*, *low-flow showerheads*, *faucet aerators*, and *advanced power strips (APS))*, and incentives for more in-depth services designed to improve efficiency. In BY2023, the program incented *tune-ups* of *air conditioners* and *heat pump systems* and the installation of *air infiltration* and *duct sealing*. *Faucet aerators*, *low-flow showerheads*, *APS*, and *lighting* measures were directly installed at no cost.

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team conducted a tracking system review and desk reviews on a randomly selected sample of 20 projects and on-site verifications of five projects. Table 74 details the evaluation activities completed for the program in BY2023.

Table 74. Energy Solutions for Manufactured Homes—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site verification	Metered data analysis[37]
PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (30) Update Act 1102	Census	20	5	None

6.1 KEY FINDINGS

In BY2023, the Manufactured Homes program achieved 5,631 megawatt-hours (MWh) in gross energy savings and 0.8 megawatts (MW) in gross demand savings, as shown in Table 75. The Manufactured Homes program's gross evaluated energy savings were slightly lower than reported, while evaluated demand savings were slightly higher than reported, resulting in realization rates of 99.8 percent and 100.2 percent (megawatt-hour and megawatt, respectively). The EM&V team's adjustments drive these results during the tracking system review, project-level engineering desk reviews, and on-site verifications.

[37] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site measurement and verification (M&V).

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Table 75. Energy Solutions for Manufactured Homes—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	5,643	5,631	99.8%	100.0%	5,631	2.0%
Demand savings (MW)	0.8	0.8	100.2%	100.0%	0.8	0.9%

Table 76. Energy Solutions for Manufactured Homes—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	5,403	5,631	104.2%
Demand savings (MW)	0.7	0.8	115.1%

Overall, satisfaction is high among respondents in all aspects of the program included in the survey. Ninety-one percent of respondents said they were *very satisfied* or *satisfied* with the program overall. The majority of respondents, over 80 percent, implemented some or all of the upgrades recommended. Saving energy and money on their utility bill and fixing air leaks were cited as what was most useful about the energy audit or assessment. Of those who reported dissatisfaction with aspects of the program, the most commonly cited reasons were wanting better communication and follow-up from implementation staff, more recommendations and information about upgrades, and more equipment to be installed.

6.2 RECOMMENDATIONS

The EM&V team identified seven recommendations, shown in Table 77, for EAL's consideration from the evaluation activities.

Table 77. Energy Solutions for Manufactured Homes—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Continue internal quality control and quality assurance (QA/QC) processes, as they largely appear to be working well in producing verifiable results and correctly input data.	The EM&V team found that most projects tracked the correct variables consistent with the project documentation. However, there was one project where the EM&V team found a discrepancy in the cooling efficiency that could be caught in a comprehensive documentation QA/QC prior to tracking data upload.
	Recommendation 2: Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program.	The EM&V team found instances where the photo of the *APS* showed the *APS* still in the packaging or a non-descriptive installation location. In other instances, the EM&V team observed the *APS* was plugged into the wall, but

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Type	Recommendation	Key finding
	Given the nature of the measure, it is recommended the Arkansas Technical Reference Manual (TRM) add an in-service rate for Tier 1 *APS* in the next update process.	nothing was plugged into the 'switched' setting resulting in no savings coming from the *APS*.
BY2023 process recommendations	**Recommendation 3:** Heating type documentation should be collected for all projects where savings are dependent on heating type.	The EM&V team found that although the cooling type is documented through nameplate photos, the heating type is not documented in the same manner. Heating savings for several measures are based on the fuel type and the system type of a central heating system and should be documented and verifiable.
	Recommendation 4: The implementer QA/QC process should include a comprehensive review of documentation materials provided by the trade allies and compare them with the documentation collected during the QA/QC process to verify all key parameters in the tracking data.	The EM&V ride-alongs during the implementation QA/QC process showed that photos of key attributes were taken while on-site but are not checked against the project tracking data to ensure accuracy in key parameters, such as heating type.
	Recommendation 5: Continue to share information directly with customers about the Manufactured Homes program via direct mailing when possible.	Word of mouth was the most cited source for how customers learned about the program, although customers preferred direct mail and email for receiving information about the Manufactured Homes program.
	Recommendation 6: Provide a written audit report and discuss recommendations with customers to ensure that customers understand what is included in the audit.	Several customers reported not receiving an audit as part of the program, suggesting that there may be confusion as to what an audit entails. Additionally, several customers who received *duct sealing* and *air infiltration sealing* upgrades would have liked more explanation of the work being done and more recommendations for saving energy. A written report may provide additional clarity as to (1) why recommendations have been made and the appropriate course of action and (2) prevent discrepancies between what customers expect to be done and the upgrades implemented.

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Type	Recommendation	Key finding
	Recommendation 7: Enhance communication and provide customers with contact information to reach customer service with program-related issues.	Some customers had issues with the equipment after installation, questions about their energy bill, or questions about other measures available through the program. By providing them with easy access to customer service for program-related questions, their concerns can be addressed in a timely manner, and they can benefit more from the program.

Table 78. Energy Solutions for Manufactured Homes—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Continue to accurately track cooling capacity in ArchEE for *duct sealing* measures since it is a critical parameter in calculating savings. ○ Continuing.
	• Ensure that all documentation is legible and that critical parameters, such as model number, are identifiable. ○ Continuing.
PY2020 process recommendations	• Work with the evaluator to determine a QA/QC threshold for *blower door* testing variance. ○ Complete.
	• Develop strategies to implement *ductless mini-splits* in manufactured homes and similar housing types that show substantial savings opportunities. Coordinate with the independent evaluation monitor (IEM) on claiming the increased savings beyond the TRM deemed savings. ○ In progress.
PY2021 impact recommendations	• Continue to accurately track cooling capacity in ArchEE for *duct sealing* measures since it is a key parameter in calculating savings. ○ Continuing.
	• Ensure all documentation is available and legible and key parameters, such as model number, are identifiable. ○ Continuing.
	• Increase the internal QA/QC process on the *duct sealing* measure for all heating types to capture all cooling and heating variables. ○ Continuing.

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Status of prior year recommendations	
PY2021 process recommendations	• Increase customer service training for contractors regarding communication. ○ Continuing.
	• Ensure replaced equipment, such as incandescents, are removed and disposed of properly. ○ Continuing.
	• Discuss quarterly allocations with trade allies to ensure understanding of the process and how exceptions are handled to keep trade allies engaged in the program. ○ Continuing.
	• Ensure trade allies are aware of the database and process to check on customer eligibility. ○ Continuing.
PY2022 impact recommendations	• Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program. ○ In progress

6.3 METHODOLOGY

The following sections present an overview of the impact and process evaluation methodologies.

6.3.1 Impact Evaluation

The evaluated savings results, established at the project level, are based on savings calculations and adjustments made during the tracking system review, 20 engineering desk reviews, and five on-site visits. Final evaluated savings account for the tracking system review and desk review level adjustments for all measure categories.

6.3.1.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review began using the Arkansas TRM 9.1 as a reference in our review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to TRM deemed savings and methods used to estimate savings.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings algorithms' results outlined in TRM 9.1. Third, it assessed the tracking system's ability to support QA/QC, including future evaluation needs.

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The ArchEE tracking system, which supplied all participant and claimed savings, and many of the inputs needed to verify savings calculations, was used to check for systemic errors across a participant census.

6.3.1.2 Desk Reviews

In addition to verifying the use of equations based on the TRM and inputs used to calculate deemed savings, the EM&V team also examined inputs into the tracking system based on a sample of projects. The implementation team provided project files and documentation for sampled projects, and the EM&V team compared parameter values in the project files with those entered into the program's tracking system.

Based on the program's tracking system extract from the tracking system database, BY2023 participant records were assigned measure categories, and the EM&V team created a sample of 15[38] projects for desk reviews. Participants receiving non-direct-install measures (i.e., *envelope* and *HVAC* projects) were prioritized and selected from the data extract. Table 79 below characterizes the BY2023 sample selected for desk reviews.

Table 79. Energy Solutions for Manufactured Homes—Summary of Desk Review Sampled Savings by Measure Category[39]

Measure category	Reported kWh	Sampled kWh	Percentage kWh sampled	Reported kW	Sampled kW	Percentage kW sampled
Appliances	45,896	1,765	3.8%	5.5	0.2	3.9%
Domestic hot water	43,104	575	1.3%	4.5	0.1	1.3%
Envelope	264,951	6,918	2.6%	35.9	1.1	3.1%
HVAC	5,258,395	98,488	1.9%	752.9	18.6	2.5%
Lighting	30,349	1,278	4.2%	5.5	0.2	4.3%
Total	**5,642,694**	**109,024**	**1.9%**	**804.2**	**20.2**	**2.5%**

6.3.1.3 On-Site Verifications

Five projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. The EM&V team did not perform testing but made process observations and verified measure installation. Almost all the participants who received on-site verifications had multiple measures installed. One of the five sites that had both *domestic hot water* and *HVAC* measures was canceled, and savings were removed from the program based on the site visit findings. Table 80 details the five sites that received on-site verification in BY2023. The project that was canceled is reported in the total number of site visits with zero savings reported.

[38] Based on the distinct count of account numbers sampled for desk review only. Site visits were part of a separate sample.
[39] The data extract was obtained on January 19, 2024.

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Table 80. Energy Solutions for Manufactured Homes—Summary of On-Site Verification Sampled Savings by Measure Category

Measure category	Number of sites	Reported kWh	Reported kW
Appliances	2	504	0.1
Domestic hot water	2	599	0.1
HVAC	5	60,163	5.6
Total*	**5**	**61,267**	**5.7**

*A single site may have multiple measures.

6.3.2 Process Evaluation

In addition to program staff interviews, participating customer surveys were conducted. Survey results are discussed below.

6.3.2.1 Survey Methodology

The participant survey was used to inform the process evaluation of the program's rebate components based on Arkansas TRM Volume 9.1 EM&V Protocols guidance. NTG evaluations were conducted in 2021, and therefore, NTG was not measured during this bridge year, and free-ridership and participant spillover sections were skipped in the participant survey. The purpose of the participant survey was to evaluate the process by collecting data on sources of awareness and preferred methods of communication, participation experiences, program satisfaction, and demographics. Similarities in program structure and implementation between the Manufactured and Multifamily Homes programs allowed the EM&V team to develop one survey to assess the above-identified metrics for both programs, although participants in each program were selected, identified, and reported separately.

6.3.2.2 Sampling Methodology

The sample frame for the participant survey consisted of customers who participated in the program between June 2022 and July 2023. Table 81 illustrates the number of Manufactured Homes program participants, their kilowatt-hour savings, and the number of estimated completed surveys. Manufactured Homes participants are commonly building managers overseeing the installation of energy-efficient measures for common spaces, while individual tenants are listed for individual units. Manufactured Homes participants—detailed below—are represented by unique account numbers corresponding with the individual that triggered participation in the Manufactured Homes programs, be it a landlord, property manager, or tenant.

Table 81. Manufactured Homes Process Participant Survey Sample Plan

Participation period	Count of participants in population	Reported (ex-ante) kWh for population	Count of participants sampled	Estimated completed surveys
June 2022–July 2023	485	4,162,434	100	30

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Based on an estimated response rate of 30 percent, 100 customers were selected for sampling from the Manufactured Homes program. Table 82 details the measures received among the entire program population, and Table 83 details the measures received among the 100 customers that were contacted for surveying.

Table 82. Manufactured Homes Population by Measure Category

Participation period	Measure installed	Count of measures installed
June 2022–July 2023	HVAC	460
	Envelope	160
	Direct install	237
Total		**857**

Table 83. Manufactured Homes Sample by Measure Category

Participation period	Measure installed	Count of measures installed
June 2022 – July 2023	HVAC	52
	Envelope	13
	Direct install	35
Total		**100**

6.4 DETAILED IMPACT EVALUATION RESULTS

This section presents the results of evaluation activities and details findings from the desk reviews and on-site verifications. Results are reported at the measure level and program level based on the EM&V activities.

6.4.1 Tracking System Review

Overall, the Manufactured Homes program evaluated tracking system review resulted in identical savings to those calculated by the program implementer. The realization rates were 100 percent for both energy and demand savings.

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Table 84. Energy Solutions for Manufactured Homes—BY2023 Tracking System Energy Savings and Realization Rates by Measure Category

Measure	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW
Appliances	45,896	5.5	45,896	5.5	100.0%	100.0%
Domestic hot water	43,104	4.5	43,104	4.5	100.0%	100.0%
Envelope	264,951	35.9	264,951	35.9	100.0%	100.0%
HVAC	5,258,395	752.9	5,258,395	752.9	100.0%	100.0%
Lighting	30,349	5.5	30,349	5.5	100.0%	100.0%
Total	**5,642,694**	**804.2**	**5,642,694**	**804.2**	**100.0%**	**100.0%**

6.4.2 Desk Review Results

The EM&V team conducted desk reviews of 20 projects, including projects that received site visits, to compare values recorded on project documentation with those available in the tracking system. The sites that received desk reviews reported 170,291 kWh in energy savings and 25.9 kW in demand savings. The EM&V team found discrepancies leading to adjustments in savings. Desk review findings from projects that did not receive 100 percent realization rates are detailed below.

6.4.2.1 Heating/Cooling Type Discrepancies

- **Participant ID: 415001.** The project included one *APS* and *duct sealing*. A *heat pump* was reported as the heating and cooling type. However, the condenser nameplate photo indicated that it was an *AC unit*, not a *heat pump*. The EM&V team also adjusted the cooling efficiency from *14 SEER* to *13 SEER* based on the nameplate. This site was sampled for implementation QA/QC and EM&V on-site verification. The heating type discrepancy was not initially caught by the implementation QA/QC. However, the EM&V team confirmed the *heat pump* while on-site. The heating type was adjusted from *heat pump* to *AC with electric resistance heat*. The implementer updated the project in the tracking data to the correct HVAC system type and the EM&V team adjusted the evaluated savings accordingly. The adjustments resulted in an overall project-level realization rate of 107.5 percent and 101.2 percent for energy and demand savings, respectively.

6.4.2.2 Duct Sealing CFM Discrepancies

- **Participant ID: 415004.** The project included two *low-flow showerheads* and *duct sealing* for an *AC unit with electric resistance heat*. This site was sampled for implementation QA/QC and EM&V on-site verification. The implementation QA/QC tested the *duct sealing* using a *duct blaster* test and found substantially higher cubic-feet-per-minute (CFM) compared to the tracked CFM. In addition, the showerheads installed were not EAL program-approved showerheads. The EM&V team evaluated the *duct sealing* savings using the QA/QC test results and removed the showerhead savings. The adjustments resulted in an overall project-level realization rate of 49.9

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percent and 49.5 percent for energy and demand savings, respectively. However, the project was later canceled and removed from the BY2023 program savings due to the QA/QC failure. The EM&V team reported the site visit as completed but removed the savings adjustments and realization rates from the overall results.

6.4.2.3 Advanced Power Strips Discrepancies

- **Participant ID: 115003.** The project included one *APS* and *duct sealing* for an *AC unit with gas heat*. Based on the documentation, the EM&V team confirmed the *APS* was present, but there was nothing plugged into it, resulting in no savings. This adjustment resulted in an overall project-level realization rate of 90.2 percent and 97.7 percent for energy and demand savings, respectively.
- **Participant ID: 115004.** The project included *LED bulbs*, one *smart strip*, and *duct sealing* for an *AC unit with gas heat*. Based on the documentation, the EM&V team confirmed the APS was present, but there was nothing plugged into it, resulting in no savings. This adjustment resulted in an overall project-level realization rate of 89.5 percent and 97.4 percent for energy and demand savings, respectively.
- **Participant ID: 315001.** The project included *LED bulbs*, two *low-flow showerheads*, one *APS*, and *air sealing*. Based on the documentation, the EM&V team could not confirm the location of the *APS as home entertainment and* evaluated savings as *average APS*. This adjustment resulted in an overall project-level realization rate of 94.9 percent and 94.7 percent for energy and demand savings, respectively.
- **Participant ID: 315002.** The project included *LED bulbs*, one *APS*, *air sealing*, and *duct sealing* for an *AC unit with gas heat*. The tracking system indicated *LEDs* and an *APS* were installed in the home. However, there were no photos of the equipment, and the invoice did not list *LEDs* or a *APS* as included in the scope of work. The EM&V team removed the *LED* and *APS* savings. This adjustment resulted in an overall project-level realization rate of 89.9 percent and 97.5 percent for energy and demand savings, respectively.

Overall, program-level realization based on desk reviews was 99.6 percent and 100.0 percent for energy and demand savings, respectively, due to the adjustments discussed above. See Table 85. Energy Solutions for Manufactured Homes—Desk Review Results.

Table 85. Energy Solutions for Manufactured Homes—Desk Review Results[40]

Measure	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Energy realization rate	Demand realization rate
9 w LED (60 w equivalent) - indoor	1,003	0.2	974	0.2	97.1%	97.7%
Air conditioner tune-up - manifoldi measurement	5,985	3.3	5,985	3.3	100.0%	100.0%
Air infiltration	6,918	1.1	6,918	1.1	100.0%	100.0%

[40] A dash indicates that there are no kilowatt savings associated with the respective measure.

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Measure	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Energy realization rate	Demand realization rate
Duct sealing - AC with resistance heat (tested)	127,570	12.1	127,769	12.2	100.2%	100.9%
Duct sealing - electric cooling (tested)	13,351	7.1	13,351	7.1	100.0%	100.0%
Duct sealing - heat pump (tested)	10,112	1.7	10,112	1.7	100.0%	100.0%
LED bulbs candleabra 4w (indoor)	275	0.0	275	0.0	100.0%	100.0%
Low flow showerheads	1,174	0.1	1,174	0.1	100.0%	100.0%
Smart strip (direct install)	2,270	0.3	1,428	0.2	62.9%	62.6%
Smart thermostats	1,633	-	1,633	-	100.0%	-
Total	**170,291**	**25.9**	**169,620**	**25.9**	**99.6%**	**100.0%**

6.4.3 On-Site Verifications

Five projects received on-site verifications to examine whether participating trade allies' measurements were replicable and to verify the installation of incented measures. The EM&V team did not perform testing but made process observations and verified measure installation. On-site projects also received a desk review to compare documentation to data collected on-site. The on-site results and realization rates are included in the overall desk review results.

While on-site, the EM&V team gathered customer feedback on their experience with the program. Customers stated they were satisfied with the program and indicated they would not have done this work without it. Some stated they had felt a significant difference in their bills and/or comfort level. However, contractors should take care while on-site to ensure all pertinent information is clearly communicated with the customer.

Overall, program-level realization-based on-site visits were 100.3 percent and 101.9 percent for energy and demand savings, respectively, as detailed in Table 86. Findings from projects that did not receive 100 percent realization rates are detailed in the desk review results section above.

Table 86. Energy Solutions for Manufactured Homes—On-Site Verification Results

Measure category	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Realization rate	Realization rate
Appliances	504	0.1	504	0.1	100.0%	100.0%
Domestic hot water	599	0.1	599	0.1	100.0%	100.0%

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Measure category	Reported savings (kWh)	Reported savings (kW)	Evaluated savings (kWh)	Evaluated savings (kW)	Realization rate	Realization rate
HVAC	60,163	5.6	60,363	5.7	100.3%	102.0%
Total	**61,267**	**5.7**	**61,466**	**5.8**	**100.3%**	**101.9%**

6.5 DETAILED PROCESS EVALUATION RESULTS

As part of the BY2023 evaluation, the EM&V team completed 35 telephone surveys with program participants. The vast majority of responses were from residents of the properties, while two of the 35 respondents were landlords. The participant survey included a series of questions to collect process information to inform improvements. Not all 35 participants responded to every question asked; therefore, some of the results reported will be based on fewer responses.

6.5.1 Respondent Characteristics

Participating respondents included a mix of ages and education levels. Respondents were most likely to live with two other people and be 65 years of age or older. The respondents' largest age demographic was 65 or older (36 percent), followed by 35 to 44 years old (24 percent). The average number of people living in a household was over two, with most households having three people (30 percent). Thirty-six percent were a high school graduate, while 21 percent of respondents had completed some college-level courses. Twenty-four percent of respondents completed a college degree or graduate studies. Table 7 below shows the breakdowns by respondent type.

Table 87. Energy Solutions for Manufactured Homes—Demographics by Respondent Type

Demographic category	Tenant	Landlord	Overall count	Overall percentage
Age				
18 to 24	2	0	2	6%
25 to 34	5	0	5	15%
35 to 44	7	1	8	24%
45 to 54	3	1	4	12%
55 to 64	2	0	2	6%
65 or older	12	0	12	36%
Respondents	**31**	**2**	**33**	**100%**
Education level				
Less than high school	0	0	0	0%
High school graduate	12	0	12	36%

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Demographic category	Tenant	Landlord	Overall count	Overall percentage
Vocational/technical school	6	0	6	18%
Some college	7	0	7	21%
Completed college	3	2	5	15%
Graduate studies or advanced degree	3	0	3	9%
Respondents	**31**	**2**	**33**	**100%**

Source: Participant Survey Questions d2 and d3
Don't know and *refused* responses have been removed.

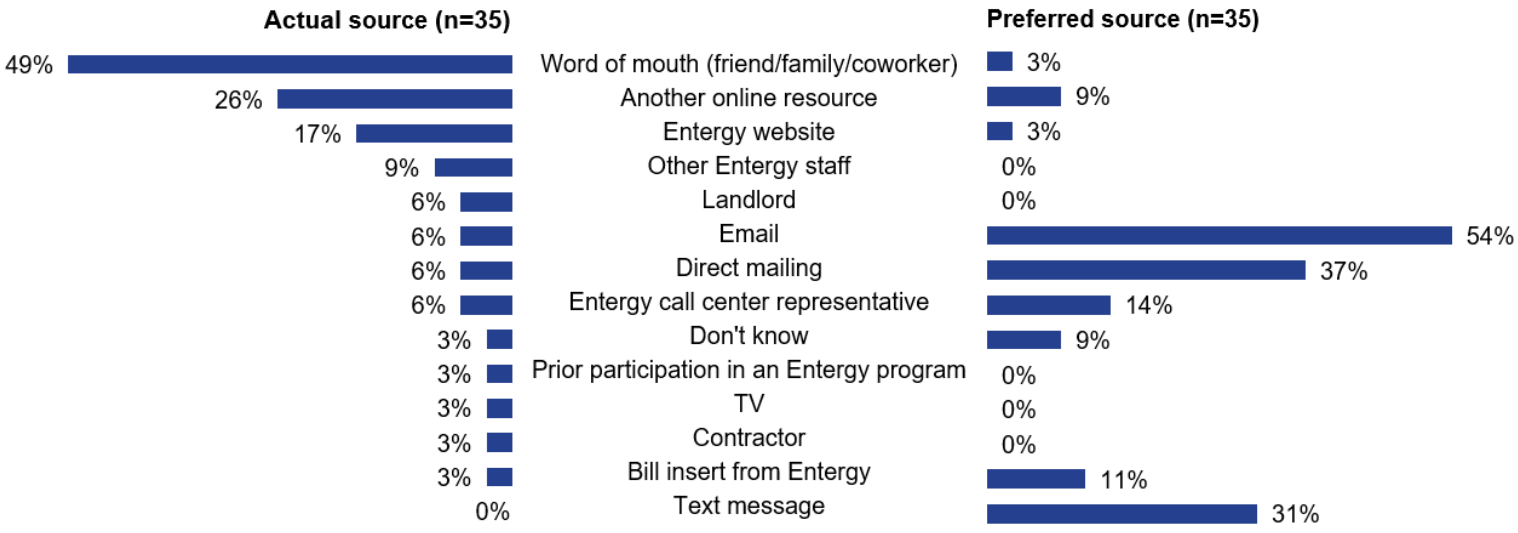
In talking with landlords, one reported that their properties were 70 percent occupied; the other did not provide a response. When asked what percentage of their units participated in the program, one reported that 100 percent of their properties participated, and the other reported 5 percent of their properties participated. When asked how likely they were to participate with their other properties, one landlord responded and said that it was *very likely*.

6.5.2 Program Marketing

Almost one-half of respondents reported learning about the program through word-of-mouth (49 percent). The next most frequently mentioned source was an online resource other than the EAL website (26 percent, nine respondents); when asked which online resource, eight respondents cited Facebook, and one cited a general Google search. In addition to how they learned about the program, the survey also asked respondents how they would prefer to receive information about EAL's energy efficiency programs in the future. The most frequently mentioned preferred communication channel was through email (54 percent), followed by direct mailing (37 percent), and text message (31 percent). Figure 37 illustrates how respondents learned about the program and how they prefer to receive communication about programs in the future.

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Figure 32. Energy Solutions for Manufactured Homes—Sources of Actual and Preferred Program Awareness



Source: Participant Survey Questions A1 and A2
*Multiple responses were allowed.

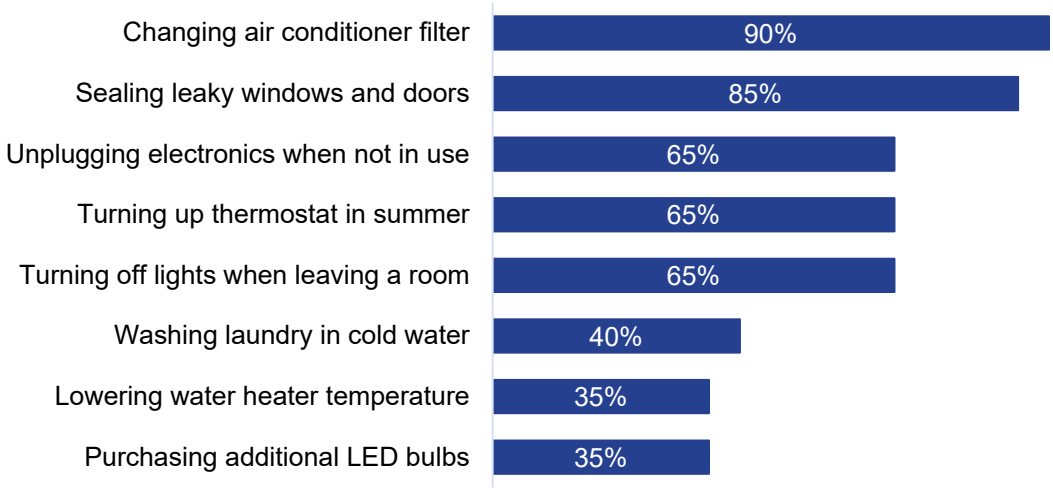
6.5.3 Participant Experience

Respondents were asked if they received an energy audit as part of their participation in the program; this would have been where a technician came to the home to install energy-efficient items and provided a report containing recommendations on ways to save energy. Twenty-five percent of respondents said they did not receive an energy audit as part of their program participation and an additional 17 percent answered *don't know.* Because an energy audit is required to receive upgrades, this suggests that some respondents may not be clear about what was included as part of the visit.

Of the 20 respondents who stated they received an audit, 8 waited less than one week to receive it, while 7 waited between one and two weeks; 4 respondents reported waiting between two and four weeks. Regarding the information discussed during the visit, most respondents recalled talking about the benefits of the items they were prompted with. Changing the AC filter (90 percent) and sealing leaky windows and doors (85 percent) were the tips respondents recalled the most. Figure 38Figure 38 details the percentage of respondents who reported receiving each energy-saving tip during the audit. When asked if there were any other ways to save energy in the home that we did not ask about, respondents specified using energy-saving advanced power strips, using appliances during off-peak hours, and how water usage affects energy consumption.

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Figure 33. Energy Solutions for Manufactured Homes—Energy-Saving Tips Discussed During the Audit (n=20)



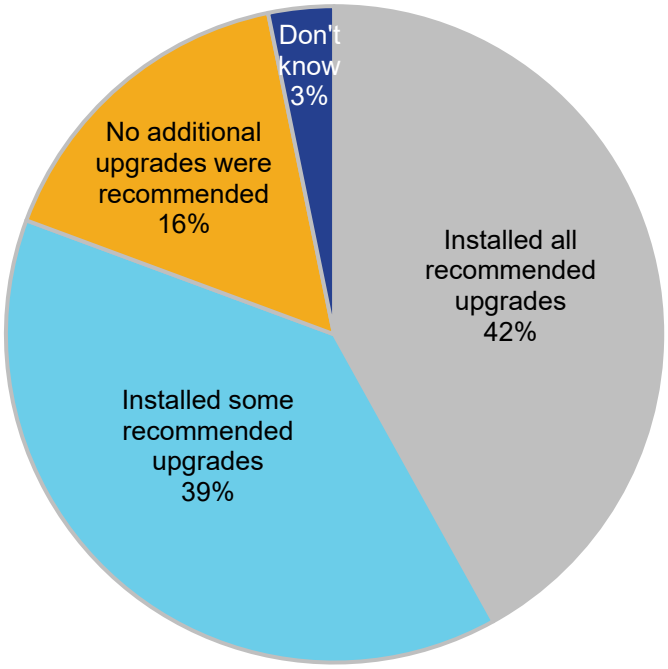
Source: Participant Survey Questions PE3a, PE3b, PE3c, PE3d, PE3e, PE3f, PE3G, PE3h
Multiple responses were allowed.

When asked about their knowledge of the different ways to save energy in their home or property, 49 percent of respondents reported being *somewhat knowledgeable,* and an additional 9 percent of respondents reported being *very knowledgeable*. Three respondents (nine percent) said they were *not at all knowledgeable.* As a result of program participation, 49 percent of respondents reported being *more knowledgeable* about energy savings; this is likely due to 83 percent of respondents feeling that saving energy has become *more important* over the last two years.

Regarding the recommendations presented by the contractor or via the program's HER, respondents were asked whether they ultimately completed *all*, *some*, or *none* of the program's recommended energy-efficient upgrades. Forty-two percent of respondents reported installing *all* the upgrades recommended to them, 39 percent installed *some* of the upgrades, and 3 percent said *don't know*. Sixteen percent of respondents reported that the contractor did not recommend any upgrades. Of the 12 respondents who only made *some* of the recommended upgrades, 3 cited *cost* as an obstacle, 3 cited *not having the time*, and 3 said they *didn't know what to do*. The reasons provided by the remaining three were: *it was not offered to them* (one respondent), *issues with the recommended equipment* (one respondent), and one respondent could not provide a reason for not making the upgrades. Figure 39Figure 39 details the breakdown of respondent upgrade behavior. Of the three who responded that they *didn't know what to do*, two wanted more information on *air sealing*, and one was uncertain about how to install *ceiling insulation* in a mobile home.

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Figure 34. Energy Solutions for Manufactured Homes—Percentage of Respondents Who Made Recommended Upgrades (n=31)



Source: Participant Survey Question Sat5

Table 88 shows the categorized responses for what respondents liked best about the energy audit. Respondents indicated that the energy-saving information they received and the fixing of *air leaks* were what they liked best (21 percent each). The energy-saving information included how to save energy and upgrades they can make to their home or property. Twelve percent said what they liked best was the *energy savings* and the *money saved on their utility bill.* Five percent (two respondents) indicated that they did not receive a report, one of which was a landlord. Twenty-three percent said they *did not know* or did not provide a response. Ensuring all participants receive a physical copy with a summary of the information discussed during the audit may improve participant education and understanding.

Table 88. Energy Solutions for Manufactured Homes—Responses When Asked What They Liked Best About the Energy Audit and Report (n=35)

Audit feature	Count of responses	Percentage
Information about how to save energy	9	21%
Fixing air leaks	9	21%
Energy savings/Lower utility bill	5	12%
Duct sealing	4	9%
Customer service	3	7%

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Audit feature	Count of responses	Percentage
Did not receive a report	2	5%
LEDs	1	2%
Don't know/Did not specify	10	23%
Respondents	**43**	**100%**

Source: Participant Survey Question Sat3
Multiple responses were allowed.

When asked if any additional information about their property/home's energy use that would make the program more valuable, six said *yes*. Three of the six respondents said they would have liked more to be done, including *checking the attic for insulation*, *adding insulation to the ceiling*, and *sealing windows*. One of the three stated that they did not understand the technician's explanation as to why the windows could not be sealed. One respondent would have liked more information about *air leaks* in their house, and another would have liked more information on saving energy in general.

When asked what they found most useful about the home energy assessment or audit report, the two landlords provided the following responses:

"I didn't get the report, but they addressed all the inefficiencies and made it more efficient."

"I found the whole thing helpful and it was very easy to read: how I might make some property investments or improvements, get the most bang for my money, or what would be most useful."

6.5.4 Participant Satisfaction

Overall, respondents rated their satisfaction with EAL as an electric service provider highly. Thirty-nine percent of respondents said they were *very satisfied*, and 42 percent said they were *satisfied* with EAL overall as an electric service provider. Respondents' high satisfaction with EAL was also seen in their satisfaction with the Manufactured Homes program. Fifty-two percent of respondents said they were *very satisfied* with the Manufactured Homes program overall, and 39 percent of respondents said they were *satisfied*. When those who were *less than very satisfied* with the program (16 respondents) were asked if there was anything EAL could have done to improve their program experience, approximately more than one-half said *no* (56 percent, nine respondents). Six respondents said *yes* and provided the following responses:

"We would like to hear back about the $50.00 referral."

"A follow-up phone call would have been nice, a week or two, or a month later."

"The recommendations, that you mentioned about using cold water, turning down the hot water tank temperature, and things like that, were not mentioned. It would have been nice for them to recommend. Also the air around the windows, I am still losing air around the windows."

"Help me understand why my energy bill is so expensive."

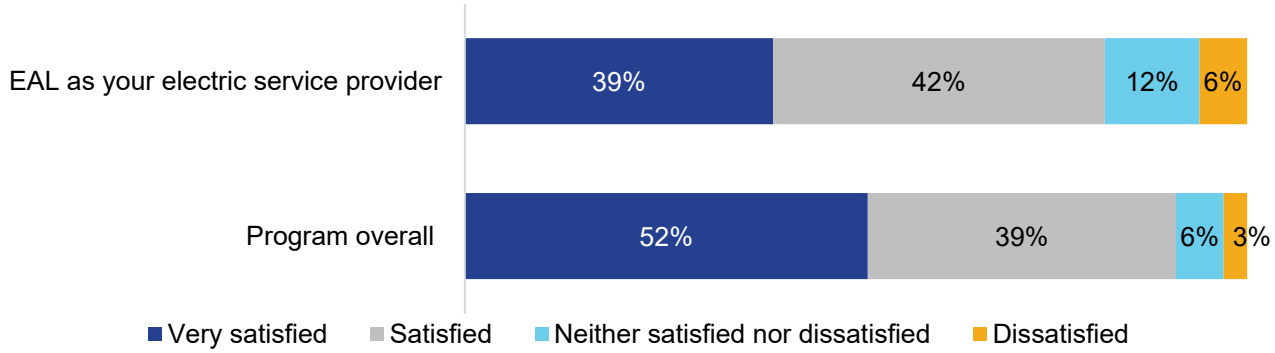
"The only issue is when I emailed about the LED lights, I got a short answer, so lack of communication."

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"To not use such cheap materials that the contractor used in the house."

Figure 40 shows the detailed satisfaction results for the program overall and EAL as their electric provider. The two landlords who responded to the survey reported being *very satisfied* or *satisfied* with all five program aspects.

Figure 35. Energy Solutions for Manufactured Homes—Participant Satisfaction with EAL as Electric Service Provider and the Program Overall



Source: Participant Survey Questions Sat10 and Sat7

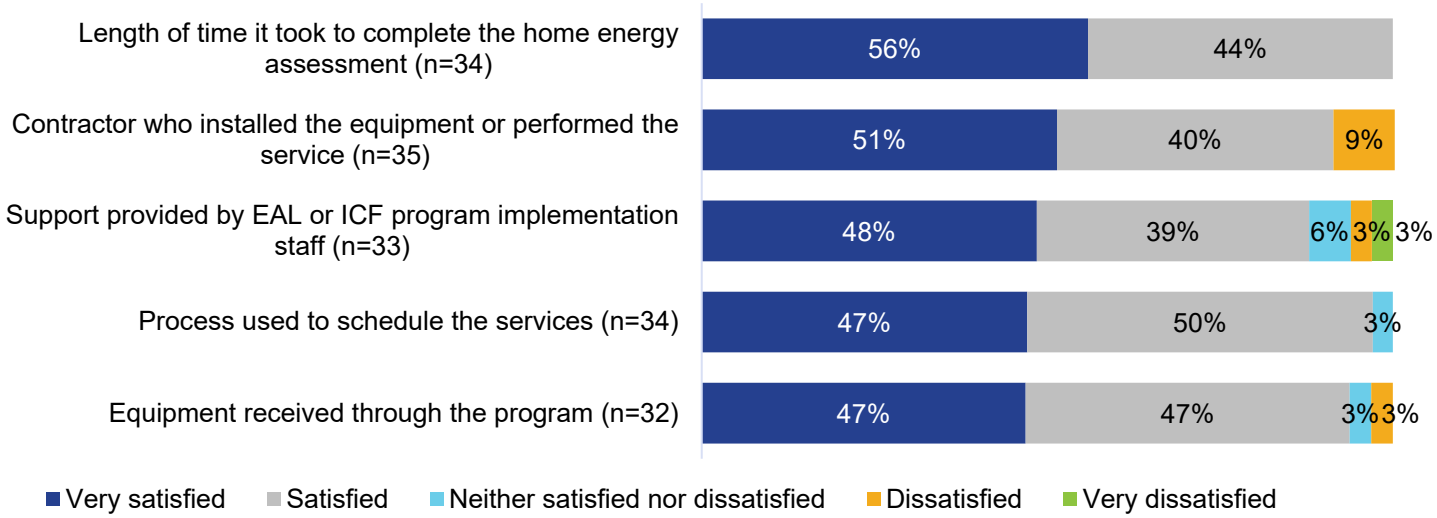
Figure 41 shows satisfaction ratings relating to specific aspects of respondents' experiences with the program, including the support provided by EAL or implementation staff, the contractor who installed program measures, the process used to schedule the services, and the equipment received. Mirroring overall program satisfaction, ratings were high across all specific program aspects queried in the survey. Over 91 percent of respondents said they were *very satisfied* or *satisfied* in each aspect, except support provided by EAL or ICF Consulting (ICF) program implementation staff, which 87 percent of respondents reported being *satisfied or very satisfied* with, and 6 percent were *neutral*.

Three respondents said they were *dissatisfied* with the contractor who installed the equipment but reported being *satisfied* or *neutral* about other program aspects. Two of the three respondents received *duct sealing* and wanted more information or work done about *sealing leaks*. The third respondent did not provide a reason.

One respondent reported being *very dissatisfied* with the support provided by EAL or ICF program implementation staff. This respondent would have liked to receive more information about air sealing and insulation, better communication, and more follow-up. The same respondent reported being *dissatisfied* with the equipment received and stated that they did not receive all of the equipment recommended. Another respondent reported being *dissatisfied* with the support provided, stating that they would have liked to receive *LED bulbs*, and there was a lack of communication when they emailed to ask about it.

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Figure 36. Energy Solutions for Manufactured Homes—Participant Satisfaction with Program Aspects



Source: Participant Survey Questions Sat1a, Sat1b, Sat1c, Sat1d, Sat1f

When asked if they experienced any obstacles or barriers to participating in the program, four respondents provided answers. One respondent indicated that the *smart thermostat* could not be installed. The other three offered the following comments:

"I could not use my high-impact tools around my house as much, and I did not know how much I was using on the grid until I started this program."

"There is only one person living in this house. It would be useful to know what to do to reduce energy. I don't understand why the bill is so high. No other obstacles or barriers."

"The first time they came, after they left my heat went out. They came back and changed the fuse and everything was good for about 2 months, then it went out completely. Not sure if it was due to the first visit."

Customers' propensity to recommend the program to others was high. Thirty-two out of 33 respondents said they would recommend EAL's Manufactured Homes program to others if given the opportunity. This is also seen, as shown above, by the number of customers who reported hearing about the program from word of mouth. The remaining respondent who said they would not recommend the program said it is because there were measures that they never received.

Respondents were asked if they had additional comments that they would like to share. Out of the six respondents who provided feedback, four expressed appreciation for the program,

"The men who did the job were very polite, courteous, clean, and efficient. I am glad that I had it done because I learned my house is not losing energy."

"I recommended this program to friends about this program, so they can use it. 100% recommend it."

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"Entergy came and put in the new thermostat, which I really appreciated because I had an old one that wasn't programmable."

"I was happy with the work they did."

6.5.5 Tune-Ups

Respondents who received *AC* or *heat pump tune-ups* were asked about their experience. Three respondents provided answers to questions regarding their experiences. All three respondents reported that the technician cleaned and inspected both the unit's indoor and outdoor components. One said that they were informed about adjustments made to the refrigerant levels. Two respondents reported that the technician provided an in-depth overview of their work, and one indicated that the technician provided recommendations for improvements to their *AC* or *heat pump* system.

6.6 OVERALL SAVINGS ESTIMATES

The EM&V team used the desk reviews and on-site verification measurements to calculate the program-level realization rates. Program realization rates indicate that the Manufactured Homes program achieved similar energy and demand savings as reported. Adjustments based on desk reviews or on-site verifications were incorporated into realization rates, ultimately resulting in realization rates of 99.2 percent and 96.9 percent for energy and demand savings, respectively.

Table 89. Energy Solutions for Manufactured Homes—Weighted Desk Review and Independent Verification Results[41]

Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
9 w LED (60 w equivalent)—indoor	22,772	4.1	22,119	4.0	97.1%	97.7%	Desk review, on-site verification, and tracking system review
Air conditioner tune-up—manifoldi measurement	241,336	134.5	241,336	134.5	100.0%	100.0%	Desk review and tracking system review
Air infiltration	264,951	35.9	264,951	35.9	100.0%	100.0%	Desk review and tracking system review
Duct replacement—heat pump	10,802	1.7	10,802	1.7	100.0%	100.0%	Tracking system review

[41] A dash indicates that there are no kilowatt savings associated with the respective measure.

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Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
Duct sealing—AC with resistance heat (tested)	4,075,031	391.1	4,081,411	394.6	100.2%	100.9%	Desk review, on-site verification, and tracking system review
Duct sealing—electric cooling (tested)	193,184	105.0	193,184	105.0	100.0%	100.0%	Desk review and tracking system review
Duct sealing—heat pump (tested)	603,030	103.1	603,030	103.1	100.0%	100.0%	Desk review, on-site verification, and tracking system review
LED bulbs BR30 8 W (indoor)	493	0.1	493	0.1	100.0%	100.0%	Tracking system review
LED bulbs candelabra 4 W (indoor)	7,083	1.3	7,083	1.3	100.0%	100.0%	Desk review and tracking system review
Low-flow faucet aerator	6,282	0.7	6,282	0.7	100.0%	100.0%	Tracking system review
Low-flow showerheads	36,822	3.8	36,813	3.8	100.0%	100.0%	Desk review, on-site verification, and tracking system review
Residential heat pump tune-up	96,049	17.6	96,049	17.6	100.0%	100.0%	Tracking system review
Smart strip (direct install)	45,896	5.5	28,882	3.4	62.9%	62.6%	Desk review, on-site verification, and tracking system review
Smart thermostats	38,962	-	38,962	-	100.0%	-	Desk review and tracking system review
Total	**5,642,694**	**804.2**	**5,631,397**	**805.7**	**99.8%**	**100.2%**	

6.7 QUALITY ASSURANCE/QUALITY CONTROL PROCESSES

The implementation team randomly selects properties to receive post-installation verification as part of the program's QA/QC process, verifying measurements taken by trade allies or performing non-invasive visual inspections of work. When work is deemed insufficient, trade allies must typically revisit the site with the implementation team and perform additional work to bring the site's performance up to program standards. For projects that fail the QA/QC *blower door* or *duct sealing* testing, the trade ally also has the option to accept the QA/QC tested result rather than return to the customer's home. If the trade ally returns to the home, additional

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documentation of the new work and test results is collected and applied to the project. Once the QA/QC process is complete, the project is processed. However, the EM&V team observed that two Manufactured Homes projects sampled for ride-alongs with the implementation QA/QC were processed, and tracking data were uploaded before adjustments even though they had failed the QA/QC. The EM&V team brought these up to the implementation team to address. These projects were addressed by the implementer in the final tracking data, and the EM&V team updated the final results accordingly.

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7.0 LOW-INCOME SOLUTIONS

Bridge year (BY) 2023 (BY2023) was the fourth year the Entergy Arkansas, LLC (EAL) Low-Income Solutions program was implemented since its launch in 2020. The program helps low-income households become more comfortable, safe, and energy-efficient using directly installed home weatherization, health, and safety upgrades at no cost to the customer. The objectives of the Low-Income Solutions program are to (1) help EAL customers reduce energy usage, save money on utility bills, and improve comfort in their homes; (2) educate homeowners on the energy efficiency and inefficiency of their homes; (3) identify opportunities for energy savings specific to customers' homes; and (4) improve health and safety of homes residents, provided at no cost to homeowners. Energy audits and energy-efficient home upgrades are delivered through trained and certified home performance contractors. The Low-Income Solutions program is also a delivery mechanism for the *consistent weatherization approach* (CWA) and includes all cost-effective measures following the CWA protocols.

The Low-Income Solutions program targets eligible low-income households or EAL customers aged 65 or older, as they are considered a hard-to-reach subsector. The program also helps with home repairs to correct minor problems that may otherwise prevent the building from receiving weatherization upgrades or pose a health or safety risk. As part of the Low-Income Solutions program, EAL offers the following measures at no cost to qualifying customers: *home energy assessments* by qualified field technicians, and direct installation of *LED bulbs*, *low-flow showerheads*, *faucet aerators*, and *advanced power strips (APS),* and *health and safety* measures. EAL also offers the following *weatherization* measures at no cost to the customer: *air sealing*, *duct sealing*, *ceiling insulation*, *advanced thermostats*, and *heat pump and AC tune-ups*.

In BY2023, the program incentivized *ceiling insulation* installation, *air infiltration*, *duct sealing*, and *advanced thermostats* while providing direct installation of *faucet aerators*, *low-flow showerheads*, *APS*, and *lighting* measures at no cost to the customer. However, BY2023 was the last year *LED bulbs* were installed due to new higher Energy Independence and Security Act (EISA) baseline standards for retailers enforced on July 1, 2023, resulting in no savings associated with this measure per Arkansas Technical Reference Manual (TRM) 9.1 (TRM 9.1). The Low-Income Solutions program was allowed to continue installing *LED bulbs* until the end of BY2023. This report section focuses on energy savings measures; the reader is referred to the *Consistent Weather Approach and Act 1102* section (Section 16.0) for information on the *health and safety* measures.

The evaluation, measurement, and verification (EM&V) team conducted program staff interviews, tracking system reviews, desk reviews, and on-site verifications for a subset of projects to support the evaluation. Table 90 below summarizes the Low-Income Solutions evaluation activities.

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Table 90. Low-Income Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site verification	Metered data analysis[42]
PY2020 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review Participant surveys (41) Update Act 1102	Census	31	5	None

7.1 KEY FINDINGS

In BY2023, the Low-Income Solutions program achieved 7,947 megawatt-hours (MWh) in gross energy savings and 1.8 megawatts (MW) in gross demand savings, as shown in Table 91. The Low-Income Solutions program's gross evaluated savings were slightly lower than reported energy savings and demand savings, resulting in realization rates of 100.0 and 99.4 percent for energy savings (megawatt-hours) and demand savings (megawatts), respectively. The variance between the reported and evaluated savings results from the EM&V team adjusting the savings during the project-level engineering desk reviews and on-site verification. Customers reported high levels of satisfaction with all program aspects, the program overall, and EAL. Reducing energy consumption and saving money on the electric bill is the main driver for customers to participate in the program, and most customers reported that saving energy has become more important over the last two years. Customers benefit from EAL providing upgrades that they may not be able to afford on their own. The energy-saving tips provided during the audit were well received.

Table 91. Low-Income Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio[43]	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	7,946	7,947	100.0%	100.0%	7,947	2.8%
Demand savings (MW)	1.9	1.8	99.4%	100.0%	1.8	2.1%

Table 92. Low-Income Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	7,863	7,947	101.1%
Demand savings (MW)	2.9	1.8	63.7%

[42] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site measurement and verification (M&V).
[43] Based on the PY2020 process evaluation.

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7.2 RECOMMENDATIONS

Similar to PY2022, the EM&V team found continuous improvement in project documentation verifying removed *bulbs* and *HVAC* system nameplates. The program should continue improving project documentation to increase transparency and savings reliability.

During on-site verifications, the EM&V team observed customers' satisfaction with contractor communication with customers and going the extra mile to increase the energy efficiency, health and safety, and comfort of their home. One customer mentioned being very happy with the trade ally providing the measure installation services: "*He went over and beyond*." The contractor closed the register in the garage (the old owner repaired cars in the garage) and changed the customer's air filter (she already had them).

In terms of health and safety measures, the EM&V team found significantly more diversified measures taking place through on-site verifications, as well as better documentation of the measures, aligned with the previous year's trend. Health and safety actions taken by the contractor were, in some cases, more urgent and specific to home needs as opposed to being prescriptive. Examples include drywalling, taping, and painting an exposed ceiling, installing three gable vents to ensure proper attic ventilation, and ensuring a bathroom exhaust fan that goes to the attic was connected to the outside.

The EM&V team also physically verified contractors taking labor-intensive steps to remedy extreme cases to improve duct leakage and air infiltration, such as drywalling the air handler closet and closing attic holes in severely under-weatherized homes, resulting in significant energy savings and improving indoor air quality. The BY2023 EM&V included participant surveys to collect process information and verify program eligibility. Although the EM&V team attempted to verify program eligibility in surveys through household size and income information and participation in other programs, participants remained reluctant to share this information, and it was not possible to verify 100 percent of participants.

The EM&V team identified eight recommendations, shown in Table 93, for EAL's consideration from the evaluation activities.

Table 93. Low-Income Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Collect documentation that clearly verifies the installation location of the *APS* or use *average APS* consistently in the program. Given the nature of the measure, it is recommended the Arkansas TRM add an in-service rate for Tier 1 *APS* in the next update process.	The EM&V team found several cases of Low-Income Solutions desk review documentation not showing what the *APS* was connected to. The EM&V team evaluated savings using the *average APS* rather than the highest savings associated with connecting to a *home entertainment center*, as savings were claimed. The adjustment in savings resulted in realization rates of 66.5 percent and 65.0 percent for energy and demand savings, respectively, for the *APS* measure.
	Recommendation 2: Ensure quality assurance/quality control (QA/QC) results and findings are incorporated to update savings calculation and ArchEE.	Through ride-along site visits with the QA/QC team, the EM&V team found that one project did not pass the measurement threshold for *blower duct* tests. However, this issue was corrected in a final version

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Type	Recommendation	Key finding
		of ArchEE after receiving the EM&V team's recommendation. Ensuring ArchEE gets updated based on the findings of the QA/QC process and/or further actions taken is critical to having a QA/QC process in place in the final version of ArchEE.
	Recommendation 3: Continue internal QA/QC processes to improve documentation and transparency and resolve discrepancies.	The EM&V team found that most projects tracked the correct variables consistent with the project documentation. However, there were a few projects where the EM&V team found a discrepancy in the cooling efficiency, HVAC system type, and measurement results varying in pictures and reported parameters. These issues could be caught in a comprehensive documentation QA/QC prior to tracking data upload.
BY2023 process recommendations	**Recommendation 4:** Continue focusing on training contractors on the importance of customer communication.	Through on-site verifications, the EM&V team found that, typically, customers are highly satisfied with contractors' communication; however, in one case, the customer needed an *APS* to replace an old one for their home office, but the contractor forgot to install a new one. In another case related to *ceiling insulation* qualification, the customer needed insulation, but the contractor said they didn't qualify (above 6-inch existing insulation). When examined during the QA/QC process, the insulation depth was approximately 3 inches. Per the QA/QC team's observation, sometimes this issue is due to the contractor not having the equipment or not knowing how to install *ceiling insulation*. Contractors need to let ICF Consulting or other contractors know when that is the case for another contractor to be deployed to the site.
	Recommendation 5: Continue training contractors on best implementation practices to maximize the savings.	The EM&V team observed that the quality of measure implementation for *duct sealing* and *air infiltration* is generally high. However, during one ride-along site visit, the EM&V team observed that the contractor could do caulking on the window seal. Better training of trade allies may be a cost-effective way to achieve higher, more consistent savings.
	Recommendation 6: Continue to share information directly with customers about the Low-Income Solutions program via email and direct mailing when possible.	Word of mouth was the most cited source for how customers learned about the program, although customers preferred email and direct mail for receiving information about the Low-Income Solutions program.

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Type	Recommendation	Key finding
	Recommendation 7: Provide a written audit report to ensure that customers understand what is included in the audit.	Several customers reported not receiving an audit as part of the program, suggesting that there may be confusion as to what an audit entails. Having documentation to refer back to may improve recall and follow-up on energy savings tips and recommendations.
	Recommendation 8: Work with the EM&V team, IEM and Parties Working Collaboratively to identify streamlined methods to verify program eligibility; collecting sensitive income information was both a barrier to upfront program eligibility verification and back-end program eligibility verification by the EM&V team.	Program design and delivery staff reported that verifying income eligibility is an upfront barrier to program participation for the low-income population; therefore, staff primarily try to determine program eligibility through participation in other programs that have already verified Low-Income Home Energy Assistance Program eligibility. The EM&V team also found barriers on collecting eligibility information in participant surveys and was able to verify the majority, but not all participants' eligibility as defined in Act 1102.

Table 94. Low-Income Solutions—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• For *duct sealing* projects where actual cooling efficiency is unobtainable, use the default value, 11.5 seasonal energy efficiency ratio (SEER), for the cooling efficiency, as outlined in the TRM. ○ Continuing.
	• Use calculators with project-specific inputs for *ceiling insulation* projects and provide the calculations as part of the project documentation. ○ Complete.
PY2020 process recommendations	• Consider developing additional outreach communication and marketing materials to reach potential customers via direct mailings, utility bill inserts, phone calls, and emails. ○ Complete.
PY2021 impact recommendations	• Ensure contractors consistently submit key savings project documentation such as condenser nameplate, *APS* location, heating seasonal performance factor (HSPF), and *LED bulbs* installed and removed. ○ Continuing.
	• Ensure that the contractor installs *direct-install* measures such as *LEDs, APSs, low-flow showerheads, and low-flow faucet aerators* rather than giving them to the customer to install. ○ Continuing.
	• Continue standardizing *MeasureDescription* for prescriptive *health and safety* measures to track measure accomplishments in the tracking database. ○ Continuing.
	• Increase customer service training for contractors regarding communication. ○ Continuing.

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Status of prior year recommendations	
	• Ensure to remove and properly dispose of replaced equipment, such as incandescent bulbs. ○ Continuing.
PY2021 process recommendations	• None.
PY2022 impact recommendations	• Increase QA/QC on the *APS* measure and ensure contractors are educated on installing the *APS* and collecting documentation that clearly verifies the installation location of the *APS*. ○ Continuing.
	• Ensure contractors are consistently submitting key savings project documentation. ○ Continuing.
PY2022 process recommendations	• Increase training and QA/QC of *air* and *duct sealing* measures to ensure all leaks are thoroughly sealed. ○ Continuing.
	• Consider ways to increase participation in the *ceiling insulation* measure for low-income customers. ○ Continuing.

7.3 METHODOLOGY

The following sections present an overview of the impact evaluation methodologies.

7.3.1 Impact Evaluation

The evaluated savings results, established at the project level, are based on savings calculations and adjustments made during the tracking system review, 31 engineering desk reviews, and five on-site visits. Final evaluated savings account for the tracking system review, desk review level, and on-site data collection adjustments for all measure categories.

7.3.1.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review referenced TRM 9.1 for measure-level savings assumptions; the EM&V team checked the tracking systems' linkage to TRM deemed savings and methods used to estimate savings.

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Our review accomplished three primary objectives: (1) identify initial high-level tracking system concerns, (2) verify whether the savings estimates in the tracking system are consistent with the savings algorithms' results as outlined in TRM 9.1, and (3) assess the tracking system's transparency and ability to support QA/QC activities, including future evaluation needs.

7.3.1.2 Desk Reviews

In addition to verifying the use of equations based on the TRM and inputs used to calculate deemed savings, the EM&V team also examined inputs into the tracking system based on a sample of projects. The implementation team provided project files and documentation for sampled projects, and the EM&V team compared parameter values in the project files with those entered into the program's tracking system.

Based on the program's tracking system extract from the tracking system database, BY2023 participant records were assigned measure categories, and the EM&V team created a sample of 26 projects for desk-review-only completes[44]. Participants receiving *non-direct-install* measures (i.e., *envelope* and *HVAC* projects) were prioritized and selected from the data extract. Table 95 provides details on sampled savings by measure category for the program.

Table 95. Low-Income Solutions—Summary of Sampled Savings by Measure Category[45]

Measure category	Reported kWh	Sampled kWh	Percentage kWh sampled	Reported kW	Sampled kW	Percentage kW sampled
Appliances	173,926	2,522	1.5%	20.7	0.3	1.4%
Domestic hot water	151,053	5,485	3.6%	15.7	0.6	3.6%
Envelope	1,301,594	33,098	2.5%	482.5	9.7	2.0%
HVAC	6,173,952	122,346	2.0%	1,316	26.5	2.0%
Lighting	145,760	3,239	2.2%	24	0.5	2.3%
Total	**7,946,285**	**166,690**	**2.1%**	**1,858.9**	**37.6**	**2.0%**

7.3.1.3 On-Site Verification

Five projects received on-site verifications to examine whether the measurements and parameters reported by participating trade allies were accurate and to verify the installation of incented measures. The EM&V team did not perform testing but made process and measurement observations and verified measure installation. Table 96 details the five projects that received on-site verification in BY2023.

[44] Based on the distinct count of *ParticipantID*s sampled for desk review only. Site visits were part of a separate sample.
[45] The data extract was obtained on January 30, 2024.

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Table 96. Low-Income Solutions—Summary of Sampled Savings by Measure Category

Measure category	Number of sites*	Reported kWh	Reported kW
Appliances	1	504	0.1
Envelope	3	4,186	2.1
HVAC	4	10,881	3.5
Domestic water heating	1	300	0.0
Total	**5**	**15,871**	**5.7**

*A single site may have multiple measures.

7.3.2 Process Evaluation

In addition to program staff interviews, participating customer surveys were conducted and are discussed below.

7.3.2.1 Survey Methodology

The participant survey was used to inform the process evaluation of the program's rebate components based on Arkansas TRM Volume 9.1 EM&V Protocols guidance. The participant survey included a series of questions exploring whether participants installed program-discounted energy-efficient upgrades and the importance of program discounts on those decisions. The participant survey investigated awareness and preferred communication methods, participation experiences, program satisfaction, and demographics to support the process evaluation. In addition to questions supporting the process evaluation, the survey also asked questions related to program influence in the customer decision-making process of purchasing energy-efficient equipment.

Sampling Methodology

The participant survey sample consisted of program participants between October 2022 and August 2023, stratified by the three participation periods and manufactured, multifamily, and single-family within each period. We asked spillover questions to participants who installed energy-efficient upgrades in the first two periods to allow more time for potential spillover effects to occur (October 2022 to December 2022 and January 2023 to April 2023). The most recent participants (May 2023 to August 2023) did not receive spillover questions. However, the NTG value is not going to be updated based on the free-ridership and spillover survey responses for the Low-Income Solutions program in BY2023. Table 97 shows the population counts, count of measures in the population, savings by participation period, and indicators for which strata received free-ridership and spillover questions as applicable.

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Table 97. BY2023 Low-Income Solutions NTG/Process Participant Survey Sample Plan Participation Period, Housing Type, Participant Count, and Population Savings

Participation period	House type	Count of measures in population[46]	Count of unique participants[47]	Gross kWh	Survey questions			
					Installation verification	Free-ridership	Spillover	Process
October 2022–December 2022	Manufactured home	14	6	24,264	✓	×	✓	✓
	Multifamily	143	34	170,886				
	Single-family	102	40	158,106				
January 2023–April 2023	Manufactured Home	49	17	123,344	✓	✓	✓	✓
	Multifamily	884	196	691,700				
	Single-family	1,171	433	2,028,498				
May 2023–August 2023	Manufactured home	151	59	598,930	✓	✓	×	✓
	Multifamily	622	185	717,439				
	Single-family	1,275	479	2,324,604				
Total		**4,411**	**1,381**	**6,837,773**				

Random selection was used to sample participants within the three strata. The evaluation team reviewed the sample to ensure that no one property site was overrepresented. Table 98 illustrates the number of program participants by account number in each stratum, the number of participants sampled, and the number of estimated completed surveys. Based on an estimated response rate of 25 percent, 158 participants were selected, with an approximate total of 40 participants.

Table 98. BY2023 Low-Income Solutions Number of Sampled Participants and Target Completes by Participation Period and House Type

Participation period	House type	Count of participants in population	Number of sampled participants	Target number of completes
October 2022–December 2022	Manufactured home	6	6	2
	Multifamily	34	20	5
	Single-family	40	20	5

[46] Measures included are those that have savings associated. Measures, such as *Tier 1 Audit* and *Health and Safety*, do not have savings associated with them and were removed from these counts.
[47] Participant accounts were aggregated, so there was only one record per participant. All associated savings were summed as part of the aggregation process.

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Participation period	House type	Count of participants in population	Number of sampled participants	Target number of completes
January 2023– April 2023	Manufactured home	19	16	4
	Multifamily	192	20	5
	Single-family	442	20	5
May 2023– August 2023	Manufactured home	44	16	4
	Multifamily	153	20	5
	Single-family	351	20	5
Total		**1,281**	**158**	**40**

7.4 DETAILED IMPACT EVALUATION RESULTS

This section presents the results of evaluation activities and details findings from the tracking system review, desk reviews, and on-site verifications. Results are reported at the measure and program levels based on the EM&V activities.

7.4.1 Tracking System Review

The overall Low-Income Solutions program evaluated tracking system savings resulted in identical savings (100 percent kilowatt-hour and kilowatt realization rates) as those calculated by the program implementer; no adjustments were made during the tracking system review. Further details and measure-based findings are provided in Table 99.

Table 99. Low-Income Solutions—Tracking System Review Results by Measure Category

Measure	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW
Appliances	173,926	20.7	173,926	20.7	100.0%	100.0%
Domestic hot water	151,053	15.7	151,053	15.7	100.0%	100.0%
Envelope	1,301,594	482.5	1,301,594	482.5	100.0%	100.0%
HVAC	6,173,952	1,316.3	6,173,952	1,316.3	100.0%	100.0%
Lighting	145,760	23.7	145,760	23.7	100.0%	100.0%
Total	**7,946,285**	**1,859.2**	**7,946,285**	**1,859.2**	**100.0%**	**100.0%**

7.4.2 Desk Review Results

The EM&V team conducted desk reviews of 31 participant homes, including projects that received site visits, to compare values recorded on project documentation with those available in the tracking system. The sites that received desk reviews reported 182,561 kWh in energy savings and 43.3 kW in demand savings.

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The EM&V team found documentation and key parameter issues and discrepancies related to the following measures, leading to adjustments in savings.

Ceiling Insulation

- **Participant ID: 113001.** The square footage of the attic was higher than the square footage of the home reported on Zillow, resulting in adjusting the savings according to the verified square footage. The reported square footage used in the calculation of the reported savings did not match the square footage in the Home Energy Report (HER) and the square footage on Zillow using the home's address: 1,134 square feet reported versus 960 square feet verified. However, *ceiling insulation* type and thickness pre- and post-installation aligned with the photos. The adjustment resulted in an overall project-level realization rate of 84.6 percent energy and demand savings.

Duct Sealing—Heat Pump

- **Participant ID: 313001.** The EM&V team updated the CFM_{pre} and CFM_{post} to match the pictures of the *blower door* with measurements taken by the contractor. There was no note submitted to explain why CFM_{pre} and CFM_{post} varied between the between the calculator (771 CFM_{pre} capped at 480 and 312 CFM_{post}) and the pictures (481 CFM_{pre} and 223 CFM_{post}). The adjustments resulted in an overall project-level realization rate of 153.6 percent for energy and demand savings.

Duct Sealing—Electric Cooling

- **Participant ID: 313006**. The variance between the verified energy and demand savings vs the reported savings for this project resulted from the HVAC SEER rating being adjusted from *13* SEER to *14* SEER based on the model number on the nameplate. This adjustment resulted in an overall project-level realization rate of 73.3 percent for energy and demand savings.

Air Conditioner Tune-Up

- **Participant ID: 313001.** The HVAC system type was reported to be *AC* only for the tune-up measure, while the HVAC system was a *heat pump* based on the nameplate picture and correctly identified as a *heat pump* for the other relevant measures of the same account number. The adjustments resulted in an overall project-level realization rate of 248.3 percent and 100.0 percent for energy and demand savings.

APS (Direct Install)

- **Participant IDs: 113006, 113008, 213005, 213006, and 213008.** These Participant IDs missed documentation or the location/use of the *APS* was unknown. While the picture showed that the *APS* was in use, its location could not be verified. Therefore, the *APS* location was adjusted from *home entertainment* to *average APS* for the home. The adjustments resulted in an overall project-level realization rate of 66 percent and 63 percent for energy and demand savings, respectively.

Low-Flow Faucet Aerator

- **Participant ID: 213006.** The average flow rate for one of the *low-flow faucet aerators* was adjusted from *1.5* GPM to *1.0* GPM based on the invoice. The adjustment resulted in an overall project-level realization rate of 162.5 percent for energy and demand savings.

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Overall, program-level realization based on desk reviews was 100.0 percent and 99.4 percent for energy and demand savings, respectively, due to the adjustment discussed above and the adjustments described in the following *On-Site Verification Results* Section (Section 7.4.3) demonstrates the desk review results at the measure level.

Table 100**. Low-Income Solutions—Desk Review Results**[48]

Measure	Reported savings (kWh)	Evaluated savings (kWh)	Reported savings (kW)	Evaluated savings (kW)	kWh realization rate	kW realization rate
9 W LED (60 W equivalent) - indoor	3,032	3,032	0.5	0.5	100.0%	100.0%
Air infiltration	23,211	23,211	5.3	5.3	100.0%	100.0%
Ceiling insulation	14,073	13,890	6.6	6.4	98.7%	96.9%
Duct sealing - AC with resistance heat (tested)	11,684	11,684	1.2	1.2	100.0%	100.0%
Duct sealing - electric cooling (tested)	17,648	17,540	9.5	9.4	99.0%	99.0%
Duct sealing - heat pump (tested)	82,332	83,724	13.8	14.0	101.7%	101.8%
LED bulbs candelabra 4w (indoor)	207	207	0.0	0.0	100.0%	100.0%
Low flow faucet aerator	1,064	1,084	0.1	0.1	101.9%	101.9%
Low flow showerheads	4,721	4,721	0.5	0.5	100.0%	100.0%
Smart strip (direct install)	3,026	2,013	0.4	0.2	66.5%	65.0%
Air conditioner tune-up - manifoldi measurement	2,771	5,190	1.6	1.6	187.3%	100.0%
Residential heat pump tune-up	17,553	17,553	3.9	3.9	100.0%	100.0%
Smart thermostats	1,239	1,239	-	-	100.0%	-
Total	**182,561**	**185,088**	**43.4**	**43.1**	**100.0%**	**99.4%**

7.4.3 On-Site Verification Results

Five projects received on-site verifications to examine the accuracy of the parameters and measurements reported by trade allies and to verify the installation of the incentivized measures. The EM&V team did not perform testing but made process observations and verified measure installation. On-site projects also received a desk review to compare documentation to data collected on-site. Details from the adjustments based on on-site data collection were rolled into the desk review project-level results in the previous section.

While on-site, the EM&V team gathered customer feedback on their experience with the program. Customers stated they were satisfied with the program and indicated they would not

[48] A dash indicates that there are no kilowatt savings associated with the respective measure.

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have done the work without it. Some stated they felt a significant difference in their bills and/or comfort level.

During the site visit of Participant ID 413006, only one of the two *APSs* reported could be physically verified, which resulted in a 50 percent realization rate for the *appliances* measure category.

Overall, program-level realization rates based on on-site verifications were 98.4 percent and 99.5 percent for energy and demand savings, respectively, as detailed in Table 101.

Table 101. Low-Income Solutions—On-Site Verification Results

Measure category	Reported savings (kWh)	Evaluated savings (kWh)	Reported savings (kW)	Evaluated savings (kW)	kWh realization rate	kW realization rate
Appliances	504	252	0.1	0.0	50.0%	50.0%
Envelope	4,186	4,186	2.1	2.1	100.0%	100.0%
HVAC	10,881	10,881	3.5	3.5	100.0%	100.0%
Domestic water heating	300	300	0.0	0.0	100.0%	100.0%
Total	**16,498**	**15,619**	**6.1**	**5.7**	**98.4%**	**99.5%**

7.5 DETAILED PROCESS EVALUATION RESULTS

As part of the BY2023 evaluation, the EM&V team completed 41 telephone surveys with program participants. The participant survey included a series of questions to collect process information to inform improvements. Not all 41 participants responded to every question asked, and some of the results reported will be based on responses from fewer than 41 respondents.

7.5.1 Respondent Characteristics

Participating respondents were most likely to live with one other person and be 65 years of age or older. The average number of people living in a household was just over two, with most households having two people (33 percent). The majority own their homes (85 percent). The respondents' largest age demographic was 65 or older (29 percent), followed by 35 to 44 years old (26 percent). Thirty-two percent of respondents had completed some college-level courses, while 34 percent were high school graduates or less. Thirty-two percent of respondents completed a college degree or graduate studies.

7.5.2 Decision-Making

Respondents were asked about the factors they considered when deciding whether to have the equipment installed or services done through the program. Reducing energy consumption was the most cited driver in the decision to install the equipment (78 percent), followed closely by saving money on their utility bill (75 percent).

Table 102 shows the factors influencing respondents' decisions to purchase the service or install the equipment through the program.

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Table 102. Low-Income Solutions—Decision-Driving Factors (n=32)

Decision-driving factors	Percentage of respondents*
Reduce energy use/enhance efficiency	78%
Cost savings/save money	75%
Enhance the comfort of the home	16%
Safety	9%
It was free	9%
Contractor's recommendation	6%

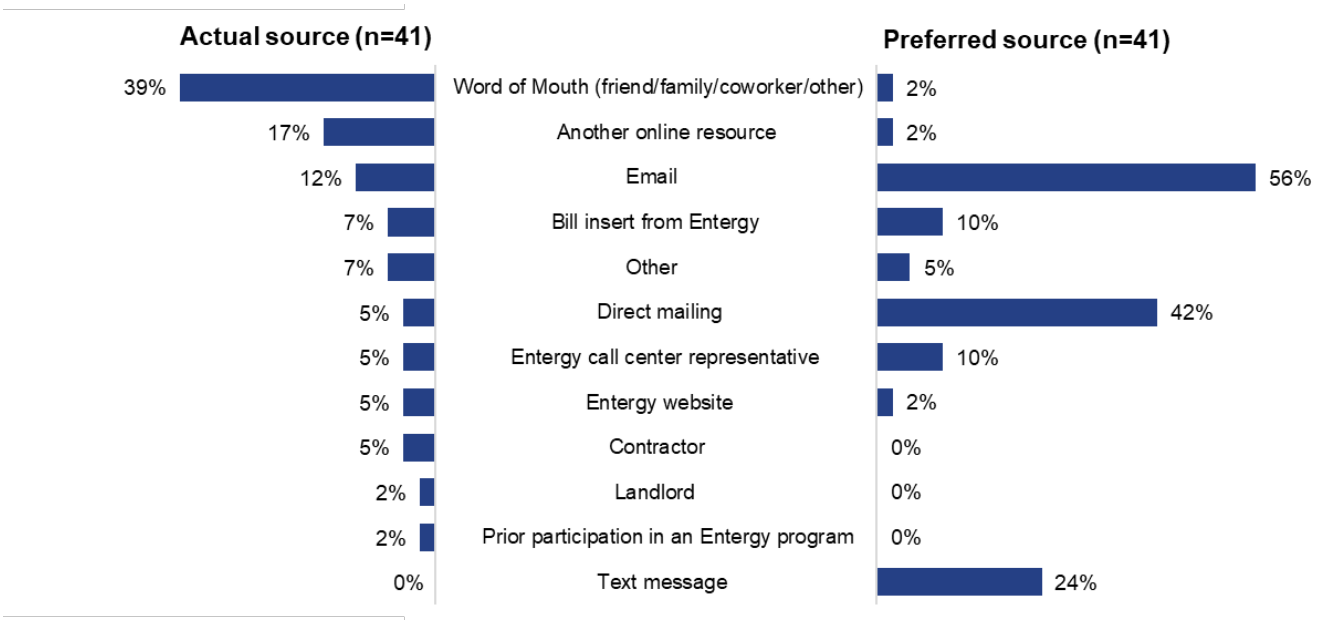
Source: Participant Survey Question Fr1

*Multiple responses were allowed; therefore, response totals may sum to over 100 percent.

7.5.3 Program Marketing

More than one-third of respondents reported learning about the program through word-of-mouth (39 percent). The following most frequently mentioned source was an online resource other than the EAL website (17 percent). In addition to how they learned about the program, the survey also asked respondents how they would prefer to receive information about EAL's energy efficiency programs in the future. The most frequently mentioned preferred communication channel was through email (56 percent), followed by direct mailing (42 percent), and text message (24 percent). Figure 37 illustrates how respondents learned about the program and how they prefer to receive communication about programs in the future.

Figure 37. Sources of Actual and Preferred Low-Income Solutions Program Awareness



Source: Participant Survey Questions A1 and A2

*Multiple responses were allowed.

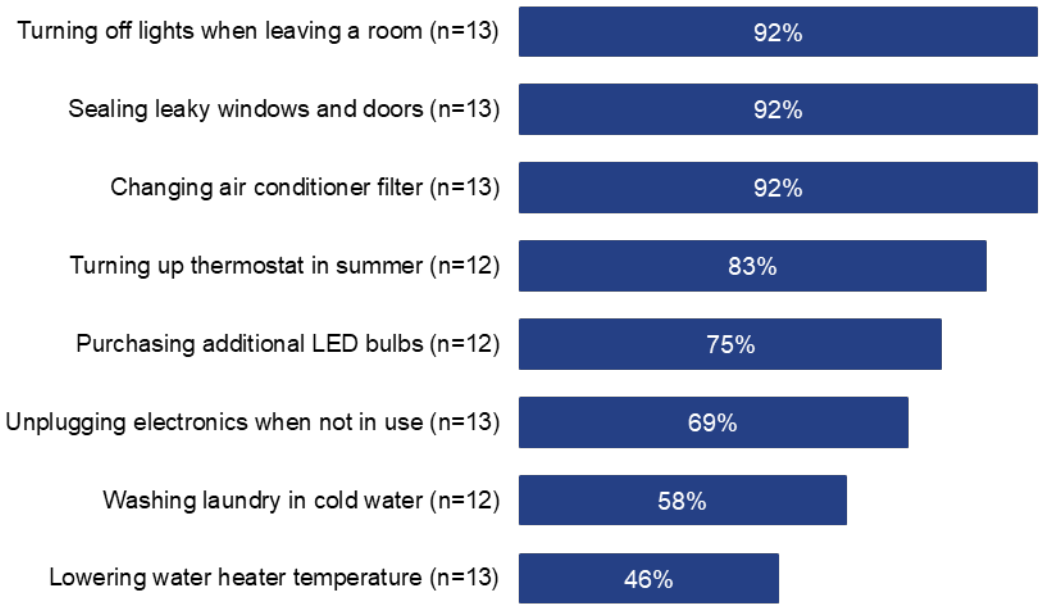
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7.5.4 Participant Experience

Respondents were asked if they received an energy audit as part of their participation in the program; this would have been where a technician came to the home to install energy-efficient items and provided a report containing recommendations on ways to save energy. Over one-half of respondents (56 percent) said they did not receive an energy audit as part of their program participation and an additional 12 percent answered *don't know.* Because an energy audit is required to receive upgrades, this suggests that some respondents may not be clear about what was included as part of the visit.

Of the 13 respondents who stated they received an audit, 3 waited less than one week to receive it, while 5 waited between one and two weeks. Three respondents reported waiting more than four weeks. Regarding the information discussed during the visit, most respondents recalled talking about the benefits of the items they were prompted with. Turning off lights when leaving rooms, sealing leaky windows and doors, and changing the air conditioner filter were the tips respondents recalled the most (92 percent each). Figure 38 details the percentage of respondents who reported receiving each energy-saving tip during the audit.

Figure 38. Low-Income Solutions—Energy-Saving Tips Discussed During the Audit



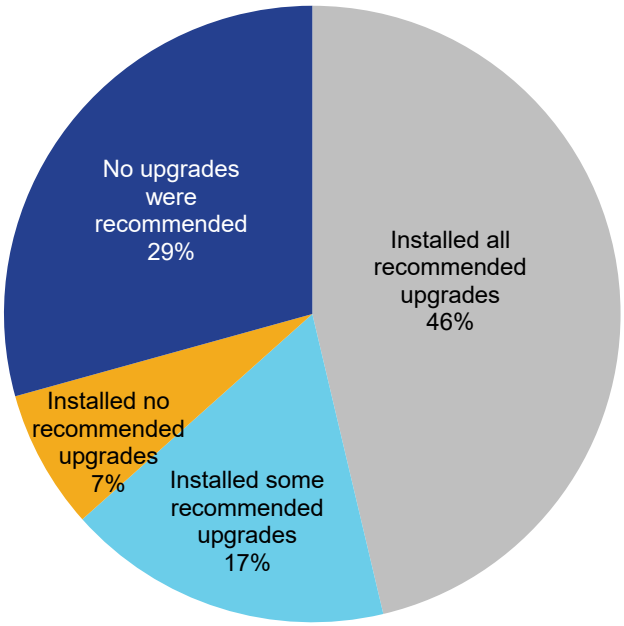
Source: Participant Survey Questions PE3a, PE3b, PE3c, PE3d, PE3e, PE3f, PE3G, PE3h

When asked about their knowledge of the different ways to save energy in their home, 56 percent of respondents reported being *somewhat knowledgeable,* and an additional 42 percent of respondents reported being either *very knowledgeable* or *extremely knowledgeable*. Only one respondent (two percent) said they were *not at all knowledgeable.* As a result of program participation, 44 percent of respondents reported being *more knowledgeable* about energy savings since participating; this is likely due to 88 percent of respondents feeling that saving energy has become *more important* over the last two years.

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Regarding the recommendation presented by the contractor or via the program's HER, respondents were asked whether they ultimately completed all, some, or none of the program's recommended energy-efficient upgrades. Almost one-half of respondents reported installing *all* the upgrades recommended to them (46 percent), 17 percent installed *some* of the upgrades, and 7 percent said they installed *none* of the recommended improvements. Thirty percent of respondents reported that the contractor did not have any upgrades recommended. Of the ten respondents who did not make all of the recommended upgrades, five cited costs as an obstacle. The reasons provided by the remaining five were (1) not believing that they would get the estimated energy savings, (2) issues with the recommended equipment, (3) not having the time, and (4) the property was sold (one respondent each). One respondent could not provide a reason for not making the upgrades. Figure 39 details the breakdown of respondent upgrade behavior.

Figure 39. Low-Income Solutions—Percentage of Respondents Who Made Recommended Upgrades (n=41)



Source: Participant Survey Question Sat5

When asked if there was any additional information about their property's/home's energy use that would make the program more valuable, six said *yes*. Two of the six respondents said they would have liked more measures installed, including *LEDs* and *showerheads*; one said that they wanted follow-up after being told *attic insulation* would be installed; one said they would like to receive a physical copy of the audit findings or a breakdown of recommended eligible upgrades; and one said the program should be advertised so more people can participate.

Respondents were asked whether a technician installed the upgrades they received through the program or if they were left for the participant to install. Seventy-eight percent said that the technician installed all of the upgrades, 15 percent said that the technician installed some of the upgrades, and 7 percent said that the technician did not install any items (they were left for the

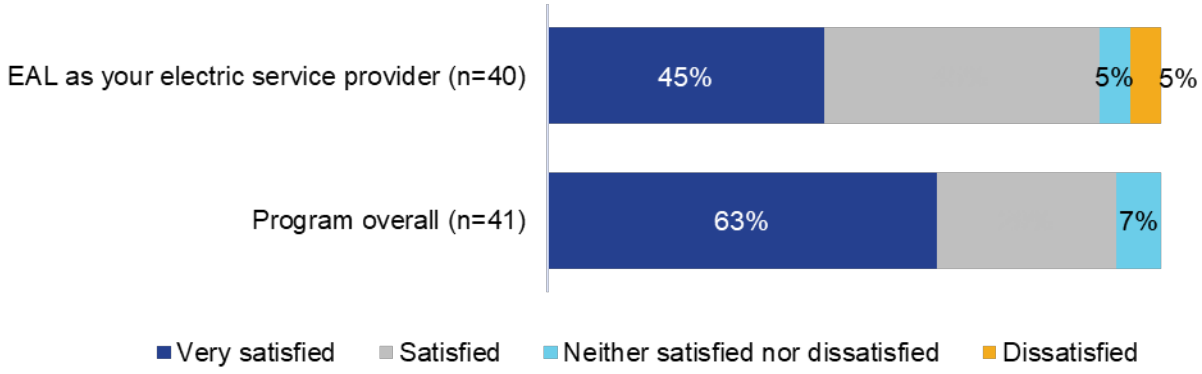
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participant to install). Ninety-two percent of respondents indicated that the technician was easy to understand when explaining why they were installing the items or performing the services. Three respondents said that the technician was not easy to understand, two of whom said that the technician did not explain what they were doing, and one said they were not home during the installation.

7.5.5 Participant Satisfaction

Overall, respondents rated their satisfaction with EAL as an electric service provider highly. Forty-five percent of respondents said they were *very satisfied*, and 45 percent said they were *satisfied* with EAL overall as an electric service provider. Respondents' high satisfaction with EAL was also seen in their satisfaction with the Low-Income Solutions program. Sixty-three percent of respondents said they were *very satisfied* with the Low-Income Solutions program overall, and 29 percent of respondents said they were *satisfied*. No respondents reported being *dissatisfied* with the program. When those who were less than very satisfied with the program were asked if there was anything EAL could have done to improve their program experience, approximately two-thirds said no (67 percent, ten respondents); of the remaining five respondents, four said additional upgrades, such as air conditioner cleaning, insulation, and upgrading windows. One respondent would have liked to receive more information on why their electric bill has increased. Figure 40 shows the detailed satisfaction results for the program overall and EAL as their electric provider.

Figure 40. Low-Income Solutions—Participant Satisfaction with EAL as Electric Service Provider and the Program Overall

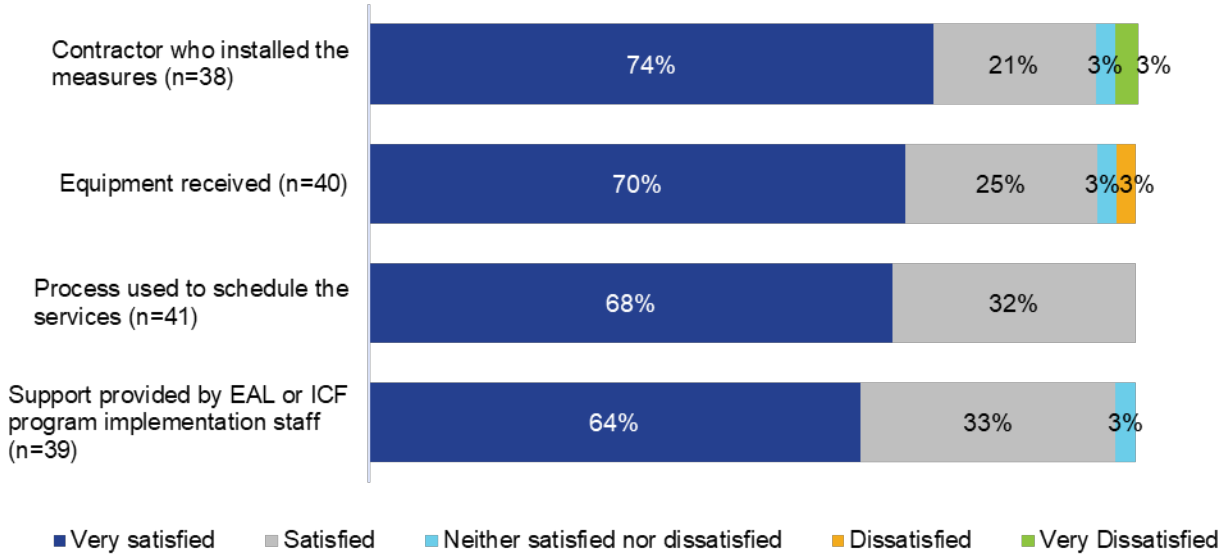


Source: Participant Survey Questions Sat10 and Sat7

Figure 41 shows satisfaction ratings relating to specific aspects of respondents' experiences with the program, including the support provided by EAL or implementation staff, the contractor who installed program measures, the process used to schedule the services, and the equipment received. Mirroring overall program satisfaction, ratings were high across all specific program aspects queried in the survey. Over ninety-five percent of respondents said they were *very satisfied* or *satisfied* in each aspect. One respondent said they were *very dissatisfied* with the contractor who installed the equipment and *dissatisfied* with the equipment received. This respondent stated that the contractor proceeded with doing the work without asking for the respondent's approval and did not provide an explanation of the work they were doing.

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Figure 41. Low-Income Solutions—Participant Satisfaction with Program Aspects



Source: Participant Survey Questions Sat1a, Sat1b, Sat1c, Sat1d

In addition to the program aspects, respondents who received *health and safety* measures were asked about their satisfaction with each, including the *dryer vent cleaning*, *bathroom exhaust fans*, and *smoke* or *carbon dioxide detectors*. Nearly 85 percent reported being *satisfied* or *very satisfied* with each measure. One respondent reported being *dissatisfied* with the *bathroom exhaust fan* and the *dryer vent cleaning*. No reason was provided for their dissatisfaction.

When asked if they experienced any obstacles or barriers to participating in the program, only one respondent reported *yes.* This respondent cited delays in some of the services related to parts. With few barriers and high satisfaction, customers' propensity to recommend the program to others was high. Forty out of 40 respondents said they would recommend EAL's Low-Income Solutions program to others if given the opportunity; this is also seen, as shown above, by the number of customers who reported hearing about the program from word of mouth.

Respondents were asked if they had additional comments that they would like to share. Out of the six respondents who provided feedback, four expressed appreciation for the program, one said it would be helpful if there were program staff who speak Spanish, one said their energy bill has increased over the last year, and one said they would like help with their phone bill. Below are a few comments provided:

"I'm glad you guys have this program. It helped."

"The contractor who came out to my house was very cordial and helpful."

"The service was great. We appreciate it. The services were very useful."

"I think it is wonderful that Entergy is doing any kind of energy-efficient program. Poor people are spending too much money on energy, so anything they can do, I am all for that."

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7.5.6 Tune-Ups

Respondents who received *AC* or *heat pump tune-ups* were asked about their experience. Only one respondent provided answers to questions regarding their experience. The respondent reported that the technician cleaned and inspected both the unit's indoor and outdoor components and that they were informed about adjustments made to the refrigerant levels. The respondent reported that the technician provided a brief overview of the work and did not provide recommendations for improvements to their *AC* or *heat pump* system.

7.6 OVERALL SAVINGS ESTIMATES

The EM&V team used desk reviews, tracking system reviews, and on-site verifications to calculate the program-level realization rates. Program realization rates indicate that the Low-Income Solutions program achieved similar energy and demand savings. Adjustments based on desk reviews or on-site verifications were incorporated into realization rates, resulting in 100.0 percent for energy savings and 99.4 percent for demand savings. Table 103 shows the final savings.

Table 103. Low-Income Solutions—Final Evaluated Energy Savings and Realization Rates by Measure Category[49]

Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
9 W LED (60 W equivalent) - indoor	118,349	19.4	118,349	19.4	100.0%	100.0%	Desk review and tracking system review
Air conditioner tune-up - manifoldi measurement	19,926	11.5	37,322	11.5	187.3%	100.0%	Desk review and tracking system review
Air infiltration	807,435	179.1	807,435	179.1	100.0%	100.0%	Desk review, on-site verification, and tracking system review
Ceiling insulation	494,160	303.4	487,736	294.0	98.7%	96.9%	Desk review, on-site verification, and tracking system review
Duct replacement - heat pump	12,680	2.3	12,680	2.3	100.0%	100.0%	Tracking system review
Duct sealing - AC with resistance heat (tested)	1,370,266	126.8	1,370,266	126.8	100.0%	100.0%	Desk review and tracking system review
Duct sealing - electric cooling (tested)	989,750	541.4	979,852	536.0	99.0%	99.0%	Desk review, on-site verification, and tracking system review
Duct sealing - heat pump (tested)	3,406,195	567.7	3,464,100	578.0	101.7%	101.8%	Desk review, on-site verification, and tracking system review

[49] A dash indicates that there are no kilowatt savings associated with the respective measure.

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Measure	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
LED (retail): outdoor, general purpose, all wattages	133	0.0	133	0.0	100.0%	_	Tracking system review
LED bulbs BR30 8w (indoor)	1,313	0.2	1,313	0.2	100.0%	100.0%	Tracking system review
LED bulbs BR30 8w (outdoor)	337	0.0	337	0.0	100.0%	100.0%	Tracking system review
LED bulbs candleabra 4w (indoor)	25,627	4.1	25,627	4.1	100.0%	100.0%	Desk review and tracking system review
Low flow faucet aerator	25,128	2.6	25,606	2.7	101.9%	101.9%	Tracking system review and desk review
Low flow showerheads	125,925	13.1	125,925	13.1	100.0%	100.0%	Desk review, on-site verification, and tracking system review
Residential heat pump tune-up	310,791	66.6	310,791	66.6	100.0%	100.0%	Desk review and tracking system review
Smart strip (direct install)	173,926	20.7	115,661	13.4	66.5%	65.0%	Desk review, tracking system review, and on-site verification
Smart thermostats	64,343	0.0	64,343	0.0	100.0%	_	Desk review, tracking system review, and on-site verification
Total	**7,946,284**	**1,858.9**	**7,947,476**	**1,847.2**	**100.0%**	**99.4%**	

7.7 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

The implementation team randomly selects properties to receive post-installation verification as part of the program's QA/QC process, verifying measurements taken by trade allies or performing non-invasive visual inspections of work. When work is deemed insufficient, trade allies must typically revisit the site and perform additional work to bring the site's performance up to program standards. For projects that fail the QA/QC *blower door* or *duct sealing* testing, the trade ally also has the option to accept the QA/QC tested result rather than return to the customer's home. If the trade ally returns to the home, additional documentation of the new work and test results is collected and applied to the project. Once the QA/QC process is complete, the project is processed.

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8.0 POINT OF PURCHASE SOLUTIONS

Beginning in program year PY2020, Entergy Arkansas, LLC's midstream and upstream programs merged into the comprehensive Point of Purchase Solutions program. The program aims to provide fast and easy energy efficiency solutions to residential and nonresidential customers at retailers where they already shop in-store, through trade allies, or online through Entergy Arkansas's Marketplace. Discounts are offered for efficient *lighting* products, *appliances*, *HVAC*, and other equipment. The program's long-term goal is to minimize barriers that hinder EAL customers from adopting energy efficiency measures and products.

For both the residential upstream and commercial midstream components, retailers and distributors are incentivized to offer point-of-sale discounts on select energy-efficient equipment. This design has two advantages: (1) it can ramp up quickly, and (2) there is no rebate application process, making it more streamlined and requiring less up-front costs to the customer. That said, for commercial midstream participation, customers must provide company and contact information for program tracking purposes. Cooperation with retailers and distributors and having clear communication channels are key strategies for promoting measures incentivized through these two channels.

The POPS *residential downstream* channel offers post-purchase rebates for select energy-efficient *appliances*, *lighting*, *smart thermostats*, *domestic hot water*, and *envelope* measures. The POPS residential measures contribute most of the energy savings for the overall program. Rebate applications can be submitted either through the mail or online.

For the BY2023 evaluation, the evaluation, measurement, and verification team conducted a full impact evaluation. A full process evaluation was conducted in PY2021, and a limited process evaluation was conducted in PY2022. Activities included in the BY2023 evaluation are program staff interviews; desk reviews of 29 randomly selected *commercial midstream lighting* projects, 1 *agricultural lighting* project, and 70 top-saving *lighting* measures from *residential upstream*; and a full tracking system review.

Table 104. BY2023 Point of Purchase Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[50]
PY2021 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	100	None	None

[50] This column refers to EAL customer meter data provided to the EM&V team instead of primary metered data collected as part of the on-site measurement and verification.

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8.1 KEY FINDINGS

Based on the BY2023 program tracking data, the POPS program reported implementing 1,977,685 measures to 2,130 unique participants.[51] Table 105 provides the program's participation and reported savings by measure category. In BY2023, *residential lighting* projects provided the most savings, with approximately 47 percent of overall savings for the POPS program.

Table 105. BY2023 Point of Purchase Solutions—Reported Participation, Measures, and Savings

Measure category	Participants*	Quantity	Gross program savings (kWh)	Percentage of program savings (kWh)
Agricultural lighting	2	1,380	1,358,294	1.4%
Commercial lighting	679	50,972	24,330,414	24.6%
Residential appliances	483	513	500,756	0.5%
Residential domestic hot water**	1	61	69,687	0.1%
Residential envelope	16	49	3,004	0.0%
Residential HVAC	690	1,080	1,122,588	1.1%
Residential lighting	290	1,775,035	46,509,561	47.1%
Residential other	309	148,686	24,938,570	25.2%
Total	**2,130**	**1,977,776**	**98,832,874**	**100.0%**

*Individual participants may install equipment from multiple measure categories.

**There were 21 returns in the *residential domestic hot water* category (line items with a quantity of -1 or -2 *water heaters*), resulting in 21 participants having a final installed quantity of 0.

In BY2023, the POPS program achieved 98,833 megawatt-hours (MWh) in gross energy savings and 14.9 megawatts (MW) in gross demand savings, as shown in Table 106. The POPS program's evaluated savings resulted in slightly lower energy and demand savings (97.3 percent kilowatt and 93.7 percent kilowatt-hour realization rates) than those calculated by the program implementer. These results are driven by the EM&V team's adjustments. The primary adjustment that decreased energy savings was related to the application of an in-service rate (ISR) to *advanced power strips* (*APS*) that were incentivized through low-income giveaways, while the primary adjustment that increased energy savings was recalculating 6.7 percent of *upstream residential lighting* sales using commercial methodologies.[52] The evaluation team applied net-to-gross (NTG) ratios for each sector measure resulting in an overall NTG ratio of 91.8 percent for energy savings and 90.8 percent for demand savings. The program exceeded planning goals, achieving 127 percent of energy and 133 percent of demand savings.

[51] Participants are defined as unique account numbers. The majority of POPS' residential savings and measures come from the upstream portion of the program (approximately 72 percent of total energy savings and 97 percent of residential savings). The participant counts for POPS greatly underestimate the true reach of the program.

[52] Arkansas TRM 9.1, Volume II, Page 196.

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Table 106. BY2023 Point of Purchase Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	98,833	92,571	93.7%	91.8%	85,012	30.0%
Demand savings (MW)	14.9	14.5	97.3%	90.8%	13.1	14.8%

Table 107. BY2023 Point of Purchase Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	66,846	85,012	127.2%
Demand savings (MW)	9.9	13.1	132.7%

The NTG ratios used for the POPS *prescriptive* measures were based on research conducted in PY2021. NTG varied by measure type, ranging from 68 to 100 percent.

8.2 RECOMMENDATIONS

The EM&V team found new areas for program improvement. Specific recommendations to address these areas are described in Table 108.

Table 108. Point of Purchase Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Apply an ISR of 0.67 to *APSs* that are distributed via low-income giveaways.	The *APS* measure increased drastically in volume compared to PY2022. 148,668 *APSs* (resulting in 24.9 million kilowatt-hours reported) were incentivized through POPS in BY2023, compared to 63,641 *APSs* (resulting in 10.6 million kilowatt-hours reported) in PY2022. The EM&V team notes that the energy savings associated with this measure depend on the correct installation within the home or office. Recent on-site inspections of Entergy Arkansas's residential *APS* measures have found only 67 percent of *APSs* were properly installed. Because the APS distributed via POPS low-income giveaways reaches a similar geographic segment as the APS distributed via the Entergy residential programs, a 67 percent ISR was applied to *APS* savings incentivized via low-income giveaways. For PY2024, the EM&V team recommends applying a 0.67 ISR; for PY2025 and beyond, the EM&V team expects the Arkansas Technical Reference Manual (TRM) will be updated for ISRs covering residential giveaways.

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Type	Recommendation	Key finding
	Recommendation 2: For *residential lighting*[53], increase quality assurance/quality control (QA/QC) on the baseline and retrofit wattages reported in the tracking data.	There were multiple instances in the r*esidential midstream* program where the baseline lighting wattages reported in ArchEE were inconsistent with those in the Arkansas TRM for the incentivized *light bulbs*. There were also instances where the reported retrofit wattage did not align with the lighting wattage on ENERGY STAR® certifications. It is recommended that additional tracking system QA/QC checks related to the baseline and retrofit wattage be conducted.
	Recommendation 3: For *commercial midstream lighting*, increase QA/QC of *commercial midstream* program tracking data to reduce errors.	There were a few instances in the *commercial midstream* program where model numbers reported in ArchEE were inconsistent with the model numbers on the invoice. There were also a few instances where baseline wattage was reported as 0 W. It is recommended that additional tracking system QA/QC checks related to the model number and reported baseline wattage be conducted.
	Recommendation 4: Update the kilowatt savings calculation to correct the identified calculation error for the *POPS weatherization* measure.	As noted in the PY2022 impact report and BY2023 tracking system review report, there is a kilowatt savings gap for all *POPS weatherization* project line items that resulted from an implementer kW calculation error. The implementer has identified the error and will correct it ahead of next year's implementation.
BY2023 process recommendations	**Recommendation 5:** Reorganize information presented on the *POPS* residential website and program manual to enhance clarity.	The program manual organized measures by their different potential channels. While the evaluation team understood the intention, the manual organization could confuse participants. Reorganizing the manual to match the website's format would help improve clarity for potential participants in the *POPS* program. In addition, the *residential weatherization* and *appliance recycling* measures are not listed in the program manual, nor do they receive a dedicated section on the program's website. Adding these measures to the program manual and creating a dedicated section on the website for them could increase visibility and participation.
	Recommendation 6: Work with EM&V team to improve	A majority of residential sector savings in the POPS program come through upstream channels, making it difficult to estimate the true

[53] Implementer will discontinue legacy residential lighting measures and will only offer residential night lights in PY2024

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Type	Recommendation	Key finding
	estimates of residential program participants.	number of program participants. Establishing an agreed upon definition and methodology will provide a standard accounting method in future years.

Table 109. Point of Purchase Solutions —Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Update the program tracking data formats and details to improve data organization, transparency, and consistency. ○ Complete.
	• Increase QA/QC and clarity of program tracking data to reduce errors across program participants. ○ Continuing.
	• Increase QA/QC in data entry to reduce errors in transferring invoice data to the tracking system. ○ Continuing.
PY2020 process recommendations	• None.
PY2021 impact recommendations	• Organize the project documentation so inspection information, participant agreements, and invoices are easily cross-referenced. ○ Complete.
	• Update the program tracking data formats and details to improve data organization, transparency, and consistency. ○ Continuing.
	• Increase QA/QC and clarity of program tracking data to reduce errors. ○ Continuing.
	• Explore strategies to increase participation among participating “dollar” stores. ○ Continuing.
PY2021 process recommendations	• Consider expanding participation in grocery stores. ○ Continuing.
	• Increase decorative and other specialty lighting options in participating stores. ○ Continuing.
	• Continue promoting the program through big box stores. ○ Continuing.
	• Discuss additional implementation strategies among EAL and the program implementer to increase the program's net savings. ○ Continuing.
	• Increase marketing efforts to residential customers to improve program awareness. ○ Continuing.
	• Increase QA/QC on *residential smart thermostat* measures.

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Status of prior year recommendations	
PY2022 impact recommendations	○ Incomplete.
	• Increase QA/QC on *commercial midstream lighting* tracking data to reduce errors. ○ Ongoing.
	• Adjust reporting of baseline and retrofit energy consumption for *ENERGY STAR® freezers* measure. ○ Complete.
PY2022 process recommendations	• Ensure that the information provided on the POPS websites is up to date with all currently offered measures and program updates. ○ Partially Complete

8.3 METHODOLOGY

This section details the evaluation activities for the impact evaluation.

8.3.1 Impact Evaluation

The evaluated savings results are based on savings calculations and adjustments made during the tracking system review, the top 70 *residential lighting* reviews, 29 engineering desk reviews of *commercial midstream lighting* measures, and 1 engineering desk review of *agricultural lighting* measures (savings adjustments were made at the account level). The final component of the evaluated savings results is allocating 6.7 percent of *residential LED lighting* to the commercial program, per Arkansas TRM 9.1 Section 2.5.1. Finally, the NTG ratio was applied at the measure category level to obtain net energy savings. The NTG ratios used for the POPS *prescriptive* measures were based on research conducted in PY2021. NTG varied by measure type, ranging from 53 to 100 percent. All *low-income* measures, denoted by *MSC* codes, were given 100 percent NTG.

Table 110 below shows what aspects of the impact evaluation were applied to each measure type, as well as the NTG used in the evaluation.

Table 110. Point of Purchase Solutions—Evaluated and Net Savings Methodology

Measure	Method to obtain evaluated savings	NTG	
		kWh	kW
Advanced power strips—retail	Tracking system review	87%	87%
Advanced power strips MSC-5606	Tracking system review	100%	100%
Appliance recycling – refrigerator	Tracking system review	100%	100%
Appliance recycling – freezer	Tracking system review	100%	100%
Cannabis dual purpose (vegetative + flowering)	Desk reviews	99%	99%
Cannabis flowering	Desk reviews	99%	99%
Cannabis late vegetative/mothering	Desk reviews	99%	99%

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Measure	Method to obtain evaluated savings	NTG	
		kWh	kW
Efficient hot water (DHW) heaters—WH replacement w/ HPWH	Tracking system review	80%	80%
ENERGY STAR dehumidifiers	Tracking system review	78%	78%
ENERGY STAR freezers	Tracking system review	68%	82%
ENERGY STAR room air cleaners	Tracking system review	78%	78%
ENERGY STAR window AC replacement	Tracking system review	80%	80%
Hard-wired LED fixtures: indoor, all wattages	Tracking system review, top 70 lighting analysis, and 6.7 percent adder	53%	53%
LED (retail): indoor reflector	Tracking system review, top 70 lighting analysis, and 6.7 percent adder	53%	53%
LED (retail): outdoor reflector	Tracking system review, top 70 lighting analysis, and 6.7 percent adder	53%	53%
LED (retail): indoor, all wattages	Tracking system review, top 70 lighting analysis, and 6.7 percent adder	53%	53%
LED fixture indoor MSC-5464	Tracking system review and top 70 lighting analysis	100%	100%
LED indoor omni or deco MSC-5420	Tracking system review and top 70 lighting analysis	100%	100%
LED indoor reflector MSC-5453	Tracking system review and top 70 lighting analysis	100%	100%
Midstream: exterior fixtures	Desk reviews	85%	85%
Midstream: interior fixtures	Desk reviews	85%	85%
Midstream: interior lamps	Desk reviews	85%	85%
Pool pumps	Tracking system review	88%	97%
POPS weatherization retail	Tracking system review	100%	100%
Residential pool pumps—non-self priming	Tracking system review	88%	97%
Smart thermostats—POPS only	Tracking system review	86.2%	86.2%

In the POPS program, the EM&V team used the following definitions for the number of participants:

- The number of participants for the *APS* measure is the number of unique account numbers (obtained using the ArchEE database field *AccountNumber*) with that designated measure, added to the number of line items with one or two *APS* quantities (participants that received one or two *APSs*), added to the number of *APS* in the line items with three or more *APS* measures (assumed one *APS* per participant) with the *-Invalid* or *0000-Invalid* account number.

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- The number of participants for the *appliance recycling – refrigerator, appliance recycling – freezer, cannabis dual purpose (vegetative + flowering), cannabis flowering, cannabis late vegetative/mothering, ENERGY STAR dehumidifiers, ENERGY STAR freezers, ENERGY STAR room air cleaners, midstream: exterior fixtures, midstream: interior fixtures, midstream: interior lamps, POPS weatherization retail, smart thermostats—POPS only, and pool pumps* measures is the number of unique account numbers (obtained using the ArchEE database field *AccountNumber*) with that designated measure.
- The number of participants for the *efficient hot water (DHW) heaters - WH replacement w/HPWH* measure is the count of line items with 1 or 2 quantities of water heaters.
- The number of participants for the *ENERGY STAR window AC replacement* measure is the count of line items with 1 or 2 quantities of window AC units (participants that received one or two window AC units), added to the number of window AC units in the line items with three or more window AC purchases with the *-Invalid* or *0000-Invalid* account number (assumption of one window AC per participant).
- The number of participants for the *residential lighting* measures is the sum of (1) the number of unique account numbers with that designated measure and (2) the quantity of lightbulb packs (*quantity* divided by *BulbsPerPack* in ArchEE database) for each line item with the *-Invalid* or *0000-Invalid* account number (assumption of one pack per participant).

In the POPS program, the EM&V team used the following definition for the quantity of measures:

- The quantity reported for each measure is the sum of the *Quantity* field in ArchEE.

8.3.1.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review used TRM 9.1 as a reference in the review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to TRM deemed savings and methods used to estimate savings. After the measure-level review, the EM&V team verified energy-savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

The ArchEE tracking system, which supplied all participant and claimed savings, and for the most part, all measure level data for *prescriptive-based* measures, was used to check for systemic errors across a census of participants.

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8.3.1.2 Desk Reviews

The engineering desk reviews explored the savings methodologies and documentation from POPS *commercial midstream lighting* projects. The reviews inspected the available project documentation and emphasized key parameters for the deemed savings protocols from TRM 9.1 and *commercial midstream lighting* methodology. After determining the best source of the key parameters from the available documentation, the savings were calculated based on TRM 9.1 algorithms and compared to the reported savings.

The 29 *commercial midstream lighting* desk reviews were selected via simple random sampling. The one *agricultural lighting* project was selected with certainty to the amount of reported savings. In BY2023, the sample was taken at an account number level, meaning that all *lighting* projects under the 30 sampled account numbers were reviewed. Desk reviews were conducted using data from Q1, Q2, and Q3. This evaluation design ensured that the EM&V team had enough time to address any issues observed in the field during the first half of BY2023, ensuring they could be reconciled ahead of the year-end reporting of the POPS program.

8.3.1.3 Review of Top Savings Upstream Lighting Measures

In addition to conducting the tracking system review, the EM&V team identified the 70 bulbs responsible for the highest portion of *upstream lighting* program savings to verify ENERGY STAR savings and status. The 70 largest saving bulbs correspond with over 95 percent of total program *upstream lighting* savings. The EM&V team then confirmed ENERGY STAR certification using extracts of the *ENERGY STAR-certified light fixtures* and *certified light bulbs* datasets and found that all but two bulbs were ENERGY STAR-certified.

Next, the EM&V team compared bulb wattages in ArchEE with wattages provided in the ENERGY STAR datasets to confirm inputs. Ten bulbs had discrepancies with retrofit wattage, 9 bulbs reported multiple baseline wattages, and 18 bulbs had discrepancies with baseline wattage.

8.3.1.4 Documentation Review

To understand the POPS program, the EM&V team had biweekly meetings with program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team reviewed the BY2023 program manuals, the data tracking system, and the savings workbook.

8.4 DETAILED IMPACT EVALUATION RESULTS

This section presents the results of evaluation activities and details findings from the tracking system review and desk reviews. Results are reported at the measure level and program level based on the EM&V activities.

8.4.1 Tracking System Review

The EM&V team completed tracking-system-based savings calculations across the *prescriptive* measure categories. The tracking review checked reported savings and performed evaluation savings calculations across the population using the parameters provided in ArchEE.

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The overall POPS program evaluated tracking system review resulted in nearly identical energy and demand savings (100 percent kilowatt-hour and kilowatt realization rates) to those calculated by the program implementer. The evaluated savings are based on the results of adjustments made from completing engineering reviews of the program's tracking data and the top 70 *residential lighting* review. Only two measures, *residential lighting* and *weatherization*, had realization rates that did not round to 100 percent. *Residential lighting* had a realization rate of 101.0 percent for kilowatt-hour and kilowatt savings due to 2,801 adjustments to retrofit and baseline wattages to match ENERGY STAR certifications or the Arkansas TRM. *Weatherization* had a realization rate of 14.4 percent for kilowatts for an unknown reason.

Measure-category and measure-level tracking system review findings are shown in Table 111 and

Table 112 below. Further details of measure-based findings follow in the sections following the tables.

Table 111. BY2023 Point of Purchase Solutions—Tracking System Review Energy and Demand Savings and Realization Rates by Measure Category

Measure category	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW
Agricultural lighting	1,358,294	260.4	1,358,294	260.4	100.0%	100.0%
Commercial lighting	24,330,414	4,074.0	24,533,106	4,113.3	100.8%	101.0%
Residential appliances	500,756	57.3	499,798	57.2	99.8%	99.8%
Residential domestic hot water	69,687	6.1	69,687	6.1	100.0%	100.0%
Residential envelope	3,004	1.9	3,004	0.3	100.0%	14.4%
Residential HVAC	1,122,588	69.7	1,122,588	69.7	100.0%	100.0%
Residential lighting	46,509,561	7,561.8	46,956,933	7,634.6	101.0%	101.0%
Residential other	24,938,570	2,835.4	17,502,113	1,991.4	70.2%	70.2%
Total	**98,819,745**	**14,857**	**91,918,347**	**14,098.9**	**93.0%**	**94.9%**

Table 112. BY2023 Point of Purchase Solutions—Tracking System Review Energy and Demand Savings and Realization Rates by Measure

Measure	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW[54]	kWh	kW[55]	kWh	kW[56]
Advanced power strips—retail	102,114	11.6	102,114	11.6	100.0%	100.0%
Advanced power strips MSC-5606	24,784,909	2,813.1	17,348,452	1,969.1	70.0%	70.0%
Appliance recycling – freezer	89,875	10.3	89,880	10.3	100.0%	100.0%

[54] A dash indicates that there are no kilowatt savings associated with the respective measure.
[55] Ibid.
[56] Not all measures reported demand savings. In these cases, no realization rate was applicable. In these instances, the kilowatt realization rate field is marked with a dash.

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Measure	Ex-ante savings		Ex-post savings		Realization rate	
	kWh	kW[54]	kWh	kW[55]	kWh	kW[56]
Appliance recycling - refrigerator	388,467	44.3	387,504	44.2	99.8%	99.7%
Cannabis dual purpose (vegetative + flowering)	1,138,132	221.2	1,138,132	221.2	100.0%	100.0%
Cannabis flowering	102,702	22.3	102,702	22.3	100.0%	100.0%
Cannabis late vegetative/mothering	117,459	17.0	117,459	17.0	100.0%	100.0%
Efficient hot water (DHW) heaters—WH replacement w/HPWH	69,687	6.1	69,687	6.1	100.0%	100.0%
ENERGY STAR dehumidifiers	1,304	0.3	1,304	0.3	100.0%	100.0%
ENERGY STAR freezers	280	0.0	280	0.0	100.0%	99.9%
ENERGY STAR room air cleaners	20,830	2.4	20,830	2.4	100.0%	100.0%
ENERGY STAR window AC replacement	59,046	69.7	59,046	69.7	100.0%	100.0%
Hard-wired LED fixtures: indoor, all wattages	313,752	51.0	313,752	51.0	100.0%	100.0%
LED (retail): indoor reflector	92,164	15.0	106,370	17.3	115.4%	115.4%
LED (retail): outdoor reflector	48	-	48	-	100.0%	-
LED (retail): indoor, all wattages	6,239,388	1,014.5	6,032,299	980.8	96.7%	96.7%
LED fixture indoor MSC-5464	182,942	29.7	99,022	16.1	54.1%	54.1%
LED indoor omni or deco MSC-5420	37,879,617	6,158.7	38,416,635	6,246.0	101.4%	101.4%
LED indoor reflector MSC-5453	1,801,651	292.9	1,988,807	323.4	110.4%	110.4%
Midstream: exterior fixtures	3,734,054	-	3,751,284	-	100.5%	-
Midstream: interior fixtures	17,115,953	3,374.8	17,136,570	3,379.2	100.1%	100.1%
Midstream: interior lamps	3,467,279	689.3	3,518,077	700.2	101.5%	101.6%
Pool pumps	51,547	10.7	51,547	10.7	100.0%	100.0%
POPS weatherization retail	3,004	1.9	3,004	0.3	100.0%	14.4%
Smart thermostats – POPS only	1,063,542	-	1,063,542	-	100.0%	-
Total	**98,819,745**	**14,857**	**91,918,347**	**14,099**	**93.0%**	**94.9%**

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8.4.1.1 Agricultural Lighting

- No issues found.

8.4.1.2 Commercial Midstream Lighting Program

- In BY2023, POPS *commercial midstream lighting* saw a significant increase in large lighting projects (over 200,000 kWh at a single address). There were 24 projects over 200,000 kWh in BY2023, compared to 8 total in PY2022. Because the POPS *commercial midstream lighting* methodology does not require the recording of the baseline lighting, there is a potential risk of reported savings deviating significantly from the actual energy savings achieved.
- There were nine *commercial midstream* projects where the baseline wattage was reported as 0 W. The EM&V team adjusted the baseline to the appropriate wattage, per the POPS *commercial midstream lighting* methodology for qualified lighting, and zeroed out savings for non-qualified lighting. This adjustment resulted in a kilowatt-hour realization rate of 100.8 and a kilowatt realization rate of 101.0 percent for the measure.

8.4.1.3 Residential Appliances

- **Dehumidifiers:** No issues found.
- **Freezers:** Slight rounding differences.
- **Room air purifier/cleaners:** No issues found.
- **Appliance recycling:** The EM&V team identified a potential duplicate entry in ArchEE, where two line items shared identical project numbers and inputs. One line item's energy savings were zeroed out, resulting in a kilowatt-hour and kilowatt realization rate of 99.8 percent for the measure.

8.4.1.4 Residential Domestic Hot Water

- **Water heater replacements (heat pump water heaters):** No issues found.

8.4.1.5 Residential Envelope

- **POPS weatherization retail:** A kilowatt savings gap (resulting in realization rates ranging between 1.4 and 25.4 percent) was found in all line items. This is a persistent finding since the BY2023 mid-year tracking system review. The reason for this deviation was due to an implementer calculation error that has been identified and will be corrected for PY2024.

8.4.1.6 Residential HVAC

- **Window air conditioner replacement:** Quantities of more than one window air conditioning unit were grouped into single line items. Although the grouped air conditioning units were the same model number, the entries under the ArchEE field *NewEqpManufacturer* were labeled as *multiple*. It is also recommended that whether AC

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units are louvered or have a reverse cycle be tracked in ArchEE, as these are inputs in determining the baseline efficiency of the unit.

- **Smart thermostats:** Six line items applied the propane factor erroneously to the savings calculation; this was also a finding in PY2022.

8.4.1.7 Residential Lighting

- **Hard-wired LED fixtures:** No issues found.
- **LED (retail) indoor reflectors:** Fifty line items with *BR30 reflector lamps* reported a baseline wattage of *40 W* instead of *65 W*, which is the correct baseline as specified in the TRM for reflector lamps that were installed before July 1, 2023. Adjusting the correct baseline wattage resulted in a kilowatt-hour and kilowatt realization rate of 115.4 percent for this measure.
- **LED (retail) outdoor reflectors:** No issues found.
- **LED (retail) indoor, all wattages:**
    - Two-hundred-twenty-nine line items with *15 W A-lamps* reported a baseline of *100 W* instead of *72 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 1,490 and 2,600 lumens that were installed before July 1, 2023.
    - Seventy-two line items with *candelabra lamps* reported a baseline of *29 W* instead of *40 W*, which is the correct baseline as specified in the TRM for *directional candelabra lamps* between 310 and 749 lumens that were installed before July 1, 2023.
    - Four-hundred-fifty-five line items with *8 W A-lamps* reported a baseline of *60 W* instead of *43 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 750 and 1,049 lumens that were installed before July 1, 2023.
    - One-hundred-eleven line items with *11 W A-lamps* reported a baseline of *75 W* instead of *53 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 1,050 and 1,489 lumens installed before July 1, 2023.
    - One-hundred-one line items with *6 W A-lamps* reported a baseline of *40 W* instead of *29 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 310 and 749 lumens that were installed before July 1, 2023.
    - Eight-hundred-fifty-two line items reported retrofit wattages for lights that were inconsistent with their ENERGY STAR-certified wattages.
    - Adjusting these line items resulted in a kilowatt-hour and kilowatt realization rate of 96.7 percent for this measure.
- **LED fixture indoor MSC-5464:**

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- Two line items with *15 W fixtures* reported a baseline of *100 W* instead of *53 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 1,490 and 2,600 lumens that were installed before July 1, 2023.
- Four line items with *9 W fixtures* reported a baseline wattage of *60 W* instead of *43 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 750 and 1,049 lumens that were installed before July 1, 2023.
- Forty-one line items were for *atypical lamps* (*desk lamps* and *under-cabinet fixtures*), whose baselines were not previously discussed with the evaluator, had their baseline wattages adjusted for Energy Independence and Security Act (EISA) minimums or industry standard replacements.
- Adjusting these line items resulted in a kilowatt-hour and kilowatt realization rate of 54.1 percent for this measure.

- **LED indoor omni or deco MSC-5420:**
  - Six-hundred-eighty-four line items with *candelabra lamps* reported a baseline of *29 W* instead of *40 W*, which is the correct baseline as specified in the TRM for *directional candelabra lamps* between 310 and 749 lumens that were installed before July 1, 2023.
  - Eight line items with *8 W A-lamps* reported a baseline of *60 W* instead of *43 W*, which is the correct baseline as specified in the TRM for *omnidirectional lamps* between 750 and 1,049 lumens that were installed before July 1, 2023.
  - Adjusting these line items resulted in a kilowatt-hour and kilowatt realization rate of 101.4 percent for this measure.
- **LED indoor reflector MSC-5453:**
  - Four-hundred-twenty-six line items with *BR30 reflector lamps* reported a baseline wattage of *40* W instead of *65 W*, which is the correct baseline as specified in the TRM for *reflector lamps* that were installed before July 1, 2023.
  - Fifteen line items with *BR30 reflector lamps* reported a baseline wattage of *60* W instead of *65 W*, which is the correct baseline as specified in the TRM for *reflector lamps* that were installed before July 1, 2023.
  - Adjusting these line items resulted in a kilowatt-hour and kilowatt realization rate of 110.4 percent for this measure.

8.4.1.8 Residential Other

- **Advanced power strips:** The *APS* measure has increased drastically in volume compared to PY2022. One-hundred-forty-eight-thousand-six-hundred-sixty-eight *APSs* (resulting in 24.9 million kilowatt-hours reported) were incentivized through POPS in BY2023, compared to 63,641 *APSs* (resulting in 10.6 million kilowatt-hours reported) in PY2022. The EM&V team notes that the energy savings associated with this measure depend on the correct installation within the home or office. Recent on-site inspections of EAL's residential APS measure (12 conducted in BY2023) found that 67 percent of *APS* were properly installed under direct install pathways. Given that Arkansas TRM 9.1 has no ISR for Tier 1 *APS* (the tier incentivized by POPS) and the APS distributed

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via POPS low-income giveaways reaches a similar geographic segment as the APS distributed via the Entergy residential programs, upon consultation with the Arkansas independent energy monitor, the EM&V team applied a 67 percent ISR to *APS* incentivized through low-income giveaway programs in BY2023 for the evaluated savings. This significantly decreased energy and demand savings for the measure.

- **Pool pumps:** No issues found.

8.4.2 Desk Reviews

As noted earlier, the BY2023 POPS program impact evaluation efforts included an engineering analysis for a sample of 29 account numbers with *commercial midstream lighting* projects and one *agricultural lighting* account number. The engineering desk reviews showed mostly consistent TRM 9.1 and *commercial midstream lighting* methodology protocols across all measures. There were six *lighting* projects with slight retrofit wattage adjustments to match the certified wattage on the DesignLights Consortium (DLC) database. Two projects reported model numbers and wattages that were inconsistent with their respective invoices. There were no adjustments for the one *agricultural lighting* account number reviewed.

Table 113 provides account-level realization rates for the 30 account numbers reviewed during the desk reviews. One of the 30 account numbers required savings adjustments of more than ten percent. Each customer was assigned an anonymous account number in the first column. A detailed description of the project with a realization rate adjustment follows.

Table 113. Commercial Midstream and Agricultural Lighting—BY2023 Desk Review Results by Project

Account number	Reported savings		Evaluated savings		Realization rate	
	kWh	kW[57]	kWh	kW[58]	kWh	kW[59]
1	12,164	2.5	11,656	2.4	95.8%	95.8%
2	30,623	6.0	30,623	6.0	100.0%	100.0%
3	9,029	1.9	9,030	1.9	100.0%	100.0%
4	9,969	0.1	9,969	0.1	100.0%	100.0%
5	7,757	1.6	7,757	1.6	100.0%	100.0%
6	3,303	0.7	3,303	0.7	100.0%	100.0%
7	46,633	-	46,633	-	100.0%	-
8	44,867	8.9	44,868	8.9	100.0%	100.0%
9	13,744	2.8	13,744	2.8	100.0%	100.0%
10	1,169	-	1,169	-	100.0%	-
11	2,941	-	2,941	-	100.0%	-

[57] A dash indicates that there are no kilowatt savings associated with the respective measure.
[58] Ibid.
[59] Not all projects reported demand savings. In these cases, no realization rate was applicable, and therefore, the kilowatt realization rate field is marked with a dash.

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Account number	Reported savings		Evaluated savings		Realization rate	
	kWh	kW[57]	kWh	kW[58]	kWh	kW[59]
12	74,630	13.6	74,630	13.6	100.0%	100.0%
13	5,369	1.1	5,369	1.1	100.0%	100.0%
14	3,387	0.3	3,387	0.3	100.0%	100.0%
15	300,709	57.1	303,667	57.1	101.0%	100.0%
16	65,933	13.0	65,932	13.0	100.0%	100.0%
17	7,653	1.5	7,653	1.5	100.0%	100.0%
18	419	0.1	405	0.1	96.7%	96.7%
19	1,902	-	1,902	-	100.0%	-
20	24,366	3.1	24,366	3.1	100.0%	100.0%
21	627	0.1	620	0.1	98.9%	98.9%
22	2,252	0.5	2,252	0.5	100.0%	100.0%
23	36,135	7.4	36,105	7.3	99.9%	99.9%
24	100,970	14.1	100,971	14.1	100.0%	100.0%
25	12,225	2.5	12,251	2.5	100.2%	100.2%
26	3,124	-	3,124	-	100.0%	-
27	3,558	0.7	3,558	0.7	100.0%	100.0%
28	222,015	43.7	222,014	43.7	100.0%	100.0%
29	31,539	1.6	8,360	1.7	26.5%	107.1%
30	853,599	165.9	853,568	165.9	100.0%	100.0%
Total	**1,932,611**	**350.6**	**1,911,829**	**350.6**	**98.9%**	**100.0%**

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To incorporate the desk review findings and adjustments to savings into the overall impact evaluation, the EM&V team applied the realization rates at a measure-type level to the *commercial midstream lighting* energy savings reported in ArchEE. The realization rates by measure type are presented in Table 114 below. A detailed description of account-level adjustments follows.

Table 114. Commercial Midstream and Agricultural Lighting—Desk Review Evaluated Energy Savings and Realization Rates by Installation Type

Measure type	Reported savings		Evaluated savings		Realization rate	
	kWh	kW[60]	kWh	kW[61]	kWh	kW[62]
Cannabis dual purpose (vegetative + flowering)	853,599	165.9	853,568	165.9	100.0%	100.0%
Midstream: exterior fixtures	145,130	-	124,863	-	86.0%	-
Midstream: interior fixtures	888,775	175.5	888,309	175.4	99.9%	99.9%
Midstream: interior lamps	45,107	9.2	45,089	9.2	100.0%	100.0%
Total	**1,932,611**	**350.6**	**1,911,829**	**350.6**	**98.9%**	**100.0%**

Details of the project-based savings adjustments are provided below by participant number and EM&V Participant ID:

- **Account 1—JobIds 202302030019875176 and 202302030019875177.** An adjustment was made to both line items.
    - The wattage for 42 *lightbulbs* was adjusted from the reported *52 W* to *55 W* to match the DLC certification database tested wattage. This adjustment resulted in a realization rate of 95.8 percent in energy and demand savings for the customer.
- **Account 15—JobIds 202302210019905005, 202212050019669110, 202212050019669111, 202302270019919233, 202310130020241964, 202209280019378266, 202212130019694920, 202212130019694921, 202212050019669073, 202212050019669074, 202212050019669084, 202212050019669085, 202212050019669128, 202212200019753412, 202302210019905004, 202310130020242192, and 202303290019970217**. An adjustment was made to 12 line items.
    - The wattage and model number for three lights (on one line item) were adjusted from the reported *SMWLPAK2A/015UNVD8SC2/NC/BZ/P* and *15 W* to *WALPAKN4C/120UNVD840/NC/yy[Blank, P]* and *120 W* to match the wattage in the DLC certification for the model number listed on the invoice. The baseline wattage was adjusted from *100.52 W* to *448.5 W* based on the lighting category of the model number listed on the invoice.

[60] A dash indicates that there are no kilowatt savings associated with the respective measure.
[61] Ibid
[62] Not all projects reported demand savings. In these cases, no realization rate was applicable, and therefore, the kilowatt realization rate field is marked with a dash.

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  - The wattage for 61 lights (across nine line items) was adjusted from the reported *218.73 W* to *218.7 W* to match the DLC certification database.
  - The wattage for 12 lights (across two line items) was adjusted from the reported *218.73 W* to *218 W* to match the DLC certification database.
  - These adjustments resulted in a realization rate of 101 percent in energy and 100 percent in demand savings for the customer.

- **Account 18—JobId 202212230019763200**. An adjustment was made to the wattage for 12 lightbulbs from the reported *19.2 W* to *19.5 W* to match the DLC certification database. This adjustment resulted in a realization rate of 96.7 percent in energy and demand savings for the customer.
- **Account 21—JobIds 202209280019378249 and 202209280019378250**. An adjustment was made to one of the two line items.
  - The wattage for six lightbulbs was adjusted from the reported *19.2 W* to *19.5 W* to match its DLC certification and the provided invoice. This adjustment resulted in a realization rate of 98.9 percent in energy and demand savings for the customer.
- **Account 23—JobId 202202080018487292**. An adjustment was made to the wattage for 165 lightbulbs from the reported *38.75 W* to *38.8 W* to match the test wattage on the DLC certification database. This adjustment resulted in a realization rate of 99.9 percent in energy and demand savings for the customer.
- **Account 25—JobIds 202211010019520621 and 202212230019763219.** An adjustment was made to both line items.
  - The wattage for 48 lightbulbs was adjusted from the reported *38.75 W* to *38.8 W* to match the DLC certification database.
  - The wattage for eight lightbulbs was adjusted from the reported *40 W* to *38.9 W* to match the DLC certification database.
  - These adjustments resulted in a realization rate of 100.2 percent in energy and demand savings for the customer.
- **Account 29—JobIds 202209280019378251, 202209280019378252, and 202209280019378253**. An adjustment was made to two out of the three line items.
  - The wattage and model number for 16 lights (on one line item) were adjusted from the reported *WMG2-5-80-BRZ-120-277* and *77.46 W* to *T8-EZ6-GS-4FT-18W-50K-F* and *19.5 W* to match the wattage in the DLC certification for the model number listed on the invoice. The baseline wattage was adjusted from *77.46 W* to *28.3 W* based on the lighting category of the model number listed on the invoice.
  - The wattage for 12 lightbulbs was adjusted from the reported *38.75 W* to *38.8 W* to match the DLC certification database.
  - These adjustments resulted in a realization rate of 26.5 percent in energy and 107.1 percent in demand savings for the customer.

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8.4.3 Documentation Review

To understand the POPS program, the EM&V team had biweekly meetings with program staff and reviewed all information on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- A data tracking system that contained compiled sales data from participating distributors.
- A 2020 EAL Midstream Lighting Savings workbook showing the buildup of the *midstream* savings methodology. No changes to the *midstream* program were made for BY2023, so the 2023 EAL Midstream Lighting Savings workbook was not updated. This workbook also contained calculated savings for each product on the Commercial Midstream Lighting Qualified Products List (QPL) using the *commercial midstream lighting* methodology outlined in Arkansas TRM 9.1. The implementer no longer maintains this QPL.
- BY2023 program manuals for the POPS program, provided via email from CLEAResult.

The EM&V team found a few minor issues in its review of documentation, including:

- a few address differences between the documentation and the tracking system,
- a few phone numbers vary between the documentation and the tracking system,
- the end customer point of contact in the Participation Agreement differed from the name in the tracking system data in a few instances,
- model numbers in the tracking system did not match the model numbers in the invoices for a few line items,

8.4.3.1 Program Website Review

8.4.3.2 Residential

Information found on the residential POPS program website includes:

- a general description of the program,
- a list of eligible energy efficient measures and their incentives,
- information (organized by measure) about how to apply for and receive rebates or discounts, and
- an updated copy of the POPS residential manual.

The residential website is very well organized by energy efficient measures. A link to participating retailers is provided under each measure that can be purchased through retailers (*APSs*, *heat pump water heaters*, *window air conditioners*). The participating retailer list includes the retailer's name, store number, and complete address. A link is provided under each measure that can be purchased through the online Entergy Arkansas Marketplace (*APSs*, *air purifiers*, *dehumidifiers*, *smart thermostats*). A rebate application form (either submitted online, mailed, faxed, or emailed) is provided under each measure that may require submitting a rebate

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application form (*freezers*, *air purifiers*, *dehumidifiers, smart thermostats*). Within each measure are also details on promotional periods or purchase limits per customer.

The program manual organized measures by their different potential channels. While the evaluation team understood the intention, the manual organization could confuse participants. For example, *smart thermostats* are listed in three different sections (corresponding with retailers, rebate applications, and the online Marketplace), and it can appear that there are different types of *smart thermostats* available, some having *no application required*, some requiring *submitting a mail-in or online rebate application*, and some exclusively *incentivized through an online marketplace*. Reorganizing the manual to match the website's format would help improve clarity for potential participants in the POPS program; this is a persistent finding from PY2022.

While *residential weatherization* measures are found in the Entergy Arkansas Marketplace, they are not listed on the program landing page or as a measure in the BY2023 program manual. Adding this measure to the landing page and manual would increase visibility and participation.

Finally, the new *appliance recycling* measures have yet to be added to the program manual. Adding this measure to the manual would increase visibility and participation. The measures have been added to the program website in two places (located in the same section as the *ENERGY STAR freezers* and at the bottom of the page, under the contact information and Marketplace link). Including the *refrigerator* and *freezer recycling* in a dedicated section (like the other measures), with the incentive amount and the application process explicitly outlined, may increase visibility and reduce confusion on the website.

8.4.3.3 Commercial

Information found on the commercial POPS program website includes a general description of the program (such as who is eligible and how participation works, including a link to the participation agreement), a comprehensive list of eligible energy efficiency measures (*lighting*, *variable frequency drives, electric hand dryers*, and *small air compressors*), along with their incentive discounts provided by the program. A link to participating distributors appears multiple times throughout the website for ease of access. An updated copy of the POPS commercial manual was also found on the website.

Clicking the participating distributors' list link takes the user to a page that lists all trade allies associated with the Entergy Arkansas energy efficiency program, including contractors and engineering consultants throughout the country. While this information could potentially be helpful to experienced participants in the program, this could be overwhelming to newer participants who may be expecting a list of local retail stores, given that the landing page states to sign the participation agreement *and take it to a participating distributor*. Providing a more streamlined list of retailers by default may reduce confusion and increase clarity for newer participants in the commercial POPS program; this is a persistent finding from PY2022.

8.5 OVERALL SAVINGS ESTIMATES

The POPS program evaluated savings that resulted in slightly lower energy and demand savings (97.3 percent kilowatt and 93.7 percent kilowatt-hour realization rates) than those calculated by the program. The evaluated savings are based on adjustments during the tracking system review, the top 70 *residential lighting* analysis, and findings from completing 30

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engineering desk reviews. Savings adjustments were made at the measure-type level (i.e., *interior lamps*, *interior fixtures*, *exterior fixtures*).

The primary adjustment that decreased energy savings was related to the application of an ISR to *APSs* that were incentivized through low-income giveaways, while the primary adjustment that increased energy savings was recalculating 6.7 percent of *upstream residential lighting* sales using *commercial* methodologies. Final savings results and realization rates are presented in Table 115.

Table 115. Point of Purchase Solutions—Final Evaluated Energy Savings and Realization Rates by Measure

Measure category	Reported savings		Evaluated savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW[63]
Advanced power strips	24,887,023	2,824.7	17,450,566	1,980.6	70.1%	70.1%
Appliance recycling - freezer	89,875	10.3	89,874.7	10.3	100.0%	100.0%
Appliance recycling - refrigerator	388,467	44.3	387,504.0	44.2	99.8%	99.7%
Cannabis dual purpose (vegetative + flowering)	1,138,132	221.2	1,138,132.2	221.2	100.0%	100.0%
Cannabis flowering	102,702	22.3	102,702.3	22.3	100.0%	100.0%
Cannabis late vegetative/mothering	117,459	17.0	117,459.3	17.0	100.0%	100.0%
Efficient hot water heater	69,687	6.1	69,687	6.1	100.0%	100.0%
ENERGY STAR dehumidifiers	1,304	0.3	1,304	0.3	100.0%	100.0%
ENERGY STAR freezers	280	0.0	280	0.0	100.0%	99.9%
ENERGY STAR room air cleaners	20,830	2.4	20,830	2.4	100.0%	100.0%
ENERGY STAR window AC replacement	59,046	69.7	59,046	69.7	100.0%	100.0%
Hard-wired LED fixtures: indoor, all wattages	313,752	51.0	387,444	71.1	123.5%	139.4%
LED (retail): indoor reflector	1,893,815	307.9	2,112,677	345.5	111.6%	112.2%
LED (retail): indoor, all wattages	6,422,330	1,044.2	7,625,976	1,403.1	118.7%	134.4%
LED (retail): outdoor reflector	48	0.0	48	-	100.0%	-
LED indoor omni or deco	37,879,617	6,158.7	38,084,740	6,192.1	100.5%	100.5%
Midstream: exterior fixtures	3,690,502	-	3,175,129	-	86.0%	-
Midstream: interior fixtures	17,146,720	3,379.4	17,137,743	3,377.6	99.9%	99.9%
Midstream: interior lamps	3,493,192	694.6	3,491,775	694.3	100.0%	100.0%

[63] Not all measures reported demand savings. In these cases, no realization rate was applicable. In these instances, the kilowatt realization rate field is marked as a dash.

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Measure category	Reported savings		Evaluated savings		Realization rate	
	kWh	kW	kWh	kW	kWh	kW[63]
Pool pumps	51,547	10.7	51,547	10.7	100.0%	100.0%
POPS Weatherization Retail	3,004	1.9	3,004	0.3	100.0%	14.4%
Smart thermostats	1,063,542	0.0	1,063,542	-	100.0%	-
Total	**98,832,874**	**14,867**	**92,571,010**	**14,469**	**93.7%**	**97.3%**

8.6 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

CLEAResult uses a Quality Management Plan (QMP), including QA and QC components. Distributor and retailer qualification and training are QA approaches used to ensure quality from the program's start and ensure quality issues are not introduced further downstream in the process. QC inspections are used toward the end of projects to check the quality of the final savings. The QA/QC process lasts the project's duration and includes a feedback loop to ensure continuous program improvement.

According to program documentation, the POPS program provides distributor training as a crucial step to ensure sales associates can speak clearly and well-informedly to customers about the program. As part of the QA process, program representatives conduct sales and program training for distributor staff, work with retailers to set up promotional events, and conduct periodic check-ins with retailers to assess program effectiveness. Data review was also described as a crucial component of the QA process. Program managers review sale reports from distributors at least once per month.

As part of the evaluation process, the EM&V team assessed the POPS program's QA/QC processes by reviewing specific *commercial midstream lighting* data and documentation. This process confirmed that protocols developed were being followed and identified any gaps or necessary changes. The EM&V team assessed each of CLEAResult's stated QA/QC processes, and our findings for each step are described in further detail next.

Enrollment and customer verification. The EM&V team downloaded and reviewed a copy of the Participant Agreement; this document records key information about the customer and the company (e.g., customer name, company name, company address, phone number, email). The agreement also requires a signature and date. This information allows the program implementer to verify that the customer's company location where the installation will take place is associated with an eligible account number. If further information is needed to complete the verification, then the contact information is captured.

Post-engineering approval and post-project review and closeout. For *commercial midstream lighting*, most of these steps are completed within CLEAResult's and EAL's data tracking systems, which occurs as projects are validated and uploaded to each tracking system. See the paragraph below regarding documentation and data review for the EM&V team's findings regarding QA/QC efforts across the tracking systems.

Documentation and data reviews. The EM&V team completed a review of program-related documentation and data tracking systems. The *commercial midstream lighting* savings

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methodology and program manual documents are comprehensive and include many critical elements.

The program relies on the tracking system and commercial POPS program documents, which supply all sales and unit-level data and reported savings. While the EM&V team generally found the tracking data complete and consistent, we also found numerous errors related to retrofit or baseline wattage in the *residential lighting* sector. Multiple baseline wattages were sometimes assigned to a given *residential light*. Other times, incandescent equivalent baseline wattages were used for *omnidirectional lights* instead of EISA Tier 1 baseline wattages. These errors led to reported savings with mistakes. Implementing r*ecommendation #1* regarding additional QA/QC around the baseline and installed wattages would improve reporting accuracy in the *residential lighting* category.

The EM&V team has identified a few improvements to CLEAResult's current QA/QC process:

- improve QA/QC checks to ensure *lighting* model numbers are correctly imported from invoices and work orders to the tracking system (this is a continued recommendation from PY2021 and PY2022), and
- perform cursory reviews of the tracking system data periodically before finalizing at the end of the program year (this is a continued recommendation from PY2020, PY2021, and PY2022).

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9.0 LARGE COMMERCIAL AND INDUSTRIAL SOLUTIONS

The Large Commercial and Industrial Solutions (LCI) program offers nonresidential customers cash and non-cash incentives in implementing energy-efficient technologies. Eligible customers have a minimum peak demand of 100 kilowatts (kW) (at an individual site or combined accounts) and are not served by the Public Institutions Solutions, Small Business Solutions, or Agricultural Energy Solutions programs. The LCI program utilizes calculated (*prescriptive*) or measured and verified (*custom*) approaches. Additionally, the program is available to all commercial new construction customers. No minimum energy savings are needed for new construction projects to qualify for this program, but to receive the non-cash benefits, annual energy savings must exceed 10,000 kilowatt-hours (kWh).

Eligible customers can participate in both *prescriptive* and *custom* approaches. Participants seeking the *prescriptive* route can choose from an extensive menu of qualified technologies, such as *lighting*, *lighting controls*, *HVAC controls*, *variable speed drives*, *HVAC equipment*, *refrigeration equipment*, *office equipment*, and *food service equipment*. The *custom* component supports customers in identifying and implementing site-specific, cost-effective energy-efficiency projects through technical assistance, program referrals, and incentives. The program addresses *industrial process improvements*, *chillers and boilers*, *data center efficiency*, *plug-load controls*, and *other non-prescriptive* measures. The program is designed to yield substantial energy savings through energy audits, co-funding feasibility studies, energy performance ratings using the ENERGY STAR Portfolio Manager® and training in best practices.

The LCI program is designed to reduce or bypass market barriers such as:

- lack of energy efficiency information and awareness of energy and non-energy benefits (NEB),
- the perception that energy-efficient technologies have high initial costs,
- lack of customer understanding about measure payback,
- lack of customer awareness of energy-efficient technologies,
- lack of easy access to qualified vendors and installers,
- absence of tools to quantify savings,
- lack of access to capital, and
- lack of project success (which could be overcome with alternative funding such as incentive split between owners and tenants in leased spaces, assignment of incentives to installing trade allies, etc.).

Incentives vary by measure type. Most incentives were targeted to cover 50 percent of incremental costs for planning purposes.

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The program is implemented by Entergy Arkansas, LLC (EAL) and CLEAResult, who provide recruitment, marketing, outreach, and training to trade allies. On behalf of EAL, CLEAResult performs energy assessments, directly installs measures (e.g., *LEDs, low-flow faucet aerators, pre-rinse spray valves, weather stripping*), conducts pre- and post-implementation inspections, maintains the program quality assurance/quality control (QA/QC) standards, and administers the incentive process, including program tracking, directly with participating trade allies.

A network of qualified trade allies is used to perform installations of energy efficiency measures. This network works closely with EAL and CLEAResult for program training and marketing. As part of program marketing and outreach to EAL customers, they can identify potential projects and notify EAL of opportunities. All trade allies must meet the program's technical and quality standards and sign a trade ally agreement form. The LCI program is designed to generate significant energy savings and longer-term market penetration by nurturing delivery channels, such as design professionals, distributors, installation contractors, and energy service companies (ESCO).

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team conducted a tracking system review, desk reviews on a randomly selected sample of 70 projects, a review of program documentation, and early engagement reviews for 19 projects.

Table 116. Large Commercial and Industrial Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes				
		Tracking system review	Early engagement reviews	Desk reviews	On-site M&V	Metered data analysis[64]
PY2022 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	19	70	30	26

9.1 KEY FINDINGS

Based on the bridge year (BY) 2023 (BY2023) program tracking data, the LCI program incentivized energy efficiency measures to 311 unique participants[65] through 62 trade allies. Table 117 provides the program's claimed savings by measure category. The most considerable number of participants (55 percent) was attributable to *lighting* measures, which accounted for 20 percent of claimed energy savings. The most significant energy savings were for *continuous energy improvement (CEI)* (41 percent) from seven percent of the participants. The second most impactful measure category by energy savings was *custom other*, with 29 percent of claimed energy savings from 14 percent of the participants.

[64] This column refers to EAL customer meter data, supplemented by EM&V team data collection, as opposed to primary metered data collected as part of the on-site measurement and verification (M&V).

[65] A unique participant is based on a single utility account number.

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Table 117. Large Commercial and Industrial Solutions—Reported Participation and Savings[66]

Measure category	Trade allies	Participants[67]	Projects[67]	Program savings (kWh)	Percentage of program savings (kWh)
Compressed air	2	2	2	96,115	0.1%
Continuous energy improvement[68]	0	23	30	42,841,637	40.8%
Custom HVAC	5	9	9	3,554,895	3.4%
Custom other	20	43	55	30,074,331	28.6%
Domestic hot water[68]	0	3	3	41,683	0.0%
Envelope[68]	0	33	35	3,577,146	3.4%
HVAC	13	18	18	669,626	0.6%
Lighting	24	140	152	14,517,700	13.8%
Lighting—new construction	8	30	31	6,917,591	6.6%
Other[68]	0	2	2	33,372	0.0%
Refrigeration	2	20	20	126,354	0.1%
Tune-up	6	28	420	2,609,466	2.5%
Total	**62**	**311**	**757**	**105,059,917**	**100.0%**

In BY2023, the LCI program reported 105,060 megawatt-hours (MWh) in gross energy savings and 11.9 megawatts (MW) in gross demand savings. Table 118 below shows the reported and evaluated savings across the program. The program fell short of achieving its planned energy and demand savings goals, reaching 95 percent of the annual energy and 67 percent of the annual demand savings goals, as shown in Table 119.

Table 118. Large Commercial and Industrial Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio[69]	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	105,060	103,372	98.4%	105.2%	108,800	38.4%
Demand savings (MW)	12.0	11.9	98.8%	103.8%	12.3	13.8%

[66] ArchEE extract dated January 24, 2023.

[67] A participant may install measures across multiple measure categories or multiple projects. Thus, the total count of participants and projects may not equal the sum of individual rows by measure category.

[68] The implementer directly installed or implemented all measures.

[69] NTG ratios displayed in the table are weighted based on the evaluated net savings results. The NTG ratios of 108.7 and 95.7 were used for *custom* and *prescriptive* measures from the PY2020 research. The NTG ratio used for the *tune-up* measures is 100.6 from PY2022 research.

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Table 119. Large Commercial and Industrial Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	114,387	108,800	95.1%
Demand savings (MW)	18.2	12.3	67.3%

The LCI program's evaluated energy and demand savings were slightly lower than the reported savings (98.4 percent kilowatt-hour realization rate, 98.8 percent kilowatt realization rate). The evaluated savings are based on the results of savings calculations and adjustments made across the results of the 70 sampled accounts for desk reviews and site visits. *Tune-up* measure savings were based on a comprehensive tracking system review.

In previous years, key updates to the program's tracking database were made, which improved the data's clarity and accuracy. The changes included correcting duplicate trade ally names and IDs in the tracking system and including the DesignLights Consortium (DLC) or ENERGY STAR® product IDs for all products incented through the program. The BY2023 recommendations presented in Section 9.2 focus on further improving data accuracy and consistency.

The researched NTG ratio is 108.7 percent for the LCI *custom* measures and 95.7 percent for *prescriptive* measures based on research conducted in PY2020. The NTG ratio for *Wi-Fi thermostats* and *tune-up* projects was updated to 100.6 percent from customer surveys in PY2022.

9.2 RECOMMENDATIONS

The EM&V team has identified five recommendations for consideration by EAL (Table 120), which primarily focus on improving the realization rate in the following program year and increasing the transparency, accuracy, and evaluability of program savings in the future for the LCI program.

Table 120. Large Commercial and Industrial Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Continue discussions with the EM&V team and independent evaluation monitor on the sources of and uses for weather data in CEI and *custom* projects.	The EM&V team made multiple adjustments to projects related to weather data. Various projects within *CEI* used weather data that differed from publicly available sources. The EM&V team used a common approach for evaluating these projects, which was to use actual weather observations from the nearest airport through Weather Spark.[70] The EM&V team also noted that some projects using regression and normalization were using weather data at specific locations and normalizing against the climate zone reference location. In the case of a location like Searcy, this can lead to a location-based bias in the results where the weather data averages

[70] https://weatherspark.com/

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Type	Recommendation	Key finding
		four degrees warmer than Little Rock. The EM&V team conducted regression and normalization for these projects at the same location. From examining individual projects, the EM&V team calculated savings adjustments of two to six percent from these approaches.
	Recommendation 2: Increase the review of the statistical results on regression coefficients for projects.	The EM&V team found several projects where the regression formulas derived from metered data had a higher R-squared when using a different balance point. The implementer noted a mid-year change in the software they use for analyzing metered data, so hopefully, this finding will be reduced in the future. Overall, these adjustments were minor to savings.
	Recommendation 3: Increase QA/QC of formulas and entered parameters for *custom* projects.	The EM&V team adjusted multiple projects for transcription errors (such as using *332* in a calculation instead of *323*), data ranges, and incorrect formula averages. Increasing QA/QC could catch such mistakes in the future.
	Recommendation 4: Enhance QA/QC of *general service lamp* baseline wattage.	The EM&V found two lighting projects installed after July 1, 2023, which needed to apply the correct baseline wattage to line items involving *general service lamps*. Adjustments to the baseline wattage reduced energy and demand savings. The EM&V team recommends more careful QA/QC of baseline wattage of *general service lamps* to ensure compliance with the Arkansas Technical Reference Manual (TRM) and federal Energy Independence and Security Act (EISA) standards.
BY2023 process recommendations	**Recommendation 5:** Continue early engagement reviews to gain consensus across the EM&V team, EAL, and the implementer, particularly for *custom* and *CEI* projects over a larger savings threshold. Discuss whether savings thresholds for reviews should be adjusted for the next program cycle.	The EM&V team has found that early engagement reviews of projects have improved realization rates as the EM&V team, EAL, and the implementation contractor reach a consensus on the approach prior to claimed savings. To streamline this process, project savings thresholds were established based on past experience. As the mix of measures changes, project savings thresholds for these reviews should be revisited to determine if they are still applicable or should be modified for the next program cycle.

Table 121. Large Commercial and Industrial Solutions —Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Work collaboratively with the EM&V team to revise the *CEI* M&V Plan to address peak demand concerns. ○ In progress. The implementer continued to use the demand analysis method for most projects in BY2023, an area where smart-meter data could help refine demand impacts in the future.

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Status of prior year recommendations	
	• Ensure that the implementer's site inspection results are appropriately accounted for in project savings. ○ Complete.
	• Increase QA/QC efforts of the *tune-up* measure database to ensure savings are being calculated correctly and for the appropriate equipment type. ○ Complete. BY2023 had fewer data consistency issues than previous evaluations.
	• Consider using the deemed building type annual operating hours (AOH) and coincidence factor (CF) whenever the facility type aligns with the TRM building descriptions. Also, only use *custom AOH* or *CF* for *lighting* projects when controls, such as timers or lighting control systems, make the AOH estimate certain. ○ Complete.
PY2020 process recommendations	• To better estimate annual reported savings for large *custom* projects, continue to seek the EM&V team's review throughout the program year. Work collaboratively to address both implementer and evaluators' data collection and quality needs in large and complex projects. ○ In progress.
	• Ensure program staff respond to customer and trade ally requests promptly. ○ In progress.
	• Consider establishing a process to collect customer email addresses for outreach purposes. ○ In progress.
PY2021 impact recommendations	• Review savings algorithms for *commercial Wi-Fi thermostat* measures to ensure consistency. ○ Complete. In BY2023, *commercial Wi-Fi thermostats* did not have adjustments for installed unit types that were observed in previous years.
PY2021 process recommendations	• Increase QA/QC on peak demand estimates for *custom* projects. ○ Complete. In PY2022, peak demand estimates aligned better with the EAL peak period than in previous program years.
PY2022 impact recommendations	• Review savings algorithms for *commercial Wi-Fi thermostat* measures to ensure consistency. ○ Complete. In BY2023, *commercial Wi-Fi thermostats* did not have adjustments for installed unit types that were observed in previous years.
	• Increase QA/QC on *commercial AC/HP tune-up* measures. ○ Complete. BY2023 had fewer data consistency issues than previous evaluations.
	• Use additional data descriptions for *lighting fixture certification* to distinguish between fixtures not required for certification and those that followed an alternative compliance path. ○ Complete.

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Status of prior year recommendations	
PY2022 process recommendations	• Review the requirement associated with refrigerants for *tune-ups*. ○ In progress. There were no process evaluation activities in BY2023 that confirmed the status of this recommendation.

9.3 METHODOLOGY

This section summarizes the methodologies used for the evaluation of the LCI program.

9.3.1 Impact Evaluation

The evaluated savings results are based on calculations and adjustments made during the tracking system review, *tune-up* measure review, 70 engineering desk reviews, and 30 site visits. Savings adjustments were made at the project level. Final evaluated savings for the *tune-up* measures are based on adjustments made during the tracking system review. All other measures' evaluated savings results are based on desk review and site-visit level adjustments by sampled strata. The tracking system informed qualitative findings and served as a guide for potential issues for investigation during desk reviews.

To perform the BY2023 impact evaluation, the EM&V team completed the following activities:

- staff interviews and ongoing discussions;
- program website review of eligible measures, incentives, and participating trade allies;
- program manual and supplemental documentation review;
- program tracking system/database reviews;
- review of the tracking system and measurement and verification (M&V) database for *tune-ups, advance RTU controls-lite,* and *commercial Wi-Fi thermostats*;
- engineering desk review of 70 sampled projects, representing 58 unique *account numbers;* and
- on-site M&V of 30 sampled projects that also received desk reviews.

Table 122 shows the sample design and achieved sample sizes for the different data collection types employed for the impact evaluation effort.

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Table 122. Large Commercial and Industrial Solutions—Data Collection Efforts and Project Types

Data collection activity	Design sample	Achieved sample	Custom projects	Prescriptive projects
Staff interviews	2	2	N/A	N/A
Tracking system data review[71]	Q1–Q2 Census	Q1–Q2 Census	N/A	219
Engineering desk review[72]	70	70	38	36
On-site M&V visit[73]	30	30	12	21
Tune-up measure data review	Census	Census	N/A	N/A

Most of the measures incentivized by the LCI program in BY2023 are currently included in the TRM 9.1, Volume 2. Specific sections of TRM 9.1 associated with the savings developed for the LCI program measures are provided in Table 123. These prescriptive algorithms and assumptions were the basis of the savings methodology used by the implementer and the EM&V team for energy and demand savings analysis purposes.

Table 123. TRM 9.1 Prescriptive Algorithms Utilized by the Large Commercial and Industrial Solutions Program

Measure category	TRM 9.1 section	TRM 9.1 measure name
Compressed air	3.8.1	Compressor replacement
	3.8.2	No loss condensate drains
Domestic hot water	3.3.2	Faucet aerators
	3.3.5	Low-flow showerheads
Envelope	3.2.10	Commercial door air infiltration
HVAC	3.1.16	Unitary and split-system AC/HP equipment
	3.1.17	Air- or water-cooled chilling equipment (chillers)
Lighting	3.6.2	Lighting controls
	3.6.3	Lighting efficiency
Other	3.9.6	High-efficiency battery chargers
Refrigeration	3.4.1	Electronically commutated motors for refrigeration and HVAC applications
	3.5.7	Door gaskets for walk-in and reach-in coolers and freezers

[71] ArchEE extract dated July 3, 2023. The count of *prescriptive* projects is the quantity of unique *JobId* numbers for the measure categories included in the Q1–Q2 tracking database review.
[72] Four participants had both *prescriptive* and *custom* measures incentivized under the same *JobId*.
[73] On-site visits were recruited from the list of participants that received desk reviews, nesting the on-site sample within the desk review sample. Three participants had *prescriptive* and *custom* measures incentivized under the same *JobId*.

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Air conditioner and *heat pump tune-ups, overhead door weather stripping*, *weather stripping for refrigerated spaces,* and *packaged terminal air conditioner (PTAC) sealing* measures were also incentivized through the LCI program. *Overhead door weather stripping, weather stripping for refrigerated spaces,* and *PTAC sealing* measures do not strictly adhere to TRM 9.1; instead, they follow prescriptive approaches developed by CLEAResult based on the TRM algorithms for *commercial door air infiltration*. Additional project details outside ArchEE were required to evaluate the *tune-up* measures, which follow a partial M&V approach. A separate tracking system review was conducted for all *tune-up* measures across the three commercial programs.

Table 124. Non-TRM Prescriptive Algorithms Utilized by the Large Commercial and Industrial Solutions Program

Measure category	Measure description
Tune-ups (formerly CoolSaver)	Advance RTU controls—lite
	Commercial AC post-test-out
	Commercial AC pre-clean
	Commercial central air conditioner (tune-up)
	Commercial heat pump (tune-up)
	Commercial HP post-test-out
	Commercial HP pre-clean
	Commercial Wi-Fi thermostat
Envelope	Overhead door weather stripping
	Overhead door weather stripping for refrigerated spaces
	PTAC sealing
	Weather stripping for refrigerated spaces

9.3.1.1 Tracking System Review

The EM&V team reviewed all tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of TRM 9.1 utilized for the tracking system review are described above in Table 123.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings. This review was completed across a census of the program measures at the end of Q2[74]. All the critical input variables and assumptions necessary for savings calculations are present in the utility's tracking database. This review is conducted mid-year to help facilitate changes in the algorithm applications before the end of the year, where they might cause discrepancies in reported versus verified savings. After the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking

[74] Tracking data downloaded July 3, 2023.

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system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

Table 125. BY2023 Q1–Q2 Tracking System Reported Energy Savings by Measure Category

Measure	Reported savings	
	kW	kWh
Compressed air	9	80,395
Envelope	15	359,999
HVAC	12	24,837
Lighting	1,180	7,546,589
Lighting—new construction	57	309,836
Refrigeration	3	30,578
Total evaluated	**1,276**	**8,352,233**
Tune-up and commercial Wi-Fi thermostat[75]	1	1,475
Custom HVAC[76]	1,517	12,274,492
Custom other[76]	775	5,707,630
Total	**3,569**	**26,335,830**

9.3.1.2 Tune-Up and Commercial Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all the *tune-up* and *commercial Wi-Fi thermostat* measures with a comprehensive tracking system review, supplemented with engineering reviews of the M&V and deemed savings methodologies. These measures are tracked in ArchEE but have supplemental data in external databases necessary for evaluation. The tracking system reviews focused on replicating individual measure savings results and determining population variances.

9.3.1.3 Desk Reviews and Site Visits

The optimal count of sample units for the *custom*, *lighting*, and *other* strata were determined based on PY2018 through PY2022 savings representation for each stratum. These savings were compared against the savings in ArchEE quarterly to determine whether there was under- or over-representation of specific measure categories occurring compared to past years.

[75] *Tune-up*, *advanced RTU controls-light,* and *commercial Wi-Fi thermostat* measures are evaluated through a separate tracking system and an M&V data review at the close of the program year.
[76] The algorithms and key input assumptions for *custom* measures are not provided within the tracking system, therefore a review of those measures was not completed as part of tracking system data review. However, they will be analyzed as part of the engineering desk reviews and on-site visits.

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The sampling plan for *lighting* accounted for the differences between fully deemed lighting projects and those using custom hours of use. For the whole population, *lighting* projects were considered deemed if all measures for a project were using the deemed value for AOH that is consistent with the building type as defined in ArchEE. For projects with any measure that uses AOH that is not consistent with the building type, the entire project is considered *non-deemed*. For *lighting*, this is the classification process:

1. Projects were divided into *deemed* and *non-deemed* based on whether all measures used AOH that matched their building type in the tracking system (deemed) or any measure deviated from that value (non-deemed).

2. The contribution of energy savings for both strata is examined. The base strategy is to oversample the non-deemed projects so that at 50 percent energy savings, twice as many non-deemed projects will be chosen. The amounts are then adjusted up or down for each program based on the actual percentage of energy savings for non-deemed compared to the whole population.

In addition to the sub-strata for *lighting* projects, three sub-strata for *custom* projects were defined. The first sub-strata divides projects by whether they went through the *Early Engagement for High Profile Projects* protocol; if projects went through the protocol, they were assigned to the *early review* sub-strata. Non-*early review CEI* projects were assigned to the *CEI* sub-strata. Finally, the remaining projects assigned to the *other* sub-strata. The contribution of savings was used to determine the number of sample points for each sub-strata, with a higher weighting for *other*, a standard weighting for *CEI*, and a lower weighting for *early review*.

The site visits were a nested selection of the desk reviews, meaning that all projects receiving a site visit assessment also received a desk review. Projects with variances that could be cleared up during the site visit were prioritized first, with remaining site visits randomly selected from within the desk review sample. Table 126 summarizes the result of the sampling for the LCI program.

Table 126. Large Commercial and Industrial Solutions—Summary of Sampled Savings

Sampling strata	Projects	Projects sampled[77]	Site visits sampled	Reported kWh	Reported kW
Custom subtotal	**94**	**38**	**12**	**38,157,216**	**4,189**
CEI	29	14	0	17,972,826	1,761
Early review	18	8	4	16,959,191	2,082
Other	47	16	8	3,225,199	346
Lighting subtotal	**183**	**26**	**17**	**2,112,964**	**327**
Deemed	158	19	12	781,282	128
Non-deemed	25	7	5	1,331,682	200
Other subtotal	**76**	**10**	**4**	**468,929**	**13**
Total	**337**	**70**	**30**	**40,739,109**	**4,529**

[77] Four sampled projects had measures in multiple categories.

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9.3.2 Early Engagement on High-Profile Projects

Based on the discussion between the EM&V team and CLEAResult, the protocol outlined below was developed to address savings verification risk for high energy-saving projects, clarify baseline data and assumptions, and foster site-specific project savings calculations. The protocol describes how program implementers can provide the EM&V team with project savings calculations and other documentation to develop final program-saving results for the project. The collaboration could occur either in advance of offering *custom* incentives or after a completed project is made ready for payment and close-out.

Projects meeting either one of the following criteria were considered good candidates for review:

- Calculated savings for an individual measure is 500,000 kWh or greater. For projects meeting this savings threshold, an EM&V team review is required. NEBs are expected to be estimated in parallel with energy savings calculations for the EM&V team review. An exception is allowed for projects where the EM&V team has reviewed the project savings methodology, and no adjustments were made for future savings claims.
- *Custom* projects that are expected to save less than 500,000 kWh, but CLEAResult would like to collaborate on savings approaches or arrive at an agreement on calculation methods or results with the EM&V team. Situations that may warrant such a review include:
    - the calculations are statistically anomalous or otherwise present an outlier from typical practices or outcomes,
    - NEB calculations and their treatment for the specific project,
    - the calculations or data collection utilize uncommon or unproven methods, and
    - the calculation methods used for savings will deviate substantially from the methods outlined in the M&V plan.

During BY2023, the program implementer submitted 19 projects under the *Early Engagement for High Profile Projects* protocol. Based on the individual submission, the EM&V team provided review comments on detailed calculations, white papers, or M&V plans for these projects. In most cases, the implementer brought final, or nearly final, savings estimates to the EM&V team for review. The implementer subsequently claimed all of these *early reviews* with 29,666 MWh of annual energy savings, representing 28 percent of the program savings.

Eight of these projects were subsequently selected for engineering desk reviews or site visits by the EM&V team, resulting in two savings adjustments. Further, the EM&V team noticed a trickledown effect with guidance from large projects informing savings estimations for small projects, combining to create an overall evaluation with fewer savings adjustments and fewer findings and recommendations than in previous evaluation cycles. Beginning with PY2022, the EM&V team and CLEAResult agreed to relax the protocol—particularly for *CEI* projects—where additional savings claims were made, and the regression models had already been reviewed. The relaxed protocol did not affect the accuracy of the savings results for BY2023.

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9.3.3 Evaluated Savings Methodology by Measure

The EM&V team referred to relevant sections in TRM 9.1, Volume 2, to utilize the prescriptive algorithms for calculating energy and demand impacts for a significant portion of the program's measures, including *domestic hot water*, *envelope*, *HVAC*, *lighting*, and *refrigeration* measures. The program implementer tracks the savings type for each measure as either *deemed*, *measured,* or *stipulated*[78].

- *Deemed* savings measures are prescriptive measures from TRM 9.1 and use all or most of the default assumptions of the TRM 9.1 methodology, such as the baseline flow rate of a *faucet aerator* or the AOH for *lighting* measures.
- *Measured* savings measures are either *custom* or *prescriptive* measures from TRM 9.1 that use site-specific information collected as part of the implementation process, such as field-monitored data or measured results for some or all the assumptions of TRM 9.1 methodology. An example would be capturing the actual average baseline flow rate of a *pre-rinse spray valve* or a *custom compressor* project.
- *Stipulated* savings measures are *custom* or *prescriptive* measures from TRM 9.1 that use site-specific information captured from the participant for key assumptions of the TRM 9.1 methodology; they are not based on metered or measured data such as self-reported AOH for *lighting* measures.

In addition, the program included a significant number of *custom* projects for which site-specific data was gathered and industry-standard practices were applied; however, assumptions were expected to vary based on site-specific documented conditions. As noted above, *custom* measures were described as either *measured* or *stipulated* savings types.

The ArchEE tracking system was the primary source for key input assumptions into the savings algorithms to review the tracking system savings and evaluate *prescriptive* projects. The tracking system contained the key assumptions and parameters necessary for calculating measure savings for a census of *prescriptive* measure savings. As *custom* measures were not tracked with enough detail to perform similar savings calculations on the information within the tracking data alone, the EM&V team relied on engineering desk reviews and on-site visits to review *custom* measures. During the engineering desk reviews, the project documentation for individual applications was the primary source of information to verify these key input assumptions and complete the project-level savings analysis. Site-specific information gathered during the on-site visits was the primary source of information to confirm key input assumptions and complete the project-level savings analysis.

A further discussion of the source of the values for key input parameters needed for calculating measure-level impacts used by the EM&V team for evaluating each of the *prescriptive* measures is presented next.

[78] The implementer's definition of *stipulated* differs from the definition provided in the TRM. The tracking system definition of *stipulated* is a project that relies on TRM methodology for the savings calculation but substitutes *custom* parameters for some of the inputs. In particular, *lighting* projects that use *custom* AOH values are tracked as *stipulated*.

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9.3.3.1 Compressed Air Measures

Compressed air measures in BY2023 included *compressor replacement,* and *no loss condensate drains*.

The EM&V team analyzed the savings from *compressed air* measures using the data for all key input variables needed for calculating energy and demand savings per the prescriptive algorithms of TRM 9.1 (Sections 3.8.1, and 3.8.2). The key input variables of the baseline and post-retrofit conditions include (1) rated horsepower, (2) AOH, (3) modulation control type, (4) system pressure, and (5) compressor type.

For the *compressed air* measures, the claimed savings tracked, either directly or indirectly, the TRM 9.1 deemed values derived from these parameters. The EM&V team verified the parameters from available project documentation and on-site inspections, making adjustments where warranted. Compressor nameplate or Compressed Air and Gas Institute CAGI datasheets verified the rated horsepower compressor type, and modulation control. AOHs were assessed through inspection of the customer's business hours or an on-site inspection. System pressure was verified through control system documentation or an on-site inspection.

9.3.3.2 Domestic Hot Water Measures

Domestic hot water measures in BY2023 included the retrofit of existing operational faucets and showerheads with new, more efficient *low-flow faucet aerators*, and *showerheads*.

The EM&V team analyzed the savings from *domestic hot water* measures using the data for all key input variables needed for calculating energy and demand savings per the *prescriptive* algorithms of TRM 9.1 (Sections 3.3.2, and 3.3.5). The key input variables of the baseline and post-retrofit fixture include (1) average flow rate, (2) operating days per year, (3) average supply water temperature, (4) average mixed water temperature, (5) water usage duration, (6) and water heater thermal efficiency; and for the demand savings, (7) the fraction of hourly water consumption.

For the *domestic hot water* measures, the claimed savings assumed the TRM 9.1 deemed values for all these parameters except for the post-retrofit *faucet aerators*' average flow rate. Therefore, the EM&V team also used the TRM 9.1 values for all key input parameters except the post-retrofit fixture flow rates. The EM&V team verified the pre- and post-retrofit fixture average flow rate via on-site visits, manufacturer cut sheets, or web-based research of make and model numbers. If the EM&V team could not determine the pre- and post-retrofit fixture average flow rates using these sources, the EM&V team used the default values specified in TRM 9.1. The *water heater type*, *building type*, and *foodservice operation* selections guide the key input assumptions for water heater thermal efficiency, operating days per year, and water usage durations. These data were assessed during on-site visits or based on the information provided in the tracking data or project-level backup documentation.

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9.3.3.3 Envelope Measures

Envelope measures in BY2023 included the installation of *commercial door air infiltration* measures. These entailed installing *weather stripping* and *door sweeps* on exterior-facing doors to reduce infiltration of unconditioned air into a conditioned space.

The EM&V team analyzed the savings from *commercial door air infiltration* measures using the data for all key input variables needed for calculating energy and demand savings per the prescriptive algorithms of TRM 9.1 (Section 3.2.10). The key input variables of the baseline and post-retrofit door include (1) pre-retrofit air infiltration rate, (2) the percentage of reduction of the post-retrofit air infiltration rate, (3) change in temperature across the gap barrier, (4) daytime hours per year, (5) nighttime hours per year, (6) water heater thermal efficiency, (6) heating coefficient of performance, (7) width of the gap, (8) length of the gap, and (9) weather zone of the location; and for the demand savings, (10) the average cooling equivalent full-load hours.

For the *envelope* measures, the claimed savings assumed the TRM 9.1 deemed values for all these parameters except for the two required to be site-specified: the gap width and length. Therefore, the EM&V team used the TRM 9.1 values for all key input parameters, and the site captured gap widths and lengths. The EM&V team verified the *weather stripping* and *door sweep* gaps and lengths during on-site visits and the re-calculation of these measurements captured on contractor inventories taken at the retrofit time documented within the project files. If the EM&V team could not determine the gap or length using these sources, the EM&V team assumed these parameter details within the ArchEE tracking data to be accurate. The *air conditioning and heating system* types, which guide the key input assumptions for cooling, heating, and HVAC AOH, were assessed during on-site visits or based on the information provided as part of tracking data project-level backup documentation.

9.3.3.4 Heating, Ventilating, and Air-Conditioning Measures

HVAC measures in BY2023 included replace-on-burnout projects of *unitary* and *split air conditioning* and *heat pumps*, and *air-* and *water-cooled chillers*.

The EM&V team analyzed the replacement-on-burnout savings from *HVAC* measures using the data for all key input variables needed for calculating energy and demand savings per the prescriptive algorithms of TRM 9.1 (Sections 3.1.16, and 3.1.17). The key input variables that represent the baseline and post-retrofit unit conditions include (1) equipment type of the new unit, (2) rated capacity of the new unit, (3) sub-category type of the new unit, (4) full-load efficiency of the new unit, (5) part-load efficiency of the new unit, (6) equivalent full-load hours for cooling, and (7) the coincidence factor (CF) for demand savings.

For the *HVAC* measures, the claimed savings assumed the TRM 9.1 deemed values for all these parameters except for the new units' capacity and full-/part-load efficiencies for equipment replacement. Therefore, the EM&V team also used the TRM 9.1 deemed values for all key input parameters except the post-retrofit unit capacity and efficiency. The EM&V team verified the post-retrofit unit's capacity and efficiencies via on-site visits, manufacturer cut-sheets, or web-based research of make and model numbers. The deemed *building type* selections, *facility area,* and *controller settings*, which guide the key input assumptions for AOH and CFs, were assessed during on-site visits or based on the information provided as part of project-level backup documentation.

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9.3.3.5 Lighting and Lighting Controls Measures

Lighting and *lighting controls* measures in BY2023 included retrofit and new construction projects installing lamps, fixtures, and lighting controls.

The EM&V team analyzed the savings from *lighting* and *lighting controls* measures using the data for all key input variables needed for calculating energy and demand savings per the prescriptive algorithms in TRM 9.1 (Sections 3.6.2 and 3.6.3). The key input variables of the baseline and post-retrofit lighting and controls include (1) pre- and post-retrofit quantity of lighting, (2) rated wattage of the pre- and post-retrofit lighting, (3) AOH for the specified building type, (4) interactive effects factors for energy savings for the specified heating type, (5) power adjustment factor for specified control type and the demand savings, (6) the peak demand CF for the specified building type, and (7) the controls peak-demand CF.

For the *lighting* measures, the claimed savings assumed the TRM 9.1 deemed values for interactive effects factors, power adjustment factors, and AOH and CF based on the site-based details that inform them. The site-captured details were used as the basis for the other key input values to the deemed algorithms. Therefore, the EM&V team also used TRM 9.1 deemed values for all key input parameters except the site-captured information informing the deemed savings algorithm calculations. The EM&V team verified the pre- and post-retrofit *equipment quantity*, *type*, *wattage*, and *building type* during on-site visits and reviewed project-level inventories with these details captured by trade allies. The EM&V team was able to determine the pre- and post-retrofit parameters using these sources. The deemed *building type* selections, which guide the key input assumptions for AOH and CFs, were assessed during on-site visits or based on the information provided as part of project-level backup documentation.

9.3.3.6 Other Measures

Other measures in BY2023 included the installation of *high-efficiency battery chargers*.

The EM&V team analyzed the savings from these measures using the data for all key input variables needed for calculating energy and demand savings per the *prescriptive* algorithms of TRM 9.1 (Section 3.7.14). The key input variables of the baseline and post-retrofit battery charger include the (1) type of equipment, (2) pre- and post-wattage draw of the charging equipment when charging, (2) pre- and post-wattage draw of the charging equipment when idle, and (3) annual charging hours per charger.

For the *high-efficiency battery charger* measure, the claimed savings assumed the TRM 9.1 deemed values for wattage draw and operating hours based on the equipment phase-type (i.e., single-phase or three-phase). The site-captured details were used as the basis for the input values for the deemed algorithms. Therefore, the EM&V team also used TRM 9.1 deemed values for all key input parameters except the site-captured information informing the deemed savings algorithm calculations. The EM&V team verified the pre- and post-installed equipment quantity and type during on-site visits and reviewed project-level charging hour estimates. The equipment type selections that guide the key input assumptions for kilowatt-hours and kilowatts per year were assessed during on-site visits or based on the information provided as part of project-level backup documentation.

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9.3.3.7 Refrigeration Measures

Refrigeration measures in BY2023 included the retrofit of refrigerated areas with the installation of *door gaskets* and the installation of *electronically commutated motors* (*ECM*).

The EM&V team analyzed the savings from *refrigeration* measures using the data for all key input variables needed for calculating energy and demand savings per the *prescriptive* algorithms of TRM 9.1 (Sections 3.4.1, and 3.5.7). These measures' energy and demand savings are deemed based on a few key variables of the existing unit size, type, and location. For *door gaskets*, the deemed savings are based on two main variables: (1) savings per size (length) of the gasket installed and (2) case type/temperature. For *ECMs,* the deemed savings is based on (1) installed motor wattage, (2) baseline motor wattage, (3) hours of operation, (4) coefficient of performance for cooler/freezer, and (5) duty cycle of the cooler/freezer.

For the *refrigeration* measures, the claimed savings assumed the TRM 9.1 deemed values for all these parameters except for the *refrigerator case/door size*, *refrigerator temperature*, *weather zone*, and *building type*, as those are site-determined parameters. Therefore, the EM&V team also used the TRM 9.1 deemed values for all key input parameters except the site-captured information informing the deemed savings selections. During on-site visits, the EM&V team verified the post-retrofit *door size*, *refrigerator temperature*, *weather zone*, and *building type* and reviewed project-level inventories with these details captured by trade allies. The EM&V team was able to determine the post-retrofit parameters using these sources. The deemed building type selections, which guide the key input assumptions for AOH and CFs, were assessed during on-site visits or based on the information provided as part of project-level backup documentation.

For the *ECMs*, the claimed savings assumed the TRM 9.1 deemed values for all these parameters except for the pre- and post-installation motor wattage. In contrast, other parameters were determined from site-specific data. If site-specific motor information was not available, the EM&V team used the default parameters from the TRM. The deemed building type selections, which guide the key input assumptions for operating hours per year and CFs, were assessed during on-site visits or based on the information provided as part of project-level backup documentation.

9.4 DETAILED IMPACT EVALUATION RESULTS

The LCI program's evaluated energy and demand savings were lower than the reported savings (98.4 percent kilowatt-hour realization rate, 98.8 percent kilowatt realization rate). During the desk reviews and site visits, the EM&V team corrected *lighting* installed fixture types, quantities, and custom AOH estimates. The EM&V team adjusted calculation errors and savings methodologies for *custom* projects. The EM&V team adjusted *CEI* projects for weather data and regression coefficients. Finally, the EM&V team adjusted savings for *tune-up* measures due non-TRM equivalent full load hours (EFLH) being used in calculations for four building types.

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Corrections to *CEI* projects that contributed to savings adjustments were due to:

- weather data used in reported savings that deviated from actual observations with nearby weather stations and
- regression coefficients that had a higher R-squared.

Corrections to *custom—other and custom—early* projects that contributed to savings adjustments were primarily due to:

- calculation error corrections, such as not including full ranges of data or averaging the incorrect cells in a spreadsheet,
- incorrect use of white paper default parameters, and
- transcription errors of values from project documentation to the savings calculations.

Corrections to *lighting* projects were primarily due to:

- adjustments to *general service lamp* baselines for EISA Tier 2;
- installed fixture types, quantities, or input wattages being different from the project documentation, certifications, and site visits; and
- custom AOH adjustments from an interview of site personnel.

Corrections to *other* projects were due to:

- incorrect full- and part-load efficiency used in calculations for a *chiller* project.

Corrections to *tune-up* projects were primarily due to:

- adjustments for four building types that were using non-TRM values for EFLH.

9.4.1 Participant Characterization

Several different measures are provided to participants through the program. Within the tracking system, qualifying products are assigned to unique measure names. The mapping of these measure names to measure categories is provided below.

Table 127. Large Commercial and Industrial Solutions—Mapping to Measure Category

Measure description	Measure category
Compressor replacement	Compressed air
No loss condensate drains	Compressed air
Continuous energy improvement	Continuous energy improvement
Custom - heating and cooling	Custom HVAC
Custom controls	Custom HVAC
Custom - non-heating and cooling	Custom other
Variable frequency drives	Custom other
Commercial showerheads	Domestic hot water

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Measure description	Measure category
Faucet aerators	Domestic hot water
Commercial door air infiltration	Envelope
Overhead door weather stripping	Envelope
Overhead door weather stripping for refrigerated spaces	Envelope
PTAC sealing	Envelope
Weather stripping for refrigerated spaces	Envelope
Unitary AC equipment - unitary AC < 65000 Btuh - replace on burnout	HVAC
Unitary AC equipment - unitary AC => 65000 Btuh - replace on burnout	HVAC
Unitary HP equipment - heat pump < 65000 Btuh - replace on burnout	HVAC
Unitary HP equipment - heat pump => 65000 Btuh - replace on burnout	HVAC
Water chilling equipment (air cooled) - replace on burnout	HVAC
Water chilling equipment (water cooled centrifugal) - replace on burnout	HVAC
Halogens	Lighting
HIDs	Lighting
Integrated-ballast compact fluorescent lamps (CFL)	Lighting
Integrated-ballast led lamps	Lighting
LEDs	Lighting
Lighting controls	Lighting
Magnetic ballast T5 or premium T8 retrofit of T12	Lighting
Modular CFLs and CCFLs	Lighting
Other linear flourescents	Lighting
Outdoor-halogens	Lighting
Outdoor-HIDs	Lighting
Outdoor-integrated-ballast compact fluorescent lamps (CFL)	Lighting
Outdoor-integrated-ballast LED lamps	Lighting
Outdoor-LEDs	Lighting
Outdoor-magnetic ballast T5 or premium T8 retrofit of T12	Lighting
Outdoor-modular CFLs and CCFLs	Lighting
Outdoor-other linear fluorescents	Lighting
NC-integrated-ballast LED lamps	Lighting-new construction
NC-interior project savings	Lighting-new construction

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Measure description	Measure category
NC-LEDs	Lighting-new construction
NC-lighting controls	Lighting-new construction
Outdoor-NC-LEDs	Lighting-new construction
Outdoor-NC-lighting project savings	Lighting-new construction
High efficiency battery chargers	Other
Electronically commutated motors for refrigeration	Refrigeration
Refrigeration door gaskets	Refrigeration
Advance RTU controls - lite	Tune-up
Chiller tune up air cooled process chiller	Tune-up
Commercial AC post test out	Tune-up
Commercial AC pre clean	Tune-up
Commercial central air conditioner (tune-up)	Tune-up
Commercial heat pump (tune-up)	Tune-up
Commercial HP post test out	Tune-up
Commercial Wi-Fi thermostat	Tune-up

Table 128 below outlines the claimed number of program participants and the percentage of savings by measure category in BY2023. *CEI* and *custom—other* were the dominant measure categories in BY2023, accounting for 56 percent of claimed demand (kilowatt) and 69 percent of energy (kilowatt-hour) savings. *Lighting* and *lighting—new construction* accounted for 31 percent of claimed demand and 20 percent of energy savings.

Table 128. BY2023 Reported LCI Participation and Savings by Measure Category

Measure category	Participants[79]	Projects[79]	Program savings		Percentage of program savings	
			kW	kWh	kW	kWh
Compressed air	2	2	11	96,115	<0.1%	<0.1%
Continuous energy improvement	23	30	2,865	42,841,637	24.0%	40.8%
Custom HVAC	9	9	575	3,554,895	4.8%	3.4%
Custom other	43	55	3,816	30,074,331	31.9%	28.6%
Domestic hot water	3	3	2	41,683	<0.1%	<0.1%
Envelope	33	35	216	3,577,146	1.8%	3.4%

[79] A participant is a unique account described by the ArchEE data field *AccountNumber*. A project is a unique job number defined by the ArchEE data field *JobId*. A participant may install measures across multiple measure categories and multiple projects. As a result, the total count of participants and projects may not equal the sum of the counts by measure category.

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Measure category	Participants[79]	Projects[79]	Program savings		Percentage of program savings	
			kW	kWh	kW	kWh
HVAC	18	18	61	669,626	0.5%	0.6%
Lighting	140	152	2,284	14,517,700	19.1%	13.8%
Lighting-new construction	30	31	1,365	6,917,591	11.4%	6.6%
Other	2	2	4	33,372	<0.1%	<0.1%
Refrigeration	20	20	14	126,354	0.1%	0.1%
Tune-up	28	420	732	2,609,466	6.1%	2.5%
Total	**311**	**757**	**11,946**	**105,059,917**	**100.0%**	**100.0%**

Table 129 outlines the savings and percentage of savings by measure in BY2023. *CEI* was the most significant measure in BY2023, accounting for 24 percent of claimed gross kilowatt savings and 41 percent of claimed gross kilowatt-hour savings. *Custom—non-heating and cooling* was the second most significant measure, accounting for 23 percent of claimed gross kilowatt and 20 percent of the claimed kilowatt-hour savings. *LEDs* were the third most significant measure with 17 percent of the kilowatt savings and 11 percent of the program kilowatt-hour savings.

Table 129. BY2023 Reported LCI Participation and Savings by Measure

Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Compressed air				
Compressor replacement	9	80,395	<0.1%	<0.1%
No loss condensate drains	2	15,720	<0.1%	<0.1%
Continuous energy improvement				
Continuous energy improvement	2,865	42,841,637	24.0%	40.8%
Custom HVAC				
Custom - heating and cooling	564	3,464,419	4.7%	3.3%
Custom controls	10	90,476	<0.1%	<0.1%
Custom other				
Custom - non-heating and cooling	2,729	20,738,017	22.8%	19.7%
Variable frequency drives	1,087	9,336,314	9.1%	8.9%
Domestic hot water				
Commercial showerheads	2	36,202	<0.1%	<0.1%
Faucet aerators	0	5,481	<0.1%	<0.1%

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Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Envelope				
Commercial door air infiltration	38	1,121,394	0.3%	1.1%
Overhead door weather stripping	15	272,761	0.1%	0.3%
Overhead door weather stripping for refrigerated spaces	131	1,144,162	1.1%	1.1%
PTAC sealing	30	1,021,896	0.3%	1.0%
Weather stripping for refrigerated spaces	2	16,933	<0.1%	<0.1%
HVAC				
Unitary AC equipment - unitary AC < 65000 Btuh - replace on burnout	5	7,435	<0.1%	<0.1%
Unitary AC equipment - unitary AC => 65000 Btuh - replace on burnout	33	88,768	0.3%	<0.1%
Unitary HP equipment - heat pump < 65000 Btuh - replace on burnout	0	16,570	<0.1%	<0.1%
Unitary HP equipment - heat pump => 65000 Btuh - replace on burnout	1	11,698	<0.1%	<0.1%
Water chilling equipment (air cooled) - replace on burnout	17	433,413	0.1%	0.4%
Water chilling equipment (water cooled centrifugal) - replace on burnout	5	111,742	<0.1%	0.1%
Lighting[80]				
Halogens	21	144,237	0.2%	0.1%
HIDs	9	51,116	<0.1%	<0.1%
Integrated-ballast compact fluorescent lamps (cfl)	0	284	<0.1%	<0.1%
Integrated-ballast led lamps	205	1,019,887	1.7%	1.0%
LEDs	2,021	11,420,437	16.9%	10.9%
Lighting controls	3	8,924	<0.1%	<0.1%
Magnetic ballast T5 or premium T8 retrofit of T12	15	100,445	0.1%	<0.1%
Modular CFLs and CCFLs	9	62,868	<0.1%	<0.1%
Other linear flourescents	1	7,271	<0.1%	<0.1%
Outdoor-halogens	0	14,306	0.0%	<0.1%
Outdoor-HIDs	0	20,332	0.0%	<0.1%

[80] Some measures were identified in the tracking system data with no savings; these represent lighting included in *site lighting* inventories but were not incented by the program.

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Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Outdoor-integrated-ballast compact fluorescent lamps (CFL)	0	0	0.0%	0.0%
Outdoor-integrated-ballast LED lamps	0	198,509	0.0%	0.2%
Outdoor-LEDs	0	1,466,096	0.0%	1.4%
Outdoor-magnetic ballast T5 or premium T8 retrofit of T12	0	440	0.0%	<0.1%
Outdoor-modular CFLs and CCFLs	0	0	0.0%	0.0%
Outdoor-other linear fluorescents	0	2,549	0.0%	<0.1%
Lighting – new construction[80]				
NC-integrated-ballast LED lamps	0	0	0.0%	0.0%
NC-interior project savings	1,319	6,210,180	11.0%	5.9%
NC-LEDs	0	0	0.0%	0.0%
NC-lighting controls	45	176,478	0.4%	0.2%
Outdoor-NC-LEDs	0	0	0.0%	0.0%
Outdoor-NC-lighting project savings	0	530,933	0.0%	0.5%
Other				
High efficiency battery chargers	4	33,372	<0.1%	<0.1%
Refrigeration				
Electronically commutated motors for refrigeration	1	6,818	<0.1%	<0.1%
Refrigeration door gaskets	14	119,536	0.1%	0.1%
Lighting – new construction				
Advance RTU controls - lite	11	38,105	<0.1%	<0.1%
Chiller tune up air cooled process chiller	16	45,392	0.1%	<0.1%
Commercial AC post test out	1	1,785	<0.1%	<0.1%
Commercial AC pre clean	12	20,713	<0.1%	<0.1%
Commercial central air conditioner (tune-up)	543	1,197,318	4.5%	1.1%
Commercial heat pump (tune-up)	7	25,147	<0.1%	<0.1%
Commercial HP post test out	2	10,078	<0.1%	<0.1%
Commercial Wi-Fi thermostat	140	1,270,928	1.2%	1.2%
Total	**11,946**	**105,059,917**	**100.0%**	**100.0%**

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Table 130 shows the incentive structure for BY2023 compared to the previous program year. There were no changes to the incentives for BY2023 from PY2022.

Table 130. BY2023 Large Commercial and Industrial Solutions Incentives

Measure			PY2022 incentive[81]	BY2023 incentive[81]
Directly installed by CLEAResult				
Domestic hot water				
Commercial showerheads			Full cost	Full cost
Faucet aerators			Full cost	Full cost
Pre-rinse spray valves			Full cost	Full cost
Envelope				
Commercial door air infiltration (i.e., weather stripping)			Full cost	Full cost
Lighting				
Integrated-ballast LED lamps			Full cost	Full cost
Outdoor—integrated-ballast LED lamps			Full cost	Full cost
Installed by trade ally				
PC power management			$0.10/kWh	$0.10/kWh
Gaskets and strip curtains			100 percent, contact program staff	Up to 100 percent, contact program staff
All other measures[82]	1 measure	2 measures	3 measures	4+ measures
PY2022 incentive[83]	**$0.14/kWh**	**$0.15/kWh**	**$0.16/kWh**	**$0.18/kWh**
BY2023 incentive[83]	**$0.14/kWh**	**$0.15/kWh**	**$0.16/kWh**	**$0.18/kWh**

9.4.2 Program Documentation and Tracking Data Review

To understand the LCI program, the EM&V team interviewed program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- ArchEE data tracking system extract containing BY2023 participant information and savings;

[81] Source: 2022 Large Commercial & Industrial Program Manual.

[82] To qualify for an additional tier, an energy efficiency measure must exceed 30,000 kWh of savings. Measures can be grouped to meet the 30,000 kWh minimum threshold, but only one such grouping is allowed per customer. Direct-install measures only count as one measure tier. Retroactive incentives can be leveraged against other projects (up to the cap) back to January of the previous year.

[83] Source: 2022 Large Commercial & Industrial Program Manual.

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- supplemental project-level documentation received during quarterly data requests for sampled accounts, which typically included:
    - signed customer proposals and project agreements—sometimes files included initial and final proposals if projects had changed during development;
    - customer proposals that typically included a detailed inventory of site-captured measure-level details such as:
        - *Domestic hot water* measures (e.g., *low-flow faucet aerators, commercial showerheads, and low-flow showerheads*) were all directly installed by the implementer. A Direct Install Report typically inventoried the device and quantity installed by room. Additional notes typically included a flow rate as the new equipment may be multiple flow rates (e.g., 0.5 gallons per minute (GPM), 1.0 GPM). Also, photo documentation of the water heater and its nameplate was provided. Details of the exact installed equipment flow rates were not included, and a specification of the new equipment was not provided.
        - The implementer directly installed *commercial door air infiltration* measures (e.g., *weather stripping, door sealing*). A Direct Install Report typically inventoried the device, quantity (by gap size), and new weather stripping length installed by room. Additional notes typically included the gap size as the new equipment may be of multiple widths (e.g., one-eighth inch, one-quarter inch) and the type (e.g., weather stripping, door sweep). Also, photo documentation of a sample of doors with the existing condition and gap noted by a view of a tape measure was provided. A clear description or documentation of the *HVAC type* was not included.
        - *HVAC* measures included new equipment type, make and model numbers, capacity, and quantity. Manufacturers' specification sheets and Air Conditioning, Heating and Refrigeration Institute (AHRI) certificates were also provided.
        - *Lighting* and *lighting controls* measures included existing and new fixture types, make and model numbers, wattages, quantity, and control type. Also, DLC and ENERGY STAR certification sheets were typically provided for all models. Manufacturer specification sheets were generally not provided.
    - invoices;
    - pre- or post-inspection forms indicating field inspector’s notes and results; and
    - photographic documentation pre- or post-installation;
- a Quality Control and Assurance Manual for EAL commercial programs, dated February 1, 2023; and
- the PY2022 Program Manual for the LCI program—obtained from the EAL website—which was verified to be in use for BY2023.

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9.4.2.1 Detailed Tracking System/Database Review

The EM&V team reviewed all program-claimed tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms and the final claimed values necessary for each measure. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of TRM 9.1 utilized for the tracking system review are described above in Section 9.3.1.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings. This review was completed across a census of the program measures. All the critical input variables and assumptions necessary for savings calculations were present in the utility's tracking database. After the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

The ArchEE tracking system, which supplied all participant- and measure-level data, was the primary tool for checking claimed savings and performing evaluation savings calculations. These results were informed and supplemented with the findings from the engineering desk reviews and site visits, as further outlined in the savings calculation results section.

The overall LCI program-evaluated tracking system savings resulted in energy and demand savings slightly greater (103 percent kilowatt and 101 percent kilowatt-hour realization rates) than those calculated by the program implementer. The evaluated savings were based on the results of adjustments made from completing engineering reviews of the program’s tracking data. The overall realization rates were affected slightly by variances between the reported and evaluated savings (kilowatt and kilowatt-hour) for *envelope* and *lighting* projects. Further details of measure-based findings are provided below.

Overall, the tracking system review found the following:

- Except for the *custom, CEI, overhead door weather stripping,* and *tune-up* measures in the LCI program, all measures utilize TRM 9.1, Volume 2 deemed algorithms. The savings equations were confirmed consistent with TRM 9.1. As described above, the *overhead door weather stripping* and *tune-up* measures follow *custom* approaches developed from assumptions and methodologies in the TRM. The EM&V team confirmed the *overhead door weather stripping* measures followed the M&V plan through this tracking system review. A tracking system review of the *tune-up* measures was completed to inform *tune-up* evaluated savings separately from the mid-year tracking system review.
- The LCI program measures utilized TRM 9.1, Volume 2 deemed savings assumptions, with two notable exceptions. The *overhead door weather stripping* measure used extrapolated savings values based on the *commercial door air infiltration* measure in TRM 9.1. Also, some *lighting efficiency* measures used site-specific AOH instead of the deemed values in TRM 9.1 for *lighting* projects.

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- Seven percent of *lighting* projects used site-specific *custom* AOH as captured from the site and based on the buildings' typical operating hours and hours of occupancy.

- The overall tracking review realization rates were 103 percent for kilowatt and 101 percent for kilowatt-hour. Tracking review realization rates were precisely 100 percent for *compressed air*, *HVAC,* and *refrigeration* measures.

Table 131. BY2023 Q1–Q2 Tracking System Energy Savings and Realization Rates by Measure Category

Measure category	Claimed savings		Evaluated savings		Realization rate	
	kW	kWh	kW	kWh	kW	kWh
Compressed air	9	80,395	9	80,395	100%	100%
Envelope	15	359,999	12	283,549	85%	79%
HVAC	12	24,837	12	24,837	100%	100%
Lighting	1,180	7,546,589	1,222	7,724,396	104%	102%
Lighting—new construction	57	309,836	60	328,190	105%	106%
Refrigeration	3	30,578	3	30,578	100%	100%
Total evaluated	**1,276**	**8,352,233**	**1,319**	**8,471,945**	**103%**	**101%**

9.4.2.2 Compressed Air

- No issues were found.

9.4.2.3 Envelope

- For project numbers EA-0000963841 and EA-0000963842, three line items reported demand (kilowatt) and energy (kilowatt-hour) savings that differed from expectations by a factor of three. The reason for the savings deviation could not be determined based on the provided information in the tracking system. The EM&V team recalculated the energy savings using the tracked parameters and TRM algorithms and determined a kilowatt and kilowatt-hour realization rate of 33 percent for the affected line items.

9.4.2.4 HVAC

- No issues were found.

9.4.2.5 Lighting

- EA-847092 included many *LED* installations. The reason for the savings deviation was due to the CF for a non-refrigerated warehouse (0.77) being multiplied twice for all 52 lighting measures. The EM&V team adjusted the demand savings for these 52 line items, which resulted in a 130 percent realization rate for this project.

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- Project EA-0000918936 had one *non-exit sign LED* measure where the certification designation was listed as *N/A*. Only *exit sign* measures should use a certification designation of *N/A*. The EM&V team removed the energy and demand savings for this one measure, which resulted in a realization rate that rounded to 100 percent for both energy and demand savings.

9.4.2.6 Lighting—New Construction

- Projects EA-751480 (01-CARTI Surgery - Upper Floor, 010) and EA-905782 (01-Dollar General - Interior, 026) include new construction interior lighting line items where the evaluated savings did not match the reported savings. The EM&V team believes the discrepancy arose from the accounting for *not-qualified* fixtures. The evaluated savings for these two line items were evaluated at 103 percent and 186 percent, respectively.

9.4.2.7 Refrigeration

- No issues were found.

9.4.3 Tune-Up and Commercial Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review began using the TRM 9.1, the CoolSaver Program M&V Plan[84], and the Memorandum of Understanding to reference our review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to the TRM deemed savings and supplemental documentation methods used to estimate savings. After the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified that the savings estimates in the tracking system are consistent with the savings outlined in TRM 9.1, used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

The ArchEE database includes the key data for all projects and reported savings for *AC* and *heat pump tune-up* and *commercial Wi-Fi thermostat* measures, which totaled 426 measures.

As part of the BY2023 evaluation, CLEAResult provided a tracking system extract, including pre- and post-test-out projects used as the basis for CLEAResult's PY2020–PY2022 efficiency loss (EL) calculations. The EM&V team reviewed this dataset, examined it for outliers, and used it to calculate two EL values for the commercial sector: one for projects with a *refrigerant charge* adjustment and one for projects without a *refrigerant charge* adjustment. (In BY2023, separate EL factors were no longer calculated for HVAC units less than or greater than 25 tons).

Most of the key *tune-up* measure data is maintained in a separate database outside of ArchEE. The supplemental database was required for verifying the EL values, as ArchEE did not capture

[84] The *tune-up* measure methodology was developed separately under EAL's own CoolSaver program prior to being included in the LCI program.

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all four *refrigerant charge* values from iManifold[85]. As recommended last year, with continuous development and changes, the EM&V team recommends developing and maintaining a data dictionary to describe the data and document changes within this database.

Finally, as with previous years, it appears that the *commercial Wi-Fi thermostat* measures still required manual input of deemed energy (kilowatt-hour/ton) and demand savings (kilowatt/ton) values. This led to many instances of rounding errors, leading to savings deviations (described in further detail below). Automating this process in the future will allow for more effective quality assurance/quality control (QA/QC) and reduce the likelihood of rounding errors.

9.4.3.1 Tune-Up and Commercial Wi-Fi Thermostat Measurement and Verification Findings

The EM&V team evaluated CLEAResult's savings calculations by reviewing the M&V sample of participants to confirm the savings methodology and results obtained, repeating the steps, and making calculation adjustments.

The ArchEE tracking system supplied all participant and unit-level data; claimed savings was the primary tool for checking reported savings and performing evaluation savings calculations.

Detailed findings from the M&V review for *tune-up* and *commercial Wi-Fi thermostat* measures are presented below.

- CLEAResult used non-TRM EFLH values in the savings algorithms for *tune-up* projects with the following building types: *Food Sales: Non 24-hour Supermarket/Retail, Manufacturing, Service (Excluding Food), Warehouse*. This affected 65 *commercial AC tune-up*, 3 *commercial AC pre-clean*, and 6 *commercial heat pump tune-up* projects in BY2023. After working with CLEAResult to diagnose the issue and map all CoolSaver building types to TRM building types, the EM&V team adjusted the energy and demand savings for the 74 affected projects. Energy and demand savings increased for the 68 *AC tune-up* projects while energy savings decreased and demand savings increased for the 6 *commercial heat pump tune-up* projects. Nine of the affected *JobIds* are listed below, with the complete list available upon request:
    - 2022-340525
    - 2022-343663
    - 2022-343042
    - 2022-348012
    - 2022-351076
    - 2022-350296
    - 2022-350020
    - 2022-349617
    - 2022-339193

[85] https://imanifold.com/

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- One project (2022-325630) that was reported in ArchEE as a *commercial Wi-Fi thermostat* was a *commercial heat pump pre-clean* project, according to CLEAResult. The reason for the misclassification was due to a data entry issue. The EM&V team adjusted the calculation for this project to the *tune-up* methodology (in addition to an adjustment to the EFLH), which reduced energy savings and slightly increased demand savings.
- Two projects (2022-336498, 2022-336496) that were reported in ArchEE as *commercial central air conditioning (tune-up)* were *commercial Wi-Fi thermostat* projects, according to CLEAResult. The reason for the misclassification was due to a data entry issue. The EM&V team adjusted the calculation for these projects to the *Wi-Fi thermostat* methodology, but there was no impact on reported savings.
- Three *chilled tune up air cooled process chiller* projects (all at the same location, with *JobID* 371380) had their savings reduced based on a desk review of the project. The weather file was adjusted to use surface-level hourly weather from the Fort Smith, Arkansas airport. This reduced energy savings and increased demand savings. The minimum temperature cutoff was adjusted from *40°F* to *55°F*, to better reflect the balance point from using the surface-level observations. These adjustments reduced energy savings and increased demand savings.

9.4.4 Engineering Desk Reviews

The EM&V team evaluated CLEAResult's savings calculations by reviewing the program tracking data and project documentation to confirm the savings methodology used and results, repeating the calculation steps, and making adjustments.

The engineering desk reviews included reviewing the available project documentation in determining the source of key parameters for the deemed savings protocols from TRM 9.1. After selecting the best source of the key parameters from the available documentation, the savings were calculated based on TRM 9.1 algorithms and compared to the claimed savings.

In addition to the tracking system review, the engineering desk reviews also showed a consistent use of TRM 9.1 algorithms across all the measures claimed in the LCI program. The EM&V team made minor adjustments to specific projects described in Section 9.4.6.

The EM&V team completed 70 engineering desk reviews of the LCI program accounts. These projects represented all measure categories in the program, except for *tune-up* measures, and had gross savings of 40,739 MWh, or 39 percent of the total LCI program recorded gross savings of 105,557 MWh. This percentage of total program savings is based on finalized ArchEE data from January 3, 2024.

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9.4.5 Site Visits

The EM&V team's evaluation plan included conducting ten site visits to LCI program customers; these site visits also received an engineering review, as discussed above. The EM&V team's field inspector recorded the verified quantities, operation, building type, and space condition of each of the measures observed while on-site and collected additional information on critical parameters. For the LCI program, some of the key data and spot measurements obtained for essential parameters, as applicable, included:

- *compressed air* measures:
- *domestic hot water* measures: type of service, number of installed units, and rated output of installed units;
- *envelope* measures: length of the installed door, gap width, and heating/cooling system type;
- *HVAC* measures: quantity, building type, and make/model of installed units;
- *lighting* measures: base/new wattage, number of lamps per fixture, lamp/fixture make/model/type, base/new control type, building type, space heating/cooling type, and AOH; and
- *refrigeration* measures: quantity and make/model of installed ECM, refrigeration door gasket length and width, walk-in type (freezer or cooler), and evaporator fan motor size.

The site visits found that most parameters recorded in the project documentation to calculate savings were accurate. Out of the 30 site visits conducted, three projects had savings adjustments resulting from the site visit. The savings adjustments from the site visits are described in further detail in the following section.

9.4.6 Desk Review and Site-Visit Results

As noted earlier, the BY2023 LCI program impact evaluation efforts included an engineering analysis for a sample of 70 projects and a site visit for 30 of those projects reviewed. For 37 of the projects in the sample, no savings adjustments were made. For the remaining 33 projects, the impact evaluation found various discrepancies in the project documentation, the site-specific data, or methodologies that required adjustments of parameters from the claimed savings estimates. The table below provides project-level realization rates, by measure category, for the 70 LCI projects reviewed during the evaluation. Detailed descriptions of the 33 projects with energy or demand savings adjustments follow Table 132.

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Table 132. Large Commercial and Industrial Solutions—BY2023 Desk Review and Site Visit Results, By Project

EM&V participant ID	EM&V review type[86]	Ex-ante savings		Ex-post savings		Realization rate	
		kW	kWh	kW	kWh	kW	kWh
Custom—CEI							
221005	Desk review	16.7	62,053	16.7	62,053	100.0%	100.0%
221007	Desk review	0.0	847,399	0.0	847,399	N/A	100.0%
221008	Desk review	0.0	1,079,417	0.0	1,079,417	N/A	100.0%
221013	Desk review	0.0	7,981,631	0.0	7,981,631	N/A	100.0%
221016	Desk review	0.0	535,731	0.0	535,731	N/A	100.0%
321004	Desk review	0.0	251,290	0.0	204,847	N/A	81.5%
321006	Desk review	0.0	205,755	0.0	167,727	N/A	81.5%
321010	Desk review	0.0	34,165	0.0	27,851	N/A	81.5%
421012	Desk review	41.1	301,517	41.1	301,517	100.0%	100.0%
421017	Desk review	582.9	1,312,154	582.9	1,265,883	100.0%	96.5%
421018	Desk review	1,046.5	4,711,078	1,005.3	4,810,005	96.1%	102.1%
421019	Desk review	38.0	332,848	8.3	72,651	21.8%	21.8%
421020	Desk review	5.2	45,254	1.1	9,877	21.8%	21.8%
421023	Desk review	31.1	272,534	6.8	59,486	21.8%	21.8%
Custom—CEI total		**1,761.5**	**17,972,826**	**1,662.2**	**17,426,075**	**94.4%**	**97.0%**
Custom—other							
121002	Desk review	39.7	347,575	37.7	330,622	95.1%	95.1%
121006	Site visit	27.9	219,845	28.7	224,149	102.8%	102.0%
121007	Desk review	70.7	354,627	70.7	354,627	100.0%	100.0%
221001	Desk review	9.8	808,811	9.8	808,811	100.0%	100.0%
221002	Site visit	2.8	15,388	2.8	15,388	100.0%	100.0%
221003	Site visit	2.8	15,388	2.8	15,388	100.0%	100.0%
221004	Site visit	32.4	274,718	32.4	274,718	100.0%	100.0%
221012	Site visit	3.0	65,007	3.0	65,302	100.5%	100.5%
321003	Site visit	10.5	56,532	10.5	57,056	100.7%	100.9%
421003	Desk review	14.5	127,001	13.8	120,651	95.0%	95.0%
421005	Site visit	14.7	46,720	14.7	46,720	100.0%	100.0%
421006	Desk review	29.7	301,435	29.7	301,435	100.0%	100.0%
421007	Desk review	31.4	170,331	31.4	170,331	100.0%	100.0%

[86] All projects that received an on-site visit also received an engineering desk review.

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EM&V participant ID	EM&V review type[86]	Ex-ante savings		Ex-post savings		Realization rate	
		kW	kWh	kW	kWh	kW	kWh
421009	Desk review	13.6	139,190	13.6	139,190	100.0%	100.0%
421022	Desk review	3.5	49,034	2.9	45,244	81.1%	92.3%
421024	Site visit	38.6	233,595	38.6	233,595	100.0%	100.0%
Custom—other total		**345.7**	**3,225,199**	**343.2**	**3,203,228**	**99.3%**	**99.3%**
Custom—early review							
121008	Desk review	350.2	2,950,301	347.3	2,925,526	99.2%	99.2%
121012	Site visit	1,028.7	8,839,012	1,028.7	8,839,012	100.0%	100.0%
221009	Site visit	232.4	1,302,123	230.4	1,199,551	99.1%	92.1%
321002	Site visit	85.0	603,657	85.0	603,657	100.0%	100.0%
321007	Desk review	106.8	937,879	106.8	937,879	100.0%	100.0%
421002	Site visit	56.4	433,122	56.4	433,122	100.0%	100.0%
421008	Desk review	111.5	918,561	111.5	918,561	100.0%	100.0%
421021	Desk review	111.2	974,536	111.2	974,536	100.0%	100.0%
Custom—early review total		**2,082.2**	**16,959,191**	**2,077.3**	**16,831,843**	**99.8%**	**99.2%**
Lighting—deemed							
121001	Desk review	0.4	1,987	0.4	1,987	100.0%	100.0%
121003	Desk review	3.8	14,692	3.8	14,692	100.0%	100.0%
121004	Desk review	3.9	26,302	3.9	26,302	100.0%	100.0%
121005	Site visit	8.1	51,778	8.0	51,609	99.6%	99.7%
121011	Desk review	0.9	7,373	0.9	7,373	100.0%	100.0%
121013	Site visit	2.5	11,483	2.5	11,483	100.0%	100.0%
121014	Site visit	0.0	43,249	0.0	43,249	N/A	100.0%
121017	Desk review	17.2	83,862	17.2	83,862	100.0%	100.0%
221002	Site visit	3.3	17,717	3.3	17,717	100.0%	100.0%
221003	Site visit	3.8	20,707	3.9	21,140	102.1%	102.1%
221011	Desk review	8.1	75,877	8.1	75,877	100.0%	100.0%
221014	Site visit	0.9	4,903	0.9	4,903	100.0%	100.0%
221015	Site visit	7.1	50,396	8.6	50,660	120.9%	100.5%
321001	Site visit	24.7	156,983	23.2	145,175	93.7%	92.5%
321005	Site visit	7.4	23,047	7.4	23,047	100.0%	100.0%
321012	Site visit	0.0	20,867	0.0	20,216	N/A	96.9%
421001	Desk review	13.3	67,586	13.3	67,586	100.0%	100.0%
421014	Site visit	7.2	28,737	7.2	28,737	100.0%	100.0%

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EM&V participant ID	EM&V review type[86]	Ex-ante savings		Ex-post savings		Realization rate	
		kW	kWh	kW	kWh	kW	kWh
421015	Site visit	15.0	73,737	15.0	73,737	100.0%	100.0%
Lighting—deemed total		**127.5**	**781,282**	**127.5**	**769,352**	**100.0%**	**98.5%**
Lighting—non-deemed							
121009	Site visit	28.1	151,695	33.8	151,691	120.3%	100.0%
121016	Site visit	28.1	213,046	28.1	213,025	100.0%	100.0%
321011	Site visit	31.8	230,431	31.8	230,431	100.0%	100.0%
421004	Site visit	65.9	533,824	65.9	533,824	100.0%	100.0%
421011	Desk review	15.1	71,595	15.1	75,803	100.0%	105.9%
421013	Site visit	14.7	50,978	14.7	50,977	100.0%	100.0%
421016	Desk review	15.8	80,114	15.8	80,114	100.0%	100.0%
Lighting—non-deemed total		**199.7**	**1,331,682**	**205.4**	**1,335,864**	**102.9%**	**100.3%**
Other							
121010	Desk review	-8.6	203,960	-9.0	205,439	104.5%	100.7%
121015	Desk review	0.0	362	0.0	362	100.0%	100.0%
221006	Desk review	2.8	24,755	2.8	24,755	100.0%	100.0%
221010	Site visit	0.3	2,260	0.3	2,260	100.0%	100.0%
221017	Desk review	0.9	8,227	0.9	8,227	100.0%	100.0%
321008	Site visit	1.3	31,889	1.3	31,933	100.0%	100.1%
321009	Desk review	7.2	124,959	7.2	124,961	100.0%	100.0%
421010	Site visit	4.2	57,883	4.2	57,883	100.0%	100.0%
421011	Desk review	0.3	5,213	0.3	5,213	100.0%	100.0%
421013	Site visit	4.1	9,420	4.1	9,420	100.0%	100.0%
Other total		**12.5**	**468,929**	**12.1**	**470,453**	**96.9%**	**100.3%**

The project-based savings adjustments are provided below by measure strata and EM&V *ParticipantID*. Complete details for the desk reviews, site visits, and custom analyses can be found in the Technical Appendix companion to this report.

9.4.6.1 Continuous Energy Improvement

The *CEI* stratum consisted of 29 projects with a total gross energy savings of 42,033 MWh, representing 40 percent of the entire program. Fourteen desk reviews were conducted on this stratum, resulting in eight projects with savings adjustments.

CEI projects consist of meetings and working with energy ambassadors for large C&I customers to implement facility-wide energy efficiency awareness. *CEI* projects were analyzed using metered data, monthly billing data, or facility interval data, following Option C of the International

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Performance Measurement and Verification Protocol (IPMVP) for whole-facility analysis. The M&V plan for *CEI* projects is reviewed annually by the EM&V team, and all projects selected for desk reviews follow the M&V plan. The eight projects with adjustments are described below.

- **Participant IDs 321004, 321006, 321010, 421019, 421020, 421023 calculation methodology and weather data adjustment.** These six projects were for two sets (mid-year and end-of-year) of *CEI*-reported savings on three buildings at a manufacturing facility. First, the weather data file was adjusted from the implementer's partially modeled data to surface-level observations at KSRC airport, with limited backfill from KLIT. Second, the evaluated savings found a slightly different regression formula for these claims that had a higher R-squared. Overall, these adjustments decreased energy and demand savings.
- **Participant ID 421017 calculation methodology adjustment.** This project is for *CEI* at a manufacturing facility. The M&V team conducted a regression analysis based on the parameters of the implementer's regression but obtained slightly different coefficients than the claimed analysis. This difference in the regression caused a reduction in energy savings.
- **Participant ID 421018 weather data adjustment.** This project is for *CEI* at a manufacturing facility. The weather data file was adjusted from the implementer's partially modeled service to surface-level observations at KLIT airport. This adjustment increased energy savings and decreased demand savings.

9.4.6.2 Custom—Early Review

The *custom—early review* stratum consisted of 19 projects with a total gross energy savings of 28,807 MWh, representing 27 percent of the program. Eight desk reviews and four site visits were conducted on this stratum, resulting in two projects with savings adjustments.

The measures in this stratum consisted of one *CEI*, one *VFD*, one *custom—heating and cooling,* and eleven *custom—non-heating and cooling* projects. Popular measures for *early reviews* consisted of *compressed air energy improvements*, *injection molding machines* replacements, and *water/wastewater* efficiency improvements. The two projects with adjustments are described below.

- **Participant ID 121008 calculation methodology adjustment.** The site is an industrial manufacturing facility that installed six energy-efficient *injection hydroelectric injection molding machines*. The historical production was adjusted for four machines to include the most recent 12 months of data. The reported savings used an earlier 12 month period. This change slightly decreased energy and demand savings.
- **Participant ID 221009 calculation error and weather data adjustment.** This site is a bakery that upgraded its packaging infrastructure to meet an increased throughput requirement. The reported savings calculation had a few savings adjustments resulting from the regression analysis. First, the calculation for the number of bars per day included an extraneous row, which was corrected in the evaluated savings. Second, the weather data were also adjusted from a location in *Searcy, AR*, to the observed weather data at *Little Rock airport*, concurring with TMY3 weather location, to eliminate potential biases from using different weather data locations for regression and normalization. Overall, these adjustments decreased energy and demand savings.

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9.4.6.3 Custom—Other

The *custom—other* stratum consisted of 29 projects with a total gross energy savings of 6,129 MWh, representing six percent of the entire program. Sixteen desk reviews and eight site visits were conducted on this stratum, resulting in six projects with savings adjustments. The savings adjustments were primarily methodology adjustments or error corrections from the metered data analysis conducted by CLEAResult.

Common measures in the *custom—other* stratum consisted of *compressed air* system enhancements, *injection molding machines, process chilled water* improvements, and *VFDs.* The six projects with adjustments are described below.

- **Participant ID 121002 adjustment for white paper parameter and input error.** This site is a manufacturing facility that installed heater barrel blankets for *injection molding machines*. The blanket coverage percentage was adjusted from *100 percent* to the default value of *95 percent* because the specification sheets were not provided showing 100 percent coverage. Also, the temperature value of one hot barrel was adjusted from 556 F to 566 F based on the photos of the *injection molding machine* control interface. These adjustments resulted in decreased energy and demand savings.
- **Participant ID 121006 multiple adjustments for documentation consistency.** The site is a manufacturer that installed a VFD on a 75 hp compressor and repaired *compressed air leaks*. For the compressor replacement, the AOH was adjusted from *8,544* to *8,400* as per the custom air leak repair calculator. This adjustment slightly decreased energy savings. For *compressed air leaks*, the full load CFM at the rated pressure for compressor EP75 was adjusted from *332* to *323* as per the unit specifications sheet. The total inspected point was adjusted from *13* to *14* points, and the repaired points from *11* to *12* points, which increased the total repaired CFM. Overall, the adjustments slightly increased energy and demand savings.
- **Participant ID 221012 adjustment input parameter.** The site is an outpatient clinic that installed *VFDs* on air handling units. The efficiency of the fan motor on AHU-3 was adjusted slightly, from *91.7 percent* to *90.5*, to match the specification sheet. This adjustment slightly increased energy and demand savings.
- **Participant ID 321003 adjustment for calculation methodology and calculation error.** The site is a lunch meat manufacturing plant that installed *VFDs* on exhaust fans. Two minor adjustments were made to the savings calculations for the evaluated savings.
    - The retrofit energy consumption for one fan was adjusted to add the three independently monitored phases while the reported savings added a summation column to two of the individual phases. This adjustment slightly increased energy and demand savings.
    - The retrofit energy consumption for fan #2 was adjusted to align with the methodology used for fan #4's baseline energy consumption when power measurements were unavailable for all three phases. A conservative estimate of the highest post power on an individual phase multiplied by three was used. This adjustment slightly decreased energy and demand savings.

    Overall, the adjustments lightly increased energy and demand savings.

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- **Participant ID 421003 adjustment for white paper parameter.** This project consisted of installing thermal blankets on *injection molding machine* barrels at a manufacturing facility. The reported savings assumed 100 percent blanket coverage in the calculations. The EM&V team found several photos that showed gaps in the installation, with temperatures that exceeded the surface temperatures used in the savings analysis. The evaluated savings reduced the percentage of blanket coverage to the 95 percent default in the white paper, which reduced energy and demand savings.
- **Participant ID 421022 adjustment for white paper parameter.** This project consists of a grocery store that installed new *refrigerated doors*. The Seasonal Energy Efficiency Ratio (SEER) value for the HVAC condenser was adjusted from *13* to *11.7*; 11.7 is the default from the work paper. Documentation providing the basis of the *13 SEER* could not be identified. The adjustment reduced energy and demand savings.

9.4.6.4 Other

The *other* stratum consists of prescriptive *non-lighting* measures, including *HVAC replace-on-burnout*, *air- and water-cooled chillers*, *commercial showerheads*, *faucet aerators*, and *commercial door air infiltration* projects. The *other* strata consisted of 76 projects with 4,544 MWh of energy savings, representing four percent of the program savings. Ten desk reviews and four site visits were conducted on this stratum, with one adjustment to savings. The project with an adjustment is described below.

- **Participant ID 121010 adjustment for incorrect efficiencies.** This site is a large office that installed replaced an old chiller with a new *air-cooled chiller*. The full and part-load efficiencies in the tracking system did not match the provided project documentation. The tracked data, converted to EER, were *9.302326 full-load* and *19.67213 part-load*. In the project documentation, the design conditions had a full-load EER of *9.291* and part-load EER of *19.75*. Adjusting the full- and part-load EERs resulted in an increase in energy savings and an increase in the negative demand savings.

9.4.6.5 Lighting—Deemed

The *lighting—deemed* stratum consists of *lighting* projects that strictly adhere to the deemed lighting AOH and CF outlined in the TRM. This stratum consisted of 158 projects with 14,479 MWh of claimed savings, representing 14 percent of the program. Nineteen desk reviews and 12 site visits were conducted on this stratum, with five adjustments to the claimed savings.

- **Participant ID 121005 savings adjustments on-site inspection conditions.** The site is a billing office that replaced exterior metal halide lighting and interior fluorescent and incandescent lighting with *LED* lighting. A site visit was conducted at this facility, which found the quantity of installed lamps in the *interior upstairs* space was ten, while the reported savings had six. This adjustment resulted in slightly decreased energy and demand savings.
- **Participant ID 221003 savings adjustment for fixture model number.** The site is an office building that replaced its existing fluorescent lighting with *LED* lighting and installed an *advanced lighting control* system. From the post-inspection photos and work order, one more *LED* light was installed in the *conference* area than included in

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the reported savings. This adjustment resulted in increased energy and demand savings.

- **Participant ID 221015 savings adjustment for input wattage and deemed building type.** The site is a warehouse with an attached office area that replaced its existing fluorescent, high-pressure sodium, and high-impact discharge lighting with *LED* lighting. The wattage for four *LED* fixtures (LAS100S-T4) was adjusted from *258 W* to *251 W,* as per the DLC certificate. This adjustment slightly increased energy and demand savings. Also, the on-site inspection found the interior measures were installed in the warehouse portion of the building. The building type was adjusted from *office* to *warehouse: non-refrigerated* for these measures. This adjustment slightly decreased energy savings and increased demand savings.
- **Participant ID 321001 savings adjustments for GSL baseline wattage and installed quantities.** The site is a senior living facility that replaced fluorescent, halogen, incandescent, metal halide, and high-pressure sodium lighting with *LED* lighting. This project had multiple adjustments:
    - The baseline wattage was adjusted for 77 line items to be equal to the GSL standard corresponding with the lumen output of the installed *LED*, as this project closed after July 1, 2023. This adjustment decreased energy and demand savings for these measures.
    - The pre-quantity of lights for the *rear middle desk* line item was adjusted from *five* to *four* to match the pre-inspection forms. This adjustment reduced energy and demand savings for this measure.
    - The on-site inspection found that 93 of the 94 fixtures for the hallway sconces and patient toilet rooms were not retrofitted as stated in the project documentation. The evaluated savings removed the savings for these fixtures, which resulted in reduced energy and demand savings.

  Overall, these adjustments resulted in decreased energy and demand savings.
- **Participant ID 321012 savings adjustment for GSL baseline wattage.** The site is a flea market that replaced exterior metal halide, incandescent, and mercury vapor lighting with *LED* lighting. For two line items (*southeast canopy* and *east pillars*), the lamps are GSLs, and the reported savings were based on the previously installed lamps. The evaluated savings adjusted the baselines to the EISA Tier 2 lumens/watt baseline, which resulted in decreased energy savings.

9.4.6.6 Lighting—Non-Deemed

The *lighting—non-deemed* strata consisted of lighting projects with an AOH or CF tracked in the tracking system different from the deemed TRM value. These TRM value differences sometimes consist of 8,760-hour safety lighting for individual projects or custom estimated AOH for each facility area. A total of 25 projects were in this strata, with 6,957 MWh of claimed savings, representing seven percent of the program savings.

Seven desk reviews and five site visits were conducted on this stratum. The desk reviews focused on the installed lighting details, while the EM&V team attempted to schedule site visits to verify the custom AOH values. The site visits conducted for custom AOH values consisted of reviewing each area's use within the facility with the site personnel, observing the spaces' use,

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and collecting information on the controls. The EM&V team made engineering judgments about whether the custom AOH was valid and if the resulting AOH or CF should be adjusted for what was observed during the site visit.

The desk reviews and site visits resulted in three projects with adjustments to the claimed savings.

- **Participant ID 121009 adjustment for database error.** The site is a warehouse that replaced its existing fluorescent and metal halide lighting with *LED* lighting. The evaluated savings calculations for all measures did not match the reported savings. The demand savings for measures without 8,760 operations had a realization rate of 129.9 percent. The therms realization rates were 78 percent for the non-8,760 measures and 250.2 percent for the 8,760 measures. The implementer confirmed a database error had occurred that only affected this project, and would be corrected for future program years.
- **Participant ID 121016 adjustment for operating hours.** The site is a nursing building that replaced its existing fluorescent, incandescent, halogen, and high-impact discharge lighting with *LED* lighting. The AOH for *kitchen/kitchen areas/maintenance* areas was adjusted from *4,745* hours to *4,732* hours since the provided AOH document mentioned that these areas work 13 hours per day, seven days per week. This adjustment slightly decreased energy savings.
- **Participant ID 421011 adjustment for fixture input wattage.** The site is a new construction retail building that installed *LED* lighting and two 115,000 Btuh roof top units. The input wattage for five *LED* fixtures (*ST2000/ST-1750-SM-MV*) was adjusted from *33 W* to *17 W* as per the DLC certificate. This increased energy savings.

9.4.7 Program Website and Documentation Review

To understand the LCI program, the EM&V team interviewed program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- an ArchEE data tracking system extract containing BY2023 participant information and savings;
- the Quality Control and Assurance Manual for EAL commercial programs, dated February 1, 2023;
- the PY2022 Program Manual for the LCI program obtained from the EAL website; and
- updated white papers or M&V plans for *process chiller*, *refrigerator recycling*, *energy recovery ventilators*, and *CEI savings*.

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9.4.7.1 Program Website Review

Information found on the LCI program website includes a general description of the program, such as eligibility and how participation works. It also provides a list of eligible measures and their incentive discounts. An example project at an industrial facility is displayed along with the estimated energy savings, incentive amount, and utility cost savings. A copy of the program and CoolSaver trade ally manuals are located on the website, and a search link is provided to find a participating trade ally by zip code lookup.

9.4.7.2 Program Documentation Review

The EM&V team received program-related documentation key to understanding the program and participation processes, including the PY2022 Program Manual and Quality Control and Assurance Manual. Key documents to understanding the program savings methodologies and measuring-level savings include the project-level files, ArchEE data, TRM 9.1, supplementary deemed savings and M&V methodologies, and ongoing reviews with EAL and CLEAResult staff. Supplementary deemed savings and M&V methodologies included *overhead door weather stripping*, *PTAC sealing*, *CEI*, *injection molding machines*, and *compressed air systems*.

The project details and documentation collected by EAL, the implementer, and trade allies for many sampled projects are extensive. As bulleted in the section above, the critical baseline and new equipment assumptions, drivers of the prescriptive measure savings, are well described in trade ally proposals and equipment inventories. Additional documents collected at project approval support the equipment quantities and performance metrics. The documentation included invoices (support for claimed quantities and equipment make and models) and manufacturers' specification sheets (confirmation of equipment makes, models, sizes, types, efficiencies). These are industry-standard best practices for documentation collection, which reduce the uncertainty of the project savings assumptions and development.

The EM&V team found that documentation, in most cases, matched the data recorded in the ArchEE tracking system. Equipment type, quantities, and in most cases, building/space conditions were accurately recorded compared to the efficient technology data and project file documentation reviewed. Also, across projects, most project files contained similar documentation. Most project files had, at a minimum, the signed customer proposal and project agreement. This proposal typically included the list of *retrofit* measures, with pre- and post-conditions and equipment parameters identified. Some files included multiple copies (e.g., initial proposal, final proposal) depending on whether the scope had changed during project development. Many project files included pre- and post-inspection forms with field inspector notes indicating site results.

Many projects also included pre- and post-installation photographic documentation. Photos were included with some proposals and inspection reports, but not all. Except for *direct-install* projects, all project files included invoices. All invoices were found to have measure-level cost breakdowns, which helped support and confirm project details. Documentation of site stipulated AOH, usually a letter or email with schedules of use from the customer, was included in project file requests for sites that used stipulated AOH.

In BY2023, the EM&V team found the project documentation was as robust as PY2022 and previous evaluations, and as a result, additional data requests to the implementer remained low compared to prior evaluations.

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The project proposals include various details; however, the EM&V team would recommend adding other key parameters captured at the site used for savings calculations—these include *building type* and *heating and cooling space types*.

BY2023 saw continual documentation consistency for the make and model of all *lighting* products. DLC and ENERGY STAR certification sheets were included for all *lighting* projects. Manufacturer's specification sheets, however, were not included for any *lighting* projects. Manufacturers' specification sheets are essential for *LED exit signs* because DLC or ENERGY STAR certification sheets are not available for these types of lights. As *lighting* measures contribute a significant portion of the program savings, documents that support key variables that are a driver of *lighting* measure savings include the post-installation lighting wattage. Having manufacturer's specification sheets would increase clarity between similar lighting types that may differ by color temperature, voltage, and other features that can impact the equipment's qualification and fixture input wattage.

Work orders or post inspection forms were provided for most *lighting* projects sampled, which allowed for easy verification of post quantities and model numbers. Verification of baseline quantities and lighting model numbers were limited in cases where work orders and pre-inspection forms were not provided.

9.5 OVERALL SAVINGS ESTIMATES

The ArchEE tracking system contained the key assumptions and parameters to calculate measure savings. After performing evaluation savings calculations claimed by the LCI program across a sample of desk reviews and site visits, the EM&V team found discrepancies in some measure categories. The adjustments that had the most considerable impact on program savings were from *CEI* projects with weather data and regression coefficient adjustments.

The EM&V team calculated savings across the program measures based on the tracking data review and desk review results. The overall LCI program evaluated savings resulted in lower energy and demand savings than those calculated by the program implementer (98.4 percent kilowatt-hour and 98.8 percent kilowatt realization rates). Final evaluated savings for the *tune-up* measures were based on adjustments made during the tracking system review. All other measures' evaluated savings results were based on desk review and site-visit level adjustments by sampled strata. The tracking system informed qualitative findings and served as a guide for potential issues for investigation during desk reviews.

The overall realization rates were affected most by variances between the claimed and evaluated savings (kilowatt and kilowatt-hour) for *CEI* measures. *Custom—other* had adjustments resulting from not properly including default values for *injection molding machines*. *Lighting—deemed* and *lighting—non-deemed* had adjustments for GSL fixtures installed after July 1, DLC fixture input wattages, and installed quantities from site inspections. Finally, savings adjustments were made to *tune-up* measures that used non-TRM EFLH values for four building types.

Table 133 shows that *CEI* measures had the most significant realization rate adjustments and the most significant gross changes in energy and demand savings.

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Table 133. Large Commercial and Industrial Solutions—Final Evaluated Energy Savings and Realization Rates by Measure Strata

Strata	Ex-ante savings		Ex-post savings		Realization rate		Data source
	kW	kWh	kW	kWh	kW	kWh	
Custom—continuous energy improvement	2,855	42,032,826	2,694	40,754,147	94.4%	97.0%	Desk reviews
Custom—other	890	6,128,592	883	6,086,842	99.3%	99.3%	Desk reviews and site visits
Custom—early review	3,511	28,308,445	3,502	28,096,867	99.8%	99.2%	Desk reviews and site visits
Lighting-deemed	2,320	14,479,264	2,319	14,258,162	100.0%	98.5%	Desk reviews and site visits
Lighting—non-deemed	1,329	6,956,028	1,367	6,977,873	102.9%	100.3%	Desk reviews and site visits
Other	309	4,544,297	300	4,559,062	96.9%	100.3%	Desk reviews and site visits
Tune-ups	732	2,609,466	742	2,638,938	101.3%	101.1%	Tracking system and M&V review
Total	**11,946**	**105,059,917**	**11,808**	**103,371,891**	**98.8%**	**98.4%**	

9.6 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

EAL worked with the implementer CLEAResult to develop a quality management process for all EAL commercial programs. This process can be used for projects with or without a trade ally. No changes were made to this procedure in BY2023.

For trade-ally projects, CLEAResult emphasizes trade ally training to remind trade allies of program processes, technical requirements for measures, application requirements, and awareness of the QC process. QC protocols include clear pass/fail thresholds for addressing trade ally performance. During the post-inspection, any project (trade-ally-driven or not), the fail condition results if the work scope is significantly incomplete, the efficient measures are found to be ineligible, or there are safety or code issues with the installation. A failed project causes the trade ally to be removed from the reduced inspection rate list that the program maintains and is put under probationary status. Once a trade ally is removed, that contractor must complete five consecutive projects without "failures" to be returned to the reduced inspection rate list. For a trade ally to qualify for the reduced inspection rate, they must complete five consecutive projects without a failure as determined by the program implementer.

Customers must sign a customer agreement to be eligible for the program; as part of this agreement, the customer is willing to allow a field inspector to perform a QC inspection. These inspections could happen to any project regardless of scope. An inspection form was developed to perform standardized and consistent inspections to ensure the equipment is being used following the guidelines outlined in the customer agreement.

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Below are the steps that are followed during the QA/QC process, as outlined in the Quality Control and Assurance Process Manual:

- enrollment and customer verification,
- project documentation and completeness review,
- pre-engineering QC and approval,
- pre-installation inspection,
- pre-installation inspection corrections—trade-ally-driven projects,
- post-installation QC,
- post-installation inspection,
- post-installation inspection corrections—trade-ally-driven projects,
- post-engineering approval, and
- post-project review and closeout.

For all projects, the QA/QC process begins with verification that customers are eligible for participation in the program. Next, project documentation (including contact information, a signed proposal, W-9 forms, and pre-installation photos) is verified to be complete. Following the documentation check, the engineering team at CLEAResult checks to ensure that the project is installing eligible equipment and that savings parameters and calculations are accurate. For QA, the program staff also conducts reviews of each incentive application. After the engineering QC check, proposals that do not pass all aspects of the review are rejected and sent back for completion.

The next stage in the QA/QC process occurs during the pre-installation inspection stage, where pre-installation inspections are conducted to confirm pre-installation conditions. These inspections are completed for 100 percent of *custom* projects and the largest (approximately ten percent) trade-ally projects identified by kilowatt-hour savings. For the LCI program, larger projects are defined as those with savings estimated at over 150,000 kWh. Inspections are also completed for all *prescriptive* projects submitted by a non-trade ally or submitted by a trade ally under probation. A minimum of 20 percent of all other projects under 150,000 kWh are also inspected. For trade allies who are not under probationary status, at least ten percent of their total project quantities submitted are pre- or post-inspected. Any findings during the pre-inspection stage are returned to the trade ally to make corrections before the project may proceed.

Following the installation of the project, a post-installation QC check is performed via a review of documentation, to verify invoicing, any changes to the project, and a review of submitted photos. Any findings during this QC check are once again returned to the trade ally to make corrections before the project may proceed. An on-site inspection is then conducted following the same sampling methodology as detailed in the pre-installation inspection above.

At the final stage of the process, a final engineering review of the post-installation notes, completeness of documentation, and post-inspection photos is performed. Project savings calculations or incentives are adjusted as appropriate. When this is complete, the project and all required documentation is submitted to EAL for approval and project closeout.

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As part of the LCI program evaluation activities, the EM&V team assessed the program's documentation and the 70 sampled projects used to inform the impact evaluation. The documentation included:

- program manual;
- program tracking system/database extracts;
- supplemental project-level documentation:
  - customer proposals and project agreements,
  - invoices,
  - pre-inspection form (where applicable),
  - post-inspection form (where applicable), and
  - photographic documentation (where applicable).

As noted in the prior sections, the EM&V team confirmed that the information presented in the ArchEE tracking system was, for the most part, accurate compared to that in the project documentation. In general, the documentation provided project information that aligned with the stated QC goals, though the EM&V team found three specific areas for improvement:

1. Ensure photographic documentation provided is clear and legible and include nameplate photos of *lighting* model numbers and *HVAC* units, when possible,
2. Provide *lighting* specification sheets for fixtures/lamps without DLC or ENERGY STAR certification, and
3. Provide work orders and/or post-inspection reports, where available, on all projects.

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10.0 SMALL BUSINESS SOLUTIONS

The Small Business Solutions (SBS) program offers small commercial customers cash and non-cash incentives to implement energy efficiency improvements. The program assists small business customers by analyzing facility energy use and identifying energy efficiency improvement projects. The program targets small business customers with a peak electric demand of less than 100 kW. The program consults eligible customers to identify energy savings opportunities and available financial incentives. The program utilizes a network of pre-qualified trade allies to analyze customers' energy use, identify energy efficiency improvement projects, and install the recommended measures.

The SBS program is designed to overcome the unique market barriers that restrict small businesses' ability to implement energy-efficient technologies and practices. These market barriers include:

- Small business owners often lack technical expertise or time to devote to energy efficiency improvements. Most of these businesses do not have adequate time or resources to focus on energy efficiency improvements.
- Most small businesses have limited access to investment capital, which means that business owners may not afford the efficiency upgrade without immediate assistance from the program.

The program is implemented by CLEAResult, which provides recruitment, marketing, outreach, and training to trade allies. Along with participating trade allies, the program performs energy assessments, directly installs measures (e.g., *light-emitting diodes (LED)*, *low-flow faucet aerators*, *pre-rinse spray valves*, *weather stripping*), conducts pre- and post-implementation inspections, maintains the program quality assistance/quality control (QA/QC) standards, and administers the incentive process. The program also includes program tracking.

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team conducted a tracking system review, desk reviews on a randomly selected sample of 25 projects, and a review of program documentation. Ten site visits were completed for this program. Program staff interviews focused on discussing bridge year (BY) 2023 (BY2023) progress and challenges and implementing PY2022 evaluation recommendations presented in the Executive Summary (Section 1.0).

Table 134. Small Business Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[87]
PY2022 EM&V research—participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	25	10	None

[87] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site measurement and verification (M&V).

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10.1 KEY FINDINGS

Based on the BY2023 program tracking data, the SBS program incentivized energy efficiency measures to 469 unique participants[88] through 29 trade allies. Table 135 provides the program's claimed savings by measure category, where the most considerable amount of claimed participants (78 percent) and savings (83 percent) were attributable to *lighting* measures. All SBS program's claimed savings were from *prescriptive* project types, and no *custom* projects were claimed in BY2023.

Table 135. Small Business Solutions—Reported Participation and Savings[89]

Measure category	Trade allies	Participants**	Projects	Program savings (kWh)	Percentage of program savings (kWh)
Domestic hot water*	0	8	8	49,655	0.5%
Envelope*	0	41	41	867,168	8.7%
Lighting	20	364	376	8,264,964	83.2%
Refrigeration	1	15	15	30,240	0.3%
Tune-ups	8	61	240	722,551	7.3%
Total	**29**	**469**	**671**	**9,934,578**	**100.0%**

* The implementer directly installed all measures.

** A participant may install measures across multiple measure categories or multiple projects. Thus, the total count of participants and projects may not equal the sum of individual rows by measure category.

In BY2023, the SBS program reported 9,935 MWh in gross energy savings and 1.72 MW in gross demand savings. Table 136 below shows the reported and evaluated savings across the program. The program did not meet its energy and demand savings planning goals, achieving 67 percent of the energy savings goal and 89 percent of the demand savings goal.

Table 136. Small Business Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	9,935	9,221	92.8%	100.0%	9,221	3.3%
Demand savings (MW)	1.7	1.5	87.5%	100.0%	1.5	1.7%

[88] A unique participant is based on unique utility account numbers.

[89] ArchEE extract dated January 4, 2024.

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Table 137. Small Business Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	13,871	9,221	66.5%
Demand savings (MW)	1.7	1.5	88.6%

The SBS' evaluated energy and demand savings were lower than reported savings for energy savings (92.9 percent kilowatt-hour realization rate) and for demand savings (87.5 percent kilowatt realization rate). The main drivers of the realization rates were adjustments to *lighting* projects during the desk review and on-site review process. The most significant adjustment was for a *lighting* project that used the *retrofit lighting* methodology, even though the project involved a major renovation. The sources of other *lighting* adjustments included adjustments to air conditioning (AC) type, building type, and wattage adjustments related to the new federal standard for general service lamps (GSL) installed after July 1, 2023.

The researched NTG ratio is 100.0 for *prescriptive* measures and 99.9 for *tune-up* measures from research conducted in PY2022. No NTG updates were completed in BY2023.

10.2 RECOMMENDATIONS

The EM&V team has identified seven recommendations for consideration by Entergy Arkansas, LLC (EAL) (Table 138), which primarily focus on improving the realization rate in the following program year and increasing the transparency, accuracy, and evaluability of program savings in the future for the SBS program.

Table 138. Small Business Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1**: Increase QA/QC on *lighting* projects where significant renovations take place.	The EM&V team found one *lighting* project in a building that underwent a significant renovation from a retail store to a storage facility. From the photos provided, the renovation involved removing drywall and significantly altering the lighting layout of the building. As a result, the project should have used the *new construction lighting* methodology rather than the *retrofit lighting* methodology. Using the *new construction lighting* methodology significantly reduced energy and demand savings. The EM&V team recommends more careful QA/QC of projects involving lighting layout changes to ensure the *new construction methodology* is used when a major renovation occurs.
	Recommendation 2: Enhance QA/QC of space conditioning type on *lighting* projects.	The EM&V team found one *lighting* project that reported the AC type in the warehouse area despite inspection photos not showing ductwork. An on-site visit verified that the warehouse area was not conditioned. Adjustments to the space conditioning type reduced energy and demand savings. The EM&V team recommends more careful QA/QC of *lighting* project inputs like space conditioning type to ensure interactive effects are only applied when appropriate.

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Type	Recommendation	Key finding
	Recommendation 3: Enhance QA/QC of *GSL* baseline wattage.	The EM&V found three *lighting* projects installed after July 1, 2023, which did not apply the correct baseline wattage to line items involving *GSLs.* Adjustments to the baseline wattage reduced energy and demand savings. The EM&V team recommends more careful QA/QC of baseline wattage of *GSLs* to ensure compliance with the Arkansas Technical Reference Manual (TRM) and federal Energy Independence and Security Act (EISA) standards.
	Recommendation 4: Increase QA/QC on building type selection for *lighting retrofit* projects.	The EM&V team found an instance of a *lighting retrofit* project where the incorrect building type was used. One project involved *lighting* at a building that only operated once a week as an auto auction, so the *public assembly* building type should have been used instead of *service: excluding food*. The adjustments in building type resulted in reduced evaluated energy and demand savings. The EM&V team recommends more careful QA/QC to ensure that the operations within the buildings fit the building type selected.
	Recommendation 5: Increase QA/QC on baseline *lighting* fixture types and quantities.	The EM&V team found instances of *lighting retrofit* projects where the reported baseline fixture types and quantities did not match what was shown in inspection photos. One project selected the incorrect baseline *exit sign* type and counted *fluorescent tubes* that were missing, uninstalled, and non-operational. Another project selected a baseline fixture type of *incandescent* even though the pre-inspection noted the light as an *LED* bulb. The EM&V team recommends more careful QA/QC of baseline assumptions to ensure that they align with photo documentation.
	Recommendation 6: Review savings algorithms for *Wi-Fi thermostat* measures to ensure consistency.	The EM&V team identified ten projects where the reported fuel type was *air conditioning with electric resistance heat*, but savings were using deemed savings values for a *heat pump* unit. The EM&V team recommends reviewing the deemed savings values and calculation algorithms for *Wi-Fi thermostat* measures to ensure consistency based on the tracked fuel type.
BY2023 process recommendations	**Recommendation 7:** Investigate opportunities to increase energy efficiency program participation amongst small businesses in light of barriers that were encountered during BY2023, including rising baselines, persistent inflationary pressures, and high interest rates. This should include comprehensiveness of measures installed.	The SBS program did not achieve its planning goal for energy savings or demand reductions in BY2023. In addition, the majority of savings delivered through the program continue to be in *lighting*. Persistent inflationary pressures and high interest rates were reported as barriers seen in the market by program design and delivery staff. These barriers may be particularly acute for small businesses, and strategies to reach and serve this sector should continue to be assessed in the next program cycle so that the program achieves planned savings goals.

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Table 139. Small Business Solutions—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Increase QA/QC of the tracking database to ensure that all information from project documentation is captured accurately. ○ Complete.
	• Consider increasing post-inspections of completed projects. ○ Reviewed and rejected. The implementer chose not to increase post-inspections in PY2021.
	• Review savings algorithms for exterior lighting with existing controls. ○ Complete.
	• Review *tune-up* measure tracking data and algorithms. ○ In progress. Multiple *tune-up* measures with systematic errors incorrectly calculated energy or demand savings based on the tracked system heating and cooling parameters.
PY2020 process recommendations	• The program appears to be operating as intended.
PY2021 impact recommendations	• Review savings algorithms for *Wi-Fi thermostat* measures to ensure consistency. ○ Continuing.
	• Review *lighting control* measure tracking data for potential errors in algorithms. ○ Complete.
	• Increase QA/QC of renovation projects, in particular review all projects that are being completed in renovated facilities to check if the building use is changing. ○ Complete.
PY2021 process recommendations	• The program appears to be operating as intended.
	• Discuss quarterly allocations with trade allies to ensure understanding of the process and how exceptions are handled to keep trade allies engaged in the program.
	○ Continuing.
PY2022 impact recommendations	• Review savings algorithms for *Wi-Fi thermostat* measures to ensure consistency. ○ Continuing.
	• Select building types based on the closest description match from the available building types. ○ Continuing.
PY2022 process recommendations	• Review the time it takes for trade allies to receive the incentive checks.
	• Improve communication and responsiveness to customer and trade ally questions.

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Status of prior year recommendations	
	• Review the allocation of responsibilities between the trade allies and implementation staff.

10.3 METHODOLOGY

This section summarizes the methodologies used for the evaluation of the SBS program.

10.3.1 Impact Evaluation

The evaluated savings results are based on calculations and adjustments made during the tracking system review, 25 engineering desk reviews, and 10 site visits. Savings adjustments were made at the project level. Final evaluated savings for the *tune-up* measures are based on adjustments made during the tracking system review. For all other measures, evaluated savings results are based on desk review and site-visit level adjustments by sampled strata. The tracking system informed qualitative findings and served as a guide for potential issues for investigation during desk reviews.

To perform the BY2023 impact evaluation, the EM&V team completed the following activities:

- staff interviews and ongoing discussions;
- program website review of eligible measures, incentives, and participating trade allies;
- program manual and supplemental documentation review;
- program tracking system/database reviews;
- review of the tracking system and M&V database for *tune-ups* and *commercial Wi-Fi thermostats*;
- engineering desk review of 25 sampled projects; and
- on-site M&V of 10 sampled projects that also received desk reviews.

Table 140 shows the sample design and achieved sample sizes for the different data collection types employed for the impact evaluation effort.

Table 140. Small Business Solutions—Data Collection Efforts and Project Types

Data collection activity	Design sample	Achieved sample	Custom projects	Prescriptive projects
Staff interviews	2	2	N/A	N/A
Tracking system data review[90]	Census	Census	N/A	381
Engineering desk review	25	25	N/A	25

[90] ArchEE extract dated July 3, 2023. A count of *prescriptive* projects is the quantity of unique *JobId* numbers in the tracking database.

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Data collection activity	Design sample	Achieved sample	Custom projects	Prescriptive projects
On-site M&V visit[91]	10	10[92]	N/A	10

Most of the measures incentivized by the SBS program in BY2023 are currently included in the Arkansas TRM Version 9.1 (TRM 9.1), Volume 2. Specific sections of TRM 9.1 associated with the savings developed for the SBS program measures are provided in Table 141. These *prescriptive* algorithms and assumptions were the basis of the savings methodology used by the implementer and the EM&V team for energy and demand savings analysis purposes.

Table 141. TRM 9.1 Prescriptive Algorithms Utilized by the Small Business Solutions

Measure category	TRM 9.1 section	TRM 9.1 measure name
Domestic hot water	3.3.2	Faucet aerators
	3.3.5	Low-flow showerheads
Envelope	3.2.10	Commercial door air infiltration
Refrigeration	3.5.6	Strip curtains for walk-in coolers and freezers
	3.5.7	Door gaskets for walk-in and reach-in coolers and freezers
Lighting	3.6.2	Lighting controls
	3.6.3	Lighting efficiency
Food service equipment	3.7.12	Low-flow pre-rinse spray valves

Air conditioning and *heat pump* tune-up measures, commercial *Wi-Fi thermostats*, and *overhead door weather stripping* measures were incentivized through the SBS program. *Overhead door weather stripping* and *packaged terminal air conditioner (PTAC) sealing* measures do not adhere to TRM 9.1 but instead follow *prescriptive* approaches developed by CLEAResult based on the TRM algorithms for *commercial door air infiltration*. Additional project details outside of ArchEE are required to evaluate the *tune-up* measures. A separate tracking system review was conducted for all *tune-up* measures across the three commercial programs.

Table 142. Non-TRM Prescriptive Algorithms Utilized by the Small Business Solutions Program

Measure category	Measure description
Tune-ups (formerly CoolSaver)	Commercial AC post-test-out
	Commercial AC pre-clean
	Commercial central air conditioner (tune-up)
	Commercial heat pump (tune-up)

[91] On-site visits were recruited from the list of participants that received desk reviews, nesting the on-site sample within the desk review sample.

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Measure category	Measure description
	Commercial HP pre-clean
	Commercial Wi-Fi thermostat
Envelope	Overhead door weather stripping
	PTAC sealing

10.3.1.1 Tracking System Review

The EM&V team reviewed all tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of the TRM 9.1 utilized for the tracking system review are described above in Table 141.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings. This review was completed across a census of the program measures at the end of Q2[93]. All the critical input variables and assumptions necessary for savings calculations are present in the utility's tracking database. This review is conducted mid-year to help facilitate changes in the algorithm applications before the end of the year, where they might cause discrepancies in reported versus verified savings. After the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

Table 143. BY2023 Q1–Q2 Tracking System Reported Energy Savings by Measure Category

Measure	Reported savings	
	kW	kWh
Domestic hot water	10	46,111
Envelope	21	426,376
Lighting	1,007	5,714,210
Tune-up and Wi-Fi thermostat	52	296,199
Total	**1,090**	**6,482,896**

10.3.1.2 Tune-Up and Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all of the *tune-up* and *commercial Wi-Fi thermostat* measures with a comprehensive tracking system review, supplemented with engineering reviews of the M&V and deemed savings methodologies. These measures were tracked in ArchEE but had

[93] Tracking data downloaded July 3, 2023.

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supplemental data in external databases necessary for evaluation. The tracking system reviews focused on replicating individual measure savings results and determining population variances.

10.3.1.3 Desk Reviews and Site Visits

In BY2023, the primary impact evaluation activities included desk reviews and on-site assessments. Sampling was conducted via stratified random sampling on kilowatt-hour savings at the project level. Stratification was conducted according to measure category (*lighting* and *other)*.

Lighting projects were split into three strata based on the project's kilowatt-hour savings. *Lighting* strata were constructed using program tracking data spanning PY2020 through PY2022. Using these tracking data for each program year spanning PY2020 through PY2022, the following process was taken for the SBS program:

1. Projects were ordered from smallest to largest in terms of kilowatt-hour savings, and then the cumulative share of savings was calculated for this ordered list.
2. Projects representing the first one-third of total *lighting* project savings were sorted into the low-savings stratum, with the highest-saving project within this stratum representing the upper bound on savings for the low-savings stratum.
3. The projects representing the next one-third of *lighting* project savings were then sorted into the medium-savings stratum, with the highest-saving project within this stratum representing the upper bound on savings for the medium-savings stratum.
4. The remaining projects representing the top one-third of *lighting* project savings were sorted into the high-savings stratum, with the highest-saving project within the medium-savings stratum representing the lower bound on savings for the high-savings stratum.
5. BY2023 *lighting* stratum cutoffs were determined by taking the mean of cutoffs for the low-savings, medium-savings, and high-savings stratum cutoffs found for PY2020, PY2021, and PY2022.

On-site samples were a nested sample of the desk reviews, meaning that all projects receiving an on-site assessment also received a desk review. Projects with variances that could be cleared up during the site visit were selected first, with remaining site visits randomly selected from within the desk review sample. Table 144 summarizes the result of the sampling for the SBS program.

Table 144. Small Business Solutions—Summary of Sampled Savings

Measure category	Projects	Projects sampled	Reported kWh	Reported kW
Lighting subtotal	**376**	**21**	**8,264,964**	**1,516**
High ≥51.8 MWh	31	8	2,984,451	570
Medium ≥22.8 MWh and <51.8 MWh	79	7	2,643,780	415

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Measure category	Projects	Projects sampled	Reported kWh	Reported kW
Low <22.8 MWh	266	6	2,636,733	530
Other	**57**	**4**	**947,063**	**48**
Total	**433**	**25**	**9,212,027**	**1,564**

10.4 DETAILED IMPACT EVALUATION RESULTS

The SBS' evaluated energy and demand savings were lower than reported savings for energy savings (92.9 percent kilowatt-hour realization rate) and for demand savings (87.5 percent kilowatt realization rate). The main drivers of the realization rates were adjustments to *lighting* projects during the desk review and on-site review process. The most significant adjustment was for a *lighting* project that used the *retrofit lighting* methodology rather than the *new construction lighting* methodology even though the project involved a major renovation. The sources of *other lighting* adjustments included AC type, building type, and wattage adjustments related to the new federal standard for GSLs installed after July 1, 2023.

Corrections to *lighting* projects that contributed additional energy (kilowatt-hour) savings were found to be primarily due to:

- a change in the quantity of post-retrofit *lighting* fixtures.

Corrections to *lighting* projects that contributed additional demand (kilowatt) savings were found to be primarily due to:

- a change in the quantity of post-retrofit *lighting* fixtures;

Corrections to *lighting* projects that contributed to reduced energy (kilowatt-hour) savings were found to be primarily due to:

- a change in the calculation methodology for a *lighting* project from *retrofit* to *new construction,* as the building underwent a significant renovation,
- a change in the AC type observed during the site visit,
- changes to the baseline fixture wattage of *GSLs* that were installed after July 1, 2023, and
- changes to the building type to match the main function of the building.

Corrections to *lighting* projects that contributed to reduced demand (kilowatt) savings were found to be primarily due to:

- a change in the calculation methodology for a *lighting* project from *retrofit* to *new construction,* as the building underwent a significant renovation.
- a change in the AC type observed during the site visit,
- changes to the baseline fixture wattage of *GSLs* that were installed after July 1, 2023, and
- changes to the building type to match the main function of the building.

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Corrections to *tune-up* and *Wi-Fi thermostat* projects that contributed to reduced energy (kilowatt-hour) savings were found to be primarily due to:

- *Wi-Fi thermostat* measures using the incorrect unit type (*heat pump* energy savings instead of *AC* energy savings) in savings algorithms.

Corrections to *other* projects that contributed additional energy (kilowatt-hour) and demand savings (kilowatt) were found to be primarily due to:

- a change to the weather zone observed during the desk review.

10.4.1 Participant Characterization

Several different measures were provided to participants through the program. Within the tracking system, qualifying products were assigned to unique measure names. The mapping of these measure names to measure categories is provided below.

Table 145. Small Businses Solutions—Mapping to Measure Category

Measure description	Measure category
Commercial showerheads	Domestic hot water
Faucet aerators	Domestic hot water
Pre-rinse spray valves	Domestic hot water
Commercial door air infiltration	Envelope
Overhead door weather stripping	Envelope
PTAC sealing	Envelope
Halogens	Lighting
HIDs	Lighting
Integrated-ballast compact fluorescent lamps (CFL)	Lighting
Integrated-ballast LED lamps	Lighting
LEDs	Lighting
Lighting controls	Lighting
Magnetic ballast T5 or premium T8 retrofit of T12	Lighting
Modular CFLs and CCFLs	Lighting
Other linear fluorescents	Lighting
Outdoor-halogens	Lighting
Outdoor-HIDs	Lighting
Outdoor-integrated-ballast compact fluorescent lamps (CFL)	Lighting
Outdoor-integrated-ballast LED lamps	Lighting
Outdoor-LEDs	Lighting
Outdoor-magnetic ballast T5 or premium T8 retrofit of T12	Lighting
Outdoor-modular CFLs and CCFLs	Lighting

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Measure description	Measure category
Outdoor-other linear fluorescents	Lighting
Refrigeration door gaskets	Refrigeration
Refrigeration strip curtains	Refrigeration
Commercial AC post-test-out	Tune-ups
Commercial AC pre-clean	Tune-ups
Commercial central air conditioner (tune-up)	Tune-ups
Commercial heat pump (tune-up)	Tune-ups
Commercial HP pre-clean	Tune-ups
Commercial Wi-Fi thermostat	Tune-ups

Table 146 below outlines the claimed number of program participants and the percentage of savings by measure category in BY2023. *Lighting* was the dominant measure category in BY2023, accounting for 88 percent of claimed demand (kilowatt) savings and 83 percent of claimed energy use (kilowatt-hour) savings.

Table 146. BY2023 Reported Small Business Solutions Participation and Savings by Measure Category

Measure category	Participants*	Projects*	Program savings		Percentage of program savings	
			kW	kWh	kW	kWh
Domestic hot water	8	8	12	49,655	1%	0%
Envelope	41	41	33	867,168	2%	9%
Lighting	364	376	1,516	8,264,964	88%	83%
Refrigeration	15	15	3	30,240	0%	0%
Tune-ups	61	240	159	722,551	9%	7%
Total	**469**	**671**	**1,723**	**9,934,578**	**100%**	**100%**

* A participant is a unique account described by the ArchEE data field *AccountNumber*. A project is a unique job number defined by the ArchEE data field *JobId*. A participant may install measures across multiple measure categories and multiple projects. As a result, the total count of participants and projects may not equal the sum of the counts by measure category.

Table 147 outlines the savings and percentage of savings by measure in BY2023. *Interior LEDs* were the dominant measure in BY2023 and accounted for 78 percent of claimed gross kilowatt savings and 60 percent of claimed gross kilowatt-hour savings. *Outdoor LEDs* were the second most dominant measure in BY2023, accounting for 14 percent of claimed gross kilowatt-hour savings; however, they did not contribute to program demand savings. *Commercial Wi-Fi thermostats* were the second most dominant measure in BY2023, accounting for three percent of claimed gross kilowatt savings and five percent of claimed gross kilowatt-hour savings.

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Table 147. BY2023 Reported Small Business Solutions Participation and Savings by Measure

Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Domestic hot water				
Commercial showerheads	4.6	22,722	<1%	<1%
Faucet aerators	6.1	18,959	<1%	<1%
Pre-rinse spray valves	0.9	7,974	<1%	<1%
Envelope				
Commercial door air infiltration	8.4	276,601	<1%	3%
Overhead door weather stripping	20.0	380,301	1%	4%
PTAC sealing	5.0	210,267	<1%	2%
Lighting				
Halogens	8.5	34,773	<1%	<1%
HIDs	16.7	76,513	1%	1%
Integrated-ballast compact fluorescent lamps (CFL)	0.0	0	0%	0%
Integrated-ballast LED lamps	112.2	482,117	7%	5%
LEDs	1,349.5	5,970,440	78%	60%
Lighting controls	6.8	22,696	<1%	<1%
Magnetic ballast T5 or premium T8 retrofit of T12	15.6	68,892	1%	1%
Modular CFLs and CCFLs	<1	275	<1%	<1%
Other linear fluorescents	6.1	25,892	<1%	<1%
Outdoor-halogens	0.0	5,770	0%	<1%
Outdoor-HIDs	0.0	34,078	0%	<1%
Outdoor-integrated-ballast compact fluorescent lamps (CFL)	0.0	0	0%	0%
Outdoor-integrated-ballast LED lamps	0.0	182,889	0%	2%
Outdoor-LEDs	0.0	1,351,655	0%	14%
Outdoor-magnetic ballast T5 or premium T8 retrofit of T12	0.0	7,073	0%	<1%
Outdoor-modular CFLs and CCFLs	0.0	559	0%	<1%
Outdoor-other linear fluorescents	0.0	1,343	0%	<1%
Refrigeration				
Refrigeration door gaskets	2.8	24,576	<1%	<1%
Refrigeration strip curtains	0.6	5,664	<1%	<1%

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Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Tune-ups				
Commercial AC post-test-out	1.3	2,416	<1%	<1%
Commercial AC pre-clean	5.0	8,881	<1%	<1%
Commercial central air conditioner (tune-up)	91.1	169,734	5%	2%
Commercial heat pump (tune-up)	1.8	5,778	<1%	<1%
Commercial HP pre-clean	<1	0	<1%	0%
Commercial Wi-Fi thermostat	59.3	535,742	3%	5%
Total	**1,722**	**9,934,578**	**100%**	**100%**

Table 148 shows the incentive structure for BY2023.

Table 148. BY2023 Small Business Solutions—Program Incentives

Measure	Incentive as of 1/1/2020* per kWh
All lighting (including refrigeration lighting)	$0.17
Interior lighting controls	$0.17
HVAC replacement	$0.17
Direct install	Full cost
Window film	$0.35
All refrigeration	$0.30
Duct sealing	$0.35
Ceiling insulation	$0.35

* Source: PY2022 Program Manual Small Business Solutions, which was verified to be in use for BY2023

10.4.2 Program Documentation and Tracking Data Review

To understand the SBS program, the EM&V team interviewed program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- ArchEE data tracking system extract containing BY2023 participant information and savings;
- supplemental project-level documentation received during quarterly data requests for sampled accounts, which typically included:

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  - signed customer proposals and project agreements—sometimes files included initial and final proposals if projects had changed during development;

- customer proposals that typically included a detailed inventory of site-captured measure-level details such as:
  - *Commercial door air infiltration* and *domestic hot water* measures (e.g., *weather stripping*, *door sealing*, *low-flow showerheads*) were all directly installed by the implementer. A Direct Install Report typically inventoried the type of infiltration measure, the gap width sealed, and the new weather stripping length installed by room. Additional notes typically included the HVAC system type (either for the facility or by specific rooms if they varied). Legible nameplate photos verifying the HVAC or water heater type were sometimes but not always provided. Finally, photo documentation of a sample of doors with their existing condition and gap width, noted by a view of a tape measure was found.
  - *Lighting* and *lighting controls* measures included existing and new fixture types, make and model numbers, wattages, quantity, and control type. Also, DesignLights Consortium (DLC) and ENERGY STAR® certification sheets were provided for 20 out of 21 sampled *lighting* projects. Itemized invoices were provided for all *lighting* projects. Inspection reports were typically not provided; however, either a work order or inspection report was provided for all *lighting* products sampled. Manufacturer specification sheets were not provided.
- photographic documentation pre- or post-installation;
- a Quality Control and Assurance Manual for EAL commercial programs, dated February 1, 2023; and
- PY2022 Program Manual for the SBS program obtained from the EAL website, which was verified to be in use for BY2023.

10.4.3 Detailed Tracking System/Database Review

The EM&V team reviewed all program-claimed tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms and the final claimed values necessary for each measure. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of TRM 9.1 that were utilized for the tracking system review are described above in Section 10.3.1.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings. This review was completed across a census of the program measures. All the critical input variables and assumptions necessary for savings calculations were present in the utility's tracking database. Following the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

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The ArchEE tracking system, which supplied all participant- and measure-level data, was the primary tool for checking claimed savings and performing evaluation savings calculations. These results were informed and supplemented with the findings from the engineering desk reviews and site visits, as further outlined in the Overall Savings Estimatessection.

The overall program evaluated tracking system savings resulted in slightly higher savings (100.0 percent kilowatt-hour) and slightly lower savings (99.9 percent kilowatt realization rates) than those calculated by the program implementer. The evaluated savings were based on adjustments made from completing engineering reviews of the program's tracking data. The overall realization rates were affected negligibly by variances between the reported and evaluated energy savings (kilowatt-hour) for *lighting* and *domestic hot water* projects.

Overall, the tracking system review found the following:

- Except for the *overhead door weather stripping* and *tune-up* measures in the SBS program, all measures utilize TRM 9.1, Volume 2 deemed algorithms. The savings equations were confirmed consistent with TRM 9.1. As described above, the *overhead door weather stripping, PTAC sealing,* and *tune-up* measures follow custom approaches developed from assumptions and methodologies in the TRM. The EM&V team confirmed the *overhead door weather stripping* and *PTAC sealing* measures follow the M&V plan through this tracking system review. A tracking system review of the *tune-up* measures was completed to inform *tune-up* evaluated savings.
- The SBS program measures utilize TRM 9.1, Volume 2 deemed savings assumptions, with two notable exceptions. O*verhead door weather stripping* measures use extrapolated savings values based on the *commercial door air infiltration* measure in TRM 9.1. Finally, some *lighting efficiency* measures use site-specific annual operation hours instead of the deemed values in TRM 9.1 for *lighting* projects.
    - Approximately 0.8 percent of *lighting* projects use site-specific custom AOH as captured from the site and based on the buildings' typical operating hours and hours of occupancy. This approach increased over PY2022, where 0.4 percent of SBS program projects used custom AOH.
- The overall tracking review realization rates were 99.9 percent kilowatt and 100.0 percent kilowatt-hour, not including the *tune-up* measures. Tracking review realization rates for most measures were at 100 percent.

Table 149. BY2023 Q1–Q2 Tracking System Energy Savings and Realization Rates by Measure Category

Measure category	Claimed savings		Evaluated savings		Realization rate	
	kW	kWh	kW	kWh	kW	kWh
Domestic hot water	10	46,111	10	46,598	96%	101%
Envelope	21	426,376	21	426,376	100%	100%
Lighting	1,007	5,714,210	1,007	5,714,312	100%	100%
Total	**1,038**	**6,186,697**	**1,037**	**6,187,286**	**100%**	**100%**

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10.4.3.1 Domestic Hot Water

- Project EA-0000994899 (one line item for *aerators* and two for *showerheads*) selected the incorrect building type based on the provided *MeasureLocation* of *Harbor Home for Women.* The building type for the *aerator* measures was adjusted from *commercial* to *dormitory*. The *showerhead* measures were calculated using the *residential* methodology. These adjustments increased energy savings and decreased demand savings.

10.4.3.2 Envelope

- No issues found.

10.4.3.3 Lighting

- Out of 5,869 total line items, 3,071 had errors in reported natural gas savings when compared to the savings algorithms in TRM 9.1. This problem appears to have been caused by a problem with the translation tool from CLEAResult's database to ArchEE and was updated following the mid-year tracking system review.
- One project (EA-0000937912) included a line item whose *MeasureLocation* field in ArchEE was *warehouse old walk-in cooler*, which implies the lights were installed inside a refrigerated space; however, the *TempDescription* field was stated as *none*. The EM&V team adjusted the calculation to include the interactive effects factors associated with the *refrigerated space—med. temps. (33-41°F)*, resulting in a 125 percent realization rate for kilowatt-hour and kilowatt savings for that line item.
- Two *lighting control* line items associated with one project (EA-0000848664) reported using stipulated hours in the ArchEE *ProjectNarrative* field, reported hours in the *AnnualHours* field, and reported *0* in the *MeasuredCf* field. However, it does not appear that these projects calculated savings using the custom AOH and CF inputs. The EM&V team removed the reported stipulated AOH and CF values to match the energy and demand savings for these line items.
- One project (EA-0000776849) reported using stipulated hours in the ArchEE *ProjectNarrative* field for all *lighting control* line items but reported either *0* or *1* in the *AnnualHours* field and *0* in the *MeasuredCf* field. However, it does not appear that these projects calculated savings using the custom AOH and CF inputs. The EM&V team removed the reported stipulated AOH and CF values to match the energy and demand savings for these line items.
- Thirteen line items across five projects (EA-0000947043, EA-0000965267, EA-0000968927, EA-0000979001, EA-0000984780) had a consistent 83.3 percent realization rate for kilowatt savings. These lines were all related to *retrofit lighting* savings where existing controls were present. The EM&V team adjusted the kilowatt savings to match the algorithm in TRM 9.1, reducing kilowatt savings for those line items.
- Sixty-four line items were marked as *N/A* in the *EquipmentDescription* field, and savings were reported as being associated with *removed bulbs*. The *N/A* designation is typically used for *exit signs*; another designation for *removed bulbs* should be used to ensure clarity in the tracking data.

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- Eleven line items were marked as *N/A* in the *EquipmentDescription* field, and savings were reported as being associated with fixture retrofits that were not *exit signs*. The *N/A* designation is typically used for *exit signs*. Another designation for bulbs that are qualified via other methods should be used to ensure clarity in the tracking data. CLEAResult may already be addressing this via the *exception* designation, which was submitted to CGI already.
- Two projects (EA-0000994396 and EA-0000994899) incorrectly included unnecessary prefixes *DI LED* in the *BuildingDescription* ArchEE field. These two projects used the building types *DI LEDs—office* and *DI LEDs—exterior*. The EM&V team typically relies on this field to align with TRM 9.1 building types without any additional prefixes. The EM&V team adjusted the building types to *office* and *exterior*, respectively, with no impact on savings.

10.4.3.4 Tune-Up and Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review began using the TRM 9.1, the CoolSaver Program M&V Plan[94], and the Memorandum of Understanding to reference our review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to the TRM deemed savings and supplemental documentation methods used to estimate savings. Following the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified that the savings estimates in the tracking system are consistent with those outlined in TRM 9.1, used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

The ArchEE database includes the key data for all projects and reported savings for *AC* and *heat pump tune-up* and *Wi-Fi thermostat* measures, which totaled 240 measures.

A CLEAResult tracking system extract was provided, including pre- and post-test-out projects used as the basis for CLEAResult's PY2020−PY2022 efficiency loss (EL) calculations. The EM&V team reviewed this dataset, examined it for outliers, and calculated the PY2020–PY2022 EL values for two sectors (*commercial* and *residential*) and whether a refrigerant charge adjustment was performed.

The findings from the *tune-up* tracking system showed similar findings to last year's review. Most of the key *tune-up* measure data is maintained in a separate database outside of ArchEE. The database was useful for the evaluation team to reference during the review. For example, because the *TuneupidComm* field in ArchEE was once again not used in the SBS program for BY2023 for unknown reasons, the evaluation team mapped the pre-clean projects to the post-test-out measures via supplemental data and communications with CLEAResult.

Finally, as with previous years, *commercial Wi-Fi thermostat* measures still require manual input of deemed energy (kilowatt-hour/ton) and demand savings (kilowatt/ton) values. This led to

[94] The *tune-up* measure methodology was developed separately under their own CoolSaver program prior to being included in the SBS program.

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many instances of human input error with savings deviations (described in further detail below). Automating this process in the future will allow for more effective QA/QC and reduce the likelihood of errors.

10.4.4 Tune-Up and Wi-Fi Thermostat Measurement and Verification Findings

The EM&V team evaluated CLEAResult's savings calculations by reviewing the M&V sample of participants to confirm the savings methodology used and results obtained, repeating the calculation steps, and making calculation adjustments. The ArchEE tracking system, which supplied all participant and unit-level data and claimed savings, was the primary tool for checking reported savings and performing evaluation savings calculations.

Detailed findings from the M&V review for *tune-up* and *Wi-Fi thermostat* measures are presented below.

- Ten *commercial Wi-Fi thermostat* measures installed on *AC systems* with *electric resistance heat* were using incorrect energy savings. For energy savings, reported savings were calculated as if the thermostat was installed on a h*eat pump system* by including energy savings associated with heat pump heating. The EM&V team adjusted the energy savings only to include the energy savings associated with an *AC* unit. The ten affected project numbers are listed below:
    - 2022-370676,
    - 2022-370675,
    - 2022-370674,
    - 2022-370664,
    - 2022-370662,
    - 2022-370661,
    - 2022-341034,
    - 2022-367191,
    - 2022-366924, and
    - 2022-366922
- One *commercial heat pump tune-up* project (2022-320729) reported 0 kWh savings for its pre-clean savings. The EM&V team used the *pre-clean heat pump tune-up* algorithm noted in the CoolSaver M&V Plan to report energy savings.
- One *commercial central air conditioner tune-up* project (2022-319857) used 16.5 percent as the ELF in the savings calculation rather than the approved 16.7 percent for *commercial tune-ups* that did not involve refrigerant charge adjustments. The adjustment increased energy and demand savings slightly.
- One *commercial central air conditioner tune-up* project (2022-330659) used 0.84 as the CF in the demand savings calculation for a building reported as *food sales*. The EM&V team used a CF of 0.9, which aligns with the Arkansas TRM for a *grocery* building type, which increased demand savings.

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10.4.5 Engineering Desk Reviews

The EM&V team evaluated CLEAResult's savings calculations by reviewing the program tracking data and project documentation to confirm the savings methodology used and results, repeating the calculation steps, and making adjustments.

The engineering desk reviews included reviewing the available project documentation in determining the source of key parameters for the deemed savings protocols from TRM 9.1. After selecting the best source of the key parameters from the available documentation, the savings were calculated based on TRM 9.1 algorithms and compared to the claimed savings.

In addition to the tracking system review, the engineering desk reviews also showed a consistent use of TRM 9.1 algorithms across all the measures claimed in the SBS program. The EM&V team made various minor adjustments to specific projects described in detail in the Desk Review and Site-Visit Results section below.

The EM&V team completed 25 engineering desk reviews of the SBS program accounts. These projects represented all measure categories in the program, except for *tune-up* measures, and had gross savings of 1,278,979 kWh, or 13 percent of the total SBS program recorded gross savings of 9,934,578 kWh. This percentage of total program savings is based on finalized ArchEE data from January 3, 2024.

10.4.5.1 Site Visits

The EM&V team's evaluation plan included conducting ten site visits to SBS program customers. These site visits also received an engineering review, as discussed above. The EM&V team's field inspector recorded the verified quantities, operation, building type, and space condition of each of the measures observed while on-site and collected additional information on critical parameters. For the SBS program, some of the key data and spot measurements obtained for essential parameters, as applicable, included:

- *lighting* measures: base/new wattage, number of lamps per fixture, lamp/fixture make/model/type, base/new control type, building type, space heating/cooling type, and AOH; and
- *envelope* measures: length of the installed door gasket, gap width, and heating/cooling system type.
- The site visits found that most parameters recorded in the project documentation to calculate savings were accurate. Out of the ten site visits conducted, one customer had its *conditioning type* adjusted based on the site conditions. For the other nine customers, all parameters were verified or were deemed to be reasonable based on the site inspection.

10.4.6 Desk Review and Site-Visit Results

As noted earlier, the BY2023 SBS program impact evaluation efforts included an engineering analysis for a sample of 25 projects and a site visit for 10 of those projects reviewed. For 13 of the projects in the sample, no savings adjustments were made. For the remaining 12 projects, the impact evaluation found various discrepancies in the project documentation or the site visit that required adjustments of parameters from the claimed savings estimates. The table below

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provides project-level realization rates, by measure category, for the 25 SBS projects reviewed by the evaluation. Detailed descriptions of the 12 projects with energy and realization rate adjustments follow Table 150.

Table 150. Small Business Solutions—BY2023 Desk Review and Site Visit Results, By Project

EM&V participant ID	Measure stratum	EM&V review type*	Ex-ante savings		Ex-post savings		Realization rate	
			kW	kWh	kW	kWh	kW	kWh
122001	Lighting – Medium	Desk review	8.9	40,037	8.9	40,037	100%	100%
122002	Other	Desk review	1.0	42,783	1.0	42,880	101%	100%
122003	Lighting - High	Site visit	18.8	101,523	18.8	101,523	100%	100%
122004	Lighting - High	Site visit	12.3	76,991	7.7	67,401	62%	88%
122005	Lighting - Low	Desk review	3.6	17,954	3.6	17,954	100%	100%
122006	Lighting – Medium	Site visit	2.2	50,564	2.1	50,087	96%	99%
122007	Lighting - Low	Desk review	1.5	6,180	1.5	6,180	100%	100%
122008	Lighting - High	Desk review	43.9	260,220	10.2	121,074	23%	47%
222001	Lighting - Low	Site visit	2.9	9,872	2.4	9,057	83%	92%
222002	Lighting - High	Site visit	10.1	56,021	9.7	54,178	97%	97%
222003	Lighting – Medium	Desk review	3.0	25,687	3.0	25,768	100%	100%
222004	Lighting – Medium	Desk review	4.9	23,706	4.9	23,706	100%	100%
222005	Lighting - Low	Site visit	5.6	19,304	5.6	19,304	100%	100%
222006	Other	Desk review	0.0	577	0.0	577	100%	100%
222007	Lighting – Medium	Desk review	-	26,286	-	26,286	N/A	100%
222008	Lighting - High	Desk review	1.0	54,830	1.0	54,542	100%	99%
322001	Lighting - High	Site visit	46.1	190,389	39.5	176,867	86%	93%
322002	Lighting - Low	Site visit	0.8	3,638	0.8	3,638	100%	100%
322003	Lighting – Medium	Desk review	5.0	22,908	3.0	15,991	61%	70%
322004	Other	Desk review	0.2	1,809	0.2	1,809	100%	100%
322005	Lighting - High	Desk review	-	55,960	-	55,960	N/A	100%
322006	Other	Site visit	0.9	12,371	0.9	12,371	100%	100%
322007	Lighting - Low	Desk review	0.8	4,187	0.8	4,187	100%	100%
322008	Lighting – Medium	Desk review	5.0	29,120	4.5	26,007	91%	89%
322009	Lighting - High	Site visit	28.6	146,062	27.7	138,992	97%	95%

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EM&V participant ID	Measure stratum	EM&V review type*	Ex-ante savings		Ex-post savings		Realization rate	
			kW	kWh	kW	kWh	kW	kWh
Total			**207.0**	**1,278,979**	**157.9**	**1,096,375**	**76%**	**86%**

* All projects that received an on-site visit also received an engineering desk review.

A dash indicates that there are no kilowatt savings associated with the respective measure.

The project-based savings adjustments are provided below by measure category and EM&V *ParticipantID*.

10.4.6.1 Other

The *other* strata consist of *prescriptive*, *non-lighting* measures. Four project IDs were selected in the *other* category for the SBS program for desk reviews, with one project also receiving an on-site visit. All four of the *other* category projects completed *envelope* measures, with one of the four also containing a *domestic hot water* measure.

- **Participant ID 122002 adjustment to weather zone during the desk review.** This project was a *commercial door air infiltration* and *commercial showerhead* project. During the desk review, the EM&V team found a discrepancy in the weather zone used in the *domestic hot water* calculation (Weather Zone 7) and the location of the site in Lawrence County (Weather Zone 8). Adjusting the weather zone from *7* to *8* slightly increased decreased energy and demand savings.

10.4.6.2 Lighting—High

The *lighting—high* strata consist of *lighting* projects with total energy savings greater than or equal to 51.8 MWh. Eight desk reviews and five site visits were conducted on these strata, resulting in five savings adjustments.

- **Participant ID 122004 adjustment for the *building type* during the desk review.** The building type was adjusted from *service (excluding food)* to *public assembly* as the building hosts car auctions that appear to operate only once a week on Thursdays at 6:00 p.m. This reduced energy savings and demand savings.
- **Participant ID 122008 adjustment for *new construction baseline* during the desk review.** The photo documentation showed that this facility underwent a significant renovation from a *retail store* to a *storage facility*. Reported savings were calculated using a *deemed retrofit* baseline. During the desk review, all *lighting* in the new storage facility were adjusted to a *new construction* baseline. A warehouse lighting power density of *0.8 W per square foot* was used for the area of the building. An area of 20,400 square feet was determined using Google satellite imagery of the building. Overall, this reduced energy and demand savings significantly for this project.
- **Participant ID 222002 adjustment for *extraneous ArchEE entry* and *baseline fixture type* during the desk review.** The ArchEE data entries for this project included one extraneous line item of lights that were not present in the work order, pre-inspection summary, or post-inspection summary. This extraneous line item was removed from the savings for the project. In addition, during the desk review, the fixture type for one line

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item was adjusted from a *60 W incandescent* to an *11 W LED* based on the pre-inspection form. These adjustments reduced energy and demand savings.

- **Participant ID 222008 adjustments for *post-installation fixture wattage* during the desk review.** A quantity of 24 exterior LED canopy fixtures (WSD-CP65W27-50K-D) were adjusted from the reported *62 W* to *65 W* (the DLC certification database verified these lights to be *65 W*); this reduced energy savings for this measure.
- **Participant ID 322001 adjustments for *conditioning type* and *baseline fixture wattage* during the desk review and site visit.** The *conditioning type* for the warehouse area was adjusted from *air conditioned* to *no air conditioning* based on the site visit findings. In addition, the *baseline wattage* of the *60 W incandescent lightbulb* in the *interior authorized room* was adjusted from *43 W* to *17.8 W* to comply with new EISA standards for *GSLs*, as the lights for this project were installed after July 1, 2023. These adjustments reduced energy and demand savings for this project.
- **Participant ID 322009 adjustments for *baseline fixture wattage* during the desk review.** Eleven line items had their *baseline wattages* adjusted to be equal to *45 lumens per watt* (given the lumen output of the installed bulb) to comply with new EISA standards for GSLs, as the lights for this project were installed after July 1, 2023. These adjustments reduced energy and demand savings for the project.

10.4.6.3 Lighting—Medium

The *lighting—medium* strata consists of *lighting* projects with total energy savings greater than or equal to 22.8 MWh and less than 51.8 MWh. Seven desk reviews and one site visit were conducted on these strata, resulting in four savings adjustments.

- **Participant ID 122006 adjustments for *building type* and *fixture quantity* for one line item during the desk review and site visit.** The building type for one line item (*cooler displays drink coolers*) was adjusted from *food sales: supermarket/retail* to *food sales: sit-down* restaurant to match the main use of the building. In addition, the on-site visit only found *six* lights associated with the line item, instead of the reported *seven*. These adjustments reduced energy and demand savings for the project.
- **Participant 222003 adjustments for *fixture quantity* during the desk review.** A quantity of *LED panel lights* was adjusted from *two* to *one* based on post photos and engineering judgment, as one *F42ILL fixture* should become *one* LED panel, and not *two*. This adjustment increased energy and demand savings.
- **Participant 322003 adjustments for *baseline fixture wattage* during the desk review.** Twelve line items had their baseline wattages adjusted to be equal to 4*5 lumens per watt* (given the lumen output of the installed bulb) to comply with new EISA standards for *GSLs*, as the lights for this project were installed after July 1, 2023. These adjustments reduced energy and demand savings for the project.
- **Participant 322008 adjustments for *baseline fixture type* and *quantity* during the desk review.** The baseline fixture code for the *exit signs* was adjusted to match the baseline photos, showing *single-sided* exit signs rather than *double-sided* ones. The *baseline quantity* of fluorescent tubes in the warehouse area was reduced, as the photos showed many fixtures with missing, uninstalled, or non-operational fluorescent tubes. These adjustments reduced energy and demand savings for the project.

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10.4.6.4 Lighting—Low

The *lighting—low* strata consist of *lighting* projects with total energy savings of less than 22.8 MWh. Six desk reviews and three site visits were conducted on this stratum, resulting in one savings adjustment.

- **Participant ID 222001 adjustments for *space conditioning type* during the desk review and site visit.** The *space conditioning type* for all line items was adjusted *from air-conditioned* to *no air conditioning* based on the findings during the on-site visit. This adjustment reduced energy and demand savings for the project.

10.4.7 Program Documentation Review

To understand the SBS program, the EM&V team interviewed program staff and reviewed all information related to the program available on EAL's website and supplemental documentation provided by EAL and CLEAResult. The EM&V team reviewed the following documentation related to the program:

- ArchEE data tracking system extract containing BY2023 participant information and savings;
- Quality Control and Assurance Manual Process Manual - EAL Commercial Programs, dated February 1, 2023;
- PY2022 Program Manual for the Small Business Solutions Program obtained from the EAL website[95];
- *overhead door weather stripping* deemed savings methodology and calculations;
- *PTAC sealing* deemed savings methodology and calculations; and
- The program website.

10.4.7.1 Program Website Review

Information on the SBS program website includes a general description of the program, covering eligibility and participation. It also provides a list of eligible measures and their incentive discounts. For example, the website showcases a small office project, demonstrating estimated energy savings, incentives, and utility cost savings. The website readily provides a copy of the program manual; however, the available version is the *2022* Program Manual. Finally, the website includes a search tool to find participating trade allies by name or location.

10.4.7.2 Program Documentation Review

The EM&V team received program-related documentation key to understanding the program and participation processes, including the PY2022 Program Manual, and Quality Control and Assurance Manual. Key documents to understanding the program savings methodologies and measuring level savings include the project-level files, ArchEE data, TRM 9.1, supplementary

[95] The 2023 Program Manual was unavailable from the program website, but CLEAResult verified that there were no changes from the PY2022 Program Manual.

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deemed savings methodologies for *overhead door weather stripping* and *PTAC sealing*, and ongoing reviews with EAL and CLEAResult staff.

For most sampled projects, the details and documentation collected by EAL, the implementer, and trade allies are sufficiently extensive. As bulleted in the section above, the critical baseline and new equipment assumptions, drivers of the prescriptive measure savings, are well described in trade ally proposals and equipment inventories. Additional documentation (including invoices, photos, and work orders) collected at project approval support the equipment quantities and performance metrics. These are industry best standards for documentation collection, which reduce the uncertainty of the project savings assumptions and development.

In most cases, the EM&V team found that documentation matched the data recorded in the ArchEE tracking system. On occasions when discrepancies occurred, they usually stemmed from differences in the business name or address, often referring to another location or building belonging to the same customer. Equipment type, quantities, and in most cases, building/space conditions were accurately recorded compared to the efficient technology data and project file documentation reviewed. Also, across projects, most project files contained similar documentation. All project files had, at a minimum, the signed customer proposal, project savings summary, and the Participant Agreement, which included customer information, energy savings estimates, and trade ally information. The work order typically included the list of *retrofit* measures, with pre- and post-conditions and equipment parameters identified. Some project files included pre- and post-inspection forms with field inspector notes indicating site results. Except for *direct install* projects, all project files included invoices. All invoices were found to have measure-level cost breakdowns, which helped support and confirm project details.

Many projects also included pre- and post-installation photographic documentation, either with an inspection report or separately. Photos were generally of high quality; however, there were a few instances where photos provided in the documentation were unclear, and photos of *lighting* and *water heating* nameplate photos were not always provided. In BY2023, the EM&V team found the project documentation was as robust as last year, with very few additional data requests to the implementer needed throughout the year.

The project proposals include various details; however, the EM&V team would recommend adding other key parameters captured at the site used for savings calculations—these include *building type* and *heating and cooling space types*.

BY2023 saw continual documentation consistency for the make and model of all *lighting* products. DLC and ENERGY STAR certification sheets were included for all but one sampled *lighting* project. Manufacturer's specification sheets, however, were not included for any *lighting* projects. Manufacturers' specification sheets are essential for *LED exit signs* because DLC or ENERGY STAR certification sheets are not available for these types of lights. As *lighting* measures contribute a significant portion of the program savings, documents that support key variables that are drivers of *lighting* measure savings include the post-installation *lighting* wattage. Having manufacturer's specification sheets would increase clarity between similar *lighting* types that may differ by color temperature, voltage, and other features that can impact the equipment's qualification and fixture input wattage.

Work orders or post-inspection forms were provided for all 21 *lighting* projects sampled, which allowed for easy verification of post-quantities and model numbers. Verification of baseline quantities and *lighting* model numbers was limited in cases where work orders and pre-inspection forms were not provided.

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10.5 OVERALL SAVINGS ESTIMATES

The ArchEE tracking system was the primary tool for checking claimed savings and performing evaluation savings calculations across a participant census. The tracking system contained the key assumptions and parameters necessary for calculating measure savings. After performing evaluation savings calculations across all measures claimed by the SBS program, the EM&V team found discrepancies in some measure categories. Those discrepancies that had the most considerable impact on program savings were discrepancies found during the tracking system data review and project-level engineering reviews for *lighting* measures, as detailed above.

The EM&V team calculated savings across the program measures based on the tracking data review and desk review results. The SBS' evaluated energy and demand savings were lower than reported savings for energy savings (92.9 percent kilowatt-hour realization rate) and for demand savings (87.5 percent kilowatt realization rate). The evaluated savings were based on the results of savings calculations and adjustments made across the tracking system and supplemented by the results of the 25 sampled accounts, as discussed above. *Tune-up* measure savings were based on the results of the tracking system review.

The main drivers of the realization rates were adjustments to *lighting* projects during the desk review and on-site review process. The most significant adjustment was for a *lighting* project that used the *retrofit lighting methodology,* even though the project involved a major renovation. The sources of *other lighting* adjustments included *space conditioning type*, *building type*, and *wattage adjustments* related to the new federal standard for GSLs installed after July 1, 2023.

Table 151 shows that *lighting* measures had the most considerable variances and contributed the largest portion of program savings. Overall, these findings resulted in the most significant impacts on changes in kilowatt-hour and kilowatt for the program.

Table 151. Small Business Solutions—Final Evaluated Energy Savings and Realization Rates by Measure Strata

Strata	Ex-ante savings		Ex-post savings		Realization rate		Data source
	kW	kWh	kW	kWh	kW	kWh	
Lighting - high	570	2,984,451	407	2,441,229	71.3%	81.8%	Desk reviews and site visits
Lighting - medium	415	2,643,780	380	2,517,519	91.4%	95.2%	Desk reviews and site visits
Lighting - low	530	2,636,733	513	2,601,579	96.8%	98.7%	Desk reviews and site visits
Other	48	947,063	49	948,662	100.3%	100.2%	Desk reviews and site visits
Tune-ups	159	722,551	159	716,516	100.1%	99.2%	Tracking system review
Total	**1,723**	**9,934,578**	**1,507**	**9,225,505**	**87.5%**	**92.9%**	

10.6 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

EAL worked with the implementer CLEAResult to develop a quality management process for all EAL commercial programs. This process can be used for projects with or without a trade ally. No changes were made to this procedure in BY2023.

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For trade-ally projects, CLEAResult emphasizes trade ally training to remind trade allies of program processes, technical requirements for measures, application requirements, and awareness of the QC process. QC protocols include clear pass/fail thresholds for addressing trade ally performance. During the post-inspection of any project (trade-ally-driven or not), the fail condition results if the work scope is significantly incomplete, the efficient measures are found to be ineligible, or there are safety or code issues with the installation. A failed project causes the trade ally to be removed from the reduced inspection rate list that the program maintains and is put under probationary status. Once a trade ally is removed, that contractor must complete five consecutive projects without "failures" to be returned to the reduced inspection rate list. For a trade ally to qualify for the reduced inspection rate, they must complete five consecutive projects without a failure as determined by the program implementer.

Customers must sign a customer agreement to be eligible for the program; as part of this agreement, the customer is willing to allow a field inspector to perform a QC inspection. These inspections could happen to any project regardless of scope. An inspection form was developed to perform standardized and consistent inspections to ensure the equipment on-site is being documented properly.

Below are the steps that are followed during the QA/QC process, as outlined in the Quality Control and Assurance Process Manual:

- enrollment and customer verification,
- project documentation and completeness review,
- pre-engineering QC and approval,
- pre-installation inspection,
- pre-installation inspection corrections—trade-ally-driven projects,
- post-installation QC,
- post-installation inspection,
- post-installation inspection corrections—trade-ally-driven projects,
- post-engineering approval, and
- post-project review and closeout.

For all projects, the QA/QC process begins with verification that customers are eligible for participation in the program. Next, project documentation (including contact information, the signed proposal, W-9 forms, and pre-installation photos) is verified to be complete. Following the documentation check, the engineering team at CLEAResult checks to ensure that the project installs eligible equipment, and that savings parameters and calculations are accurate. For QA, the program staff also conducts reviews of each incentive application. After the engineering QC check, proposals that do not pass all review aspects are rejected and sent back for completion.

The next stage in the QA/QC process occurs during the pre-installation inspection stage, where pre-installation inspections are conducted to confirm pre-installation conditions. These inspections are completed for 100 percent of custom projects and the largest (approximately 10 percent) trade-ally projects identified by kilowatt-hour savings. For the SBS program, larger

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projects are defined as those with savings estimated at over 60,000 kWh. Inspections are also completed for all *prescriptive* projects submitted by a non-trade ally or submitted by a trade ally under probation. A minimum of ten percent of all other projects under 60,000 kWh are also inspected. Trade allies not under probationary status must have at least ten percent of their total project quantities pre- or post-inspected. Any findings during the pre-inspection stage are returned to the trade ally to make corrections before the project may proceed.

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11.0 PUBLIC INSTITUTIONS SOLUTIONS

The Public Institutions Solutions (PIS) program offers commercial customers cash and non-cash incentives for energy efficiency improvements. The program targets governments, government-owned institutions, and public-private education entities. Through technical assistance in energy performance benchmarking; energy master planning; and identifying, assessing, and implementing energy efficiency technologies, the program educates and assists customers in integrating energy efficiency into their short- and long-term planning, budgeting, and operational practices. This program was named CitySmart before program year (PY) 2020 (PY2020).

Program participants are consulted about the available offerings and financial incentives for eligible efficiency measures installed in their facilities using a network of trade allies. Trade allies are responsible for analyzing customers' energy use, identifying energy efficiency improvement projects, and installing the recommended measures. The program offers *direct-install*, *prescriptive*, and *custom* measures, which require measurement and verification (M&V). The incentive levels vary by the number of installed measures.

The program benchmarks customers' energy use through hands-on expertise and consulting and identifies a roadmap to success. Customers are given guidance throughout their experience in the program. The PIS program is designed to minimize the following market barriers to energy efficiency implementation for Entergy Arkansas, LLC's (EAL) PIS customers:

- budget constraints,
- lack of understanding of project financials, and
- lack of awareness of energy-efficient technologies.

The program is implemented by EAL and CLEAResult, who provide recruitment, marketing, outreach, and training to trade allies. On behalf of EAL, CLEAResult performs energy assessments, directly installs measures (e.g., *light-emitting diodes* (*LED*), *low-flow faucet aerators*, *pre-rinse spray valves*, *weather stripping*), conducts pre- and post-implementation inspections, maintains the program quality assurance/quality control (QA/QC) standards, and administers the incentive process—including program tracking—directly with participating trade allies.

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team conducted a tracking system review for all measures, a separate database review for *tune-up* measures, desk reviews on a randomly selected sample of 30 projects, 15 site visits, and a review of program documentation.

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Table 152. Public Institutions Solutions Program—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[96]
Prior research	Program staff interviews (2) Materials review	Census	30	15	8

11.1 KEY FINDINGS

Based on the bridge year (BY) 2023 (BY2023) program tracking data, the PIS program incentivized energy efficiency measures to 216 unique participants[97] through 29 trade allies. Table 153 provides the program's claimed savings by measure category, where the most considerable amount of claimed participants (47 percent) and savings (40 percent) were attributable to *lighting and lighting—new construction* measures. Another considerable measure in terms of participation was *continuous energy improvement (CEI)*, with 24 percent of participants and 28 percent of energy savings.

Table 153. Public Institutions Solutions Program—Reported Participation and Savings[98]

Measure category	Trade allies	Participants[99]	Projects[99]	Program savings (kWh)	Percentage of program savings (kWh)
Custom—CEI[100]	0	53	95	4,858,626	28.1%
Custom—HVAC	6	6	7	550,913	3.2%
Custom—other	2	2	2	50,390	0.3%
Domestic hot water[100]	0	1	1	1,334	<0.1%
Envelope[100]	0	5	5	173,374	2.3%
HVAC	11	16	16	330,775	1.9%
Lighting	13	96	103	6,481,428	37.5%
Lighting-New Construction	5	5	6	473,254	2.7%
Tune-ups	5	51	977	4,136,858	23.9%
Total	**29**	**216**	**1,202**	**17,057,952**	**100%**

[96] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site M&V.
[97] A unique participant is based on a single utility account number.
[98] ArchEE extract dated January 03, 2024.
[99] A participant may install measures across multiple measure categories or multiple projects. Thus, the total count of participants and projects may not equal the sum of individual rows by measure category.
[100] The implementer directly installed or implemented all measures.

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In BY2023, the PIS program reported 17,058 MWh in gross energy savings and 3.2 MW in gross demand savings. Table 154 below shows the reported and evaluated savings across the program. The program fell short of achieving its planned energy and demand savings goals, reaching 68 percent of the annual energy and 54 percent of the annual demand savings goals.

Table 154. Public Institutions Solutions Program—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio*	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	17,058	16,930	99.3%	99.4%	16,833	5.9%
Demand savings (MW)	3.2	3.2	100.4%	99.5%	3.2	3.6%

* NTG ratios displayed in the table are weighted based on the evaluated net savings results. The NTG ratios used at the measure level are 0.98 for the *tune-up* and *commercial Wi-Fi thermostats*, and 1.0 for everything else.

Table 155. Public Institutions Solutions Program—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	24,661	16,833	68.3%
Demand savings (MW)	5.9	3.2	53.8%

The PIS program's evaluated energy savings were slightly lower than the reported (99.3 percent kilowatt-hour realization rate) and the evaluated demand savings were slightly higher than the reported savings (100.4 percent kilowatt realization rate). The evaluated savings are based on the results of savings calculations and adjustments made across the results of the 30 sampled accounts for desk reviews and site visits. *Tune-up* measure savings were based on a comprehensive tracking system review.

In previous years, key updates to the program's tracking database were made, which improved the data's clarity and accuracy. The changes included correcting duplicate trade ally names and IDs in the tracking system and including the DesignLights Consortium (DLC) or ENERGY STAR® product IDs for all products sold through the program. The recommendations presented below for BY2023 focus on further improving data accuracy and consistency.

NTG research was conducted in PY2022 for PIS program and *tune-up* measures. The evaluation researched NTG ratio is 100 percent for the *non-tune-up* portion of the program. Segmented by whether the measures were tune-ups, the *tune-up* measures NTG ratio is 97.6 percent for kilowatt-hours and kilowatts while the *non-tune up* NTG ratio is 100.0 percent.

11.2 RECOMMENDATIONS

The EM&V team has identified five recommendations for consideration by EAL (Table 156), which primarily focus on improving the realization rate in the following program year and increasing the transparency, accuracy, and evaluability of program savings in the future for the PIS program.

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Table 156. Public Institutions Solutions Program—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Continue discussions with the EM&V team and Independent Evaluation Monitor (IEM) on the sources of, and uses for, weather data in *continuous energy improvement* (*CEI*) and *custom* projects.	The EM&V team made multiple adjustments to projects related to weather data. Various projects within *CEI* used weather data that differed from publicly available sources. The EM&V team used a common approach for evaluating these projects, which was to use actual weather observations from the nearest airport through Weather Spark.[101] The EM&V team also noted that some projects using regression and normalization used weather data at specific locations and normalized against the climate zone reference location. In the case of a location like Searcy, this can lead to a location-based bias in the results where the weather data averages four degrees warmer than Little Rock. The EM&V team conducted regression and normalization for these projects at the same location. From examining individual projects, the EM&V team calculated savings adjustments of two to six percent from these approaches.
	Recommendation 2: Increase the review of the statistical results on regression coefficients for projects.	The EM&V team found several projects where the regression formulas derived from metered data had a higher R-squared when using a different balance point. The implementer noted a mid-year change in the software they use for analyzing metered data, so hopefully, this finding will be reduced in the future. Overall, these adjustments were minor to savings.
	Recommendation 3: Increase quality assurance/quality control (QA/QC) on certified/non-certified lights for *lighting retrofit* projects.	During the desk review, the EM&V team found one *lighting retrofit* project where a number of the installed lights were ENERGY STAR-certified and not claimed in the savings. For another project, some lights were not certified, and that resulted in a reduction in energy and demand savings. The EM&V team recommends more careful QA/QC procedures for the *lighting retrofit* reports to limit future data errors of these types.
	Recommendation 4: Increase QA/QC on baseline lighting fixture types and quantities.	The EM&V team found instances of *lighting retrofit* projects where the reported baseline quantities did not match what was documented in inspection forms and photos. In one project, *fluorescent tubes* were counted as missing in one area, while additional tubes were added to another.

[101] https://weatherspark.com/

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Type	Recommendation	Key finding
		The EM&V team recommends more careful QA/QC of baseline assumptions to ensure that they align with photo and inspection form documentation.
BY2023 process recommendations	**Recommendation 5:** Discuss potential opportunities to focus additional outreach efforts and program offerings to non-profit organizations serving hard-to-reach segments in EAL's territory.	As discussed in the Key Findings and Recommendations, 20 percent of EAL's portfolio reaches hard-to-reach segments. The PIS program presents another opportunity to support non-profits and other organizations working in hard-to-reach customer segments. EAL and the implementer report exploring a "mission-oriented" program component in the next program cycle.

Table 157. Public Institutions Solutions Program—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Work collaboratively with the EM&V team to revise the *CEI* M&V Plan to address peak demand concerns. ○ In progress. The implementer continued to use the demand analysis method for most projects in BY2023, an area where smart-meter data could help refine demand impacts in the future.
	• Collect detailed annual operating hours (AOH) documentation to support *custom AOH* values for non-deemed *lighting* projects. ○ Complete.
PY2020 process recommendations	• Increase QA/QC efforts of the *tune-up* measure database to ensure savings are being calculated correctly and for the appropriate equipment type. ○ Complete. BY2023 had fewer data consistency issues than previous evaluations.
PY2021 impact recommendations	• Review savings algorithms for *commercial Wi-Fi thermostat* measures to ensure consistency. ○ Complete. In BY2023, *commercial Wi-Fi thermostats* did not have adjustments for installed unit types that were observed in previous years.
PY2021 process recommendations	• Increase QA/QC of data recorded from *direct-install* projects and entered into ArchEE for savings to improve consistency. ○ In progress. PY2022 noted data consistency issues had continued. There were no process evaluation activities in BY2023 to confirm the status of this recommendation.
PY2022 impact recommendations	• Review savings algorithms for *commercial Wi-Fi thermostat* measures to ensure consistency. ○ Complete. In BY2023, *commercial Wi-Fi thermostats* did not have adjustments for installed unit types that were observed in previous years.

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Status of prior year recommendations	
	• Increase QA/QC on certified/non-certified lights for *lighting retrofit* projects. ○ Complete. BY2023 had fewer data consistency issues than previous evaluations.
	• Increase QA/QC on square footage and perimeter estimates for *lighting—new construction* projects. ○ Complete
PY2022 process recommendations	• Review incentive levels related to daycares and nonprofit organizations. ○ In progress. There were no process evaluation activities in BY2023 to confirm the status of this recommendation.
	• Review the time trade allies wait to receive the incentive checks. ○ In progress. There were no process evaluation activities in BY2023 to confirm the status of this recommendation.
	• Improve communication and responsiveness to customer and trade ally questions. ○ In progress. There were no process evaluation activities in BY2023 to confirm the status of this recommendation.

11.3 METHODOLOGY

This section summarizes the methodologies used for the evaluation of the PIS program.

11.3.1 Impact Evaluation

The evaluated savings results were based on calculations and adjustments made during the tracking system review, *tune-up* measure review, 30 engineering desk reviews, and 15 site visits. Savings adjustments were made at the project level. Final evaluated savings for the *tune-up* measures were based on adjustments made during the tracking system review. All other measures' evaluated savings results were based on desk review and site-visit level adjustments by sampled strata. The tracking system informed qualitative findings and served as a guide for potential issues for investigation during desk reviews.

To perform the BY2023 impact evaluation, the EM&V team completed the following activities:

- staff interviews and ongoing discussions;
- program website review of eligible measures, incentives, and participating trade allies;
- program manual and supplemental documentation review;
- program tracking system/database reviews;
- review of the tracking system and M&V database for *tune-ups* and *commercial Wi-Fi thermostats*;
- engineering desk review of 30 sampled accounts, representing 30 individual projects; and
- on-site M&V of 15 sampled accounts that also received desk reviews.

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Table 158 shows the sample design and achieved sample sizes for the different data collection types employed for the impact evaluation effort.

Table 158. Public Institutions Solutions Program—Data Collection Efforts and Project Types

Data collection activity	Design sample	Achieved sample	Custom projects	Prescriptive projects
Staff interviews	2	2	N/A	N/A
Tracking system data review[102]	Q1–Q2 census	Q1–Q2 census	N/A	90
Engineering desk review	30	30	9	21
On-site M&V visit[103]	15	15	0	15
Tune-up measure data review	Census	Census	N/A	N/A

Most of the measures incentivized by the PIS program in BY2023 were included in Technical Reference Manual (TRM) 9.1 (TRM 9.1), Volume 2. Specific sections of TRM 9.1 associated with the savings developed for the PIS program measures are provided in Table 159. These prescriptive algorithms and assumptions were the basis of the savings methodology used by the implementer and the EM&V team for energy and demand savings analysis purposes.

Table 159. TRM 9.1 Prescriptive Algorithms Utilized by the Public Institutions Solutions Program

Measure category	TRM 9.1 section	TRM 9.1 measure name
Domestic hot water	3.3.2	Faucet aerators
	3.3.5	Low-flow showerheads
	3.7.12	Low-flow pre-rinse spray valves
Envelope	3.2.10	Commercial door air infiltration
HVAC	3.1.16	Unitary and split-system AC/HP equipment
	3.1.17	Air- or water-cooled chilling equipment (chillers)
Lighting	3.6.2	Lighting controls
	3.6.3	Lighting efficiency

Air conditioner, chiller, and heat pump tune-ups, and *overhead door weather stripping* measures were also incentivized through the PIS program. *Overhead door weather stripping* measures do not strictly adhere to TRM 9.1 but instead follow prescriptive approaches developed by CLEAResult based on the TRM algorithms for *commercial door air infiltration*. Additional project details outside ArchEE were required to evaluate the *tune-up* measures, which follow a partial M&V approach. A separate tracking system review was conducted for all *tune-up* measures

[102] ArchEE extract dated July 3, 2023. The count of *prescriptive* projects is the quantity of unique *JobId* numbers for the measure categories included in the Q1–Q2 tracking database review.
[103] On-site visits were recruited from the list of participants that received desk reviews, nesting the on-site sample within the desk review sample.

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across the three commercial programs.

Table 160. Non-TRM Prescriptive Algorithms Utilized by the Public Institutions Solutions Program

Measure category	Measure description
Tune-ups (formerly CoolSaver)	Commercial AC pre-clean
	Commercial central air conditioner (tune-up)
	Commercial heat pump (tune-up)
	Commercial HP pre-clean
	Commercial Wi-Fi thermostat
Envelope	Overhead door weather stripping

11.3.1.1 Tracking System Review

The EM&V team reviewed all tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of TRM 9.1 utilized for the tracking system review are described above in Table 159.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings. This review was completed across a census of the program measures at the end of Q2[104]. The utility's tracking database stores all the critical input variables and assumptions necessary for savings calculations. This review is conducted mid-year to help facilitate changes in the algorithm applications before the end of the year, where they might cause discrepancies in reported versus verified savings. After the measure-level review, the EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

Table 161. BY2023 Q1–Q2 Tracking System Reported Energy Savings by Measure Category

	Reported savings	
Measure	kW	kWh
Domestic hot water	0	7,715
Envelope	5	79,459
HVAC	23	108,162
Lighting	414	2,270,141
Lighting-New Construction	41	269,663

[104] Tracking data downloaded July 3, 2023.

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Measure	Reported savings	
	kW	kWh
Total evaluated	**483**	**2,735,140**
Tune-up and Wi-Fi thermostat[105]	79	369,285
Custom	240	370,413
Total	**802**	**3,474,838**

11.3.1.2 Tune-Up and Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all the *tune-up* and *commercial Wi-Fi thermostat* measures with a comprehensive tracking system review, supplemented with engineering reviews of the M&V and deemed savings methodologies. These measures were tracked in ArchEE but had supplemental data in external databases necessary for evaluation. The tracking system reviews focused on replicating individual measure savings results and determining population variances.

11.3.1.3 Desk Reviews and Site Visits

The optimal count of sample units for the *custom*, *lighting*, and *other* strata were determined based on PY2018 through PY2022 savings representations for each stratum. These savings were compared against the savings in ArchEE quarterly to determine whether there was an under- or over-representation of specific measure categories occurring compared to past years. Also, uncertainty in savings drove sampling considerations for the *lighting* stratum and *other* strata.

The sampling plan for lighting accounted for the differences between fully deemed *lighting* projects and those using custom hours of use. For the whole population, *lighting* projects were considered deemed if all measures for a project were using the deemed value for annual operating hours (AOH) that is consistent with the building type as defined in ArchEE. For projects with any measure that uses AOH that are not consistent with the building type, the entire project is considered *non-deemed*. For *lighting*, this is the classification process:

6. Projects were divided into *deemed* and *non-deemed* based on whether all measures used AOHs that matched their building type in the tracking system (deemed) or any measure deviated from that value (non-deemed).

7. The contribution of energy savings for both strata is examined. The base strategy is to oversample the non-deemed projects so that at 50 percent energy savings, twice as many non-deemed projects will be chosen. The amounts are then adjusted up or down for each program based on the actual percentage of energy savings for non-deemed compared to the whole population.

In addition to the sub-strata for *lighting* projects, three sub-strata for *custom* projects were defined. The first sub-stratum is for *CEI* projects. The other two sub-strata divide projects by

[105] *Tune-up* and *Wi-Fi thermostat* measures are evaluated through a separate tracking system and M&V data reviews at the close of the program year.

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whether they went through the *Early Engagement for High Profile Projects Protocol* (e*arly review*) or they did not (o*ther*). The contribution of savings was used to determine the number of sample points for each sub-strata, with a higher weighting for *other*, a standard weighting for *CEI*, and a lower weighting for e*arly review*. For PIS, there were no *early review* projects in BY2023.

The site visits were a nested selection of the desk reviews, meaning that all projects that received a site visit assessment also received a desk review. Projects with variances that could be cleared up during the site visit were prioritized first, with remaining site visits randomly selected from within the desk review sample. Table 162 summarizes the result of the sampling for the PIS program.

Table 162. Public Institutions Solutions—Summary of Sampled Savings

Sampling strata	Projects	Projects sampled[106]	Reported kWh	Reported kW
Custom subtotal	**104**	**12**	**1,798,768**	**493.7**
CEI	95	9	1,293,453	252.7
Other	9	3	505,315	241.0
Lighting subtotal	**109**	**14**	**1,052,097**	**170.4**
Deemed	103	12	962,545	152.4
Non-deemed	6	2	89,552	18.0
Other subtotal	**21**	**4**	**87,863**	**0.2**
Total	**225**	**30**	**2,938,728**	**664.3**

11.4 DETAILED IMPACT EVALUATION RESULTS

The PIS program's evaluated energy savings were slightly lower than the reported (99.1 percent kilowatt-hour realization rate) and the evaluated demand savings were slightly higher than the reported savings (100.4 percent kilowatt realization rate). During the desk review and site visit process, the EM&V team corrected *lighting* installed fixture types and quantities. Another finding that significantly impacted savings on many measures was adjustments to *electric resistance heat* projects in the *Wi-Fi thermostat* measures.

Corrections to *tune-up* and *Wi-Fi thermostat* projects that contributed additional energy (kilowatt-hour) savings were primarily due to:

- *electric resistance heat* projects using algorithms associated with *heat pump* units.

Corrections to *lighting* projects that contributed additional savings were primarily due to:

- fixtures installed that were DLC- or ENERGY STAR-certified but not claimed; and
- adjustments to the baseline lighting fixtures quantity.

[106] Two sampled projects had measures in multiple categories.

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Corrections to *lighting* projects that contributed reduced savings were primarily due to:

- fixtures installed that were not DLC- or ENERGY STAR-certified but claimed; and
- adjustments to the baseline lighting fixtures quantity.

Corrections to *custom* projects that contributed reduced savings were primarily due to:

- adjustment of the coincidence factor (CF) for one project to match the TRM 9.1 numbers for the building type; and
- adjustments to the outside air-entering-temperature for *custom energy recovery ventilator (ERV) energy* measure calculations to match the temperature provided in the documentation for one project.

Corrections to *other* projects that contributed additional savings were primarily due to:

- adjustments to the cooling capacities and full- and part-load efficiency for the HVAC units to match the AHRI certificates.

Corrections to *other* projects that contributed reduced savings were primarily due to:

- updating the weather zone selection in the calculation for one project to match the project location weather zone.

Several different measures were provided to participants through the program. Within the tracking system, qualifying products were assigned to unique measure names. The mapping of these measure names to measure categories is provided below.

Table 163. Mapping to Measure Category

Measure description	Measure category
Continuous energy improvement	Custom - CEI
Custom - heating and cooling	Custom HVAC
Custom - non-heating and cooling	Custom other
Variable frequency drives	Custom other
Faucet aerators	Domestic hot water
Commercial door air infiltration	Envelope
Overhead door weather stripping	Envelope
Unitary AC equipment - unitary AC < 65000 Btuh - Replace on burnout	HVAC
Unitary AC equipment - unitary AC => 65000 Btuh - replace on burnout	HVAC
Unitary HP equipment - heat pump < 65000 Btuh - replace on burnout	HVAC
Unitary HP equipment - heat pump => 65000 Btuh - replace on burnout	HVAC
Water chilling equipment (air cooled) - replace on burnout	HVAC
Halogens	Lighting

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Measure description	Measure category
HIDs	Lighting
Integrated-ballast compact fluorescent lamps (CFL)	Lighting
Integrated-ballast LED lamps	Lighting
LEDs	Lighting
Lighting controls	Lighting
Magnetic ballast T5 or premium T8 retrofit of T12	Lighting
Modular CFLs and CCFLs	Lighting
Other linear fluorescents	Lighting
Outdoor-halogens	Lighting
Outdoor-HIDs	Lighting
Outdoor-integrated-ballast LED lamps	Lighting
Outdoor-LEDs	Lighting
NC-halogens	Lighting-new construction
NC-interior project savings	Lighting-new construction
NC-LEDs	Lighting-new construction
NC-lighting controls	Lighting-new construction
Outdoor-NC-LEDs	Lighting-new construction
Outdoor-NC-lighting project savings	Lighting-new construction
Commercial AC pre-clean	Tune-up
Commercial central air conditioner (tune-up)	Tune-up
Commercial heat pump (tune-up)	Tune-up
Commercial HP pre-clean	Tune-up
Commercial Wi-Fi thermostat	Tune-up

Table 164 below outlines the claimed number of program participants and the percentage of savings by measure category in BY2023. *Lighting* was the dominant measure category in BY2023, accounting for 39 percent of claimed demand (kilowatt) savings and 41 percent of claimed energy use (kilowatt-hours) savings.

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Table 164. BY2023 Reported Public Institutions Solutions Participation and Savings by Measure Category

Measure category	Participants[107]	Projects[11]	Program savings		Percentage of program savings	
			kW	kWh	kW	kWh
Custom—CEI	53	95	974.7	4,858,626	31%	28%
Custom—HVAC	6	7	299.4	550,913	9%	3%
Custom—other	2	2	8.8	50,390	<1%	<1%
Domestic hot water	1	1	0.3	1,334	<1%	<1%
Envelope	5	5	7.3	174,374	<1%	1%
HVAC	16	16	20.0	330,775	1%	2%
Lighting	96	103	1,183.9	6,481,428	37%	38%
Lighting-New Construction	5	6	53.7	473,254	2%	3%
Tune-ups	51	977	632.0	4,136,858	20%	24%
Total	**216**	**1,202**	**3,180.1**	**17,057,952**	**100%**	**100%**

Table 165 outlines the savings and percentage of savings by measure in BY2023. *LEDs* were the dominant measure in BY2023 and accounted for 35 percent of claimed gross kilowatt savings and 32 percent of claimed gross kilowatt-hour savings. *CEI* was the second most dominant measure in BY2023, accounting for 31 percent of claimed gross kilowatt savings and 28 percent of claimed gross kilowatt-hour savings. *Commercial Wi-Fi thermostats* was the third most dominant measure with 22 percent of the kilowatt-hour savings and 13 percent of the program kilowatt savings.

Table 165. BY2023 Reported Public Institutions Solutions Program—Participation and Savings by Measure

Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Custom—CEI				
Continuous energy improvement	974.7	4,858,626	31%	28%
Custom—HVAC				
Custom—heating and cooling	299.4	550,913	9%	3%

[107] A participant is a unique account described by the ArchEE data field *Account Number*. A project is a unique job number defined by the ArchEE data field *JobId*. A participant may install measures across multiple measure categories and multiple projects. As a result, the total count of participants and projects may not equal the sum of the counts by measure category.

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Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Custom—other				
Custom—non-heating and cooling	6.7	35,776	<1%	<1%
Variable frequency drives	2.1	14,615	<1%	<1%
Domestic hot water				
Faucet aerators	<1	1,334	<1%	<1%
Envelope				
Commercial door air infiltration	3.1	84,939	<1%	<1%
Overhead door weather stripping	4.2	89,435	<1%	1%
HVAC				
Unitary AC equipment - unitary AC < 65000 Btuh - replace on burnout	3.7	3,393	<1%	<1%
Unitary AC equipment - unitary AC => 65000 Btuh - replace on burnout	2.1	108,432	<1%	1%
Unitary HP equipment - heat pump < 65000 Btuh - replace on burnout	-1.0	5,626	<1%	<1%
Unitary HP equipment - heat pump => 65000 Btuh - replace on burnout	1.9	44,765	<1%	<1%
Water chilling equipment (air cooled) - replace on burnout	13.3	168,560	<1%	1%
Lighting[108]				
Halogens	<1	366	<1%	<1%
HIDs	0	0	0%	0%
Integrated-ballast compact fluorescent lamps (CFL)	<1	127	<1%	<1%
Integrated-ballast LED lamps	32.4	151,274	1%	1%
LEDs	1,115.8	5,413,248	35%	32%
Lighting controls	35.5	110,529	1%	1%
Magnetic ballast T5 or premium T8 retrofit of T12	<1	334	<1%	<1%
Modular CFLs and CCFLs	<1	106	<1%	<1%
Other linear fluorescents	<1	406	<1%	<1%
Outdoor-halogens	0	0	0%	0%
Outdoor-HIDs	0	0	0%	0%

[108] Some measures were identified in the tracking system data with no savings; these represent *lighting* included in site lighting inventories but not incented by the program.

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Measure	Program savings		Percentage of program savings	
	kW	kWh	kW	kWh
Outdoor-integrated-ballast LED lamps	0	83,732	0%	<1%
Outdoor-LEDs	0	721,306	0%	4%
Lighting-new construction[12]				
NC-halogens	0	0	0%	0%
NC-interior project savings	51.9	262,776	2%	2%
NC-LEDs	0	0	0%	0%
NC-lighting controls	1.9	5,438	<1%	<1%
Outdoor-NC-LEDs	0	0	0%	0%
Outdoor-NC-lighting project savings	0	205,040	0%	1%
Tune-ups				
Commercial AC pre clean	30.9	54,085	1%	<1%
Commercial central air conditioner (tune-up)	178.8	348,384	6%	2%
Commercial heat pump (tune-up)	8.6	31,588	<1%	<1%
Commercial HP pre clean	<1	1,540	<1%	<1%
Commercial Wi-Fi thermostat	413.3	3,701,261	13%	22%
Total	**3,180.1**	**17,057,952**	**100%**	**100%**

Table 166 shows the incentive structure for BY2023 compared to the previous program year. The incentives for all tiers of measures stayed the same.

Table 166. BY2023 Public Institutions Solutions Program Incentives

Measure	PY2022 incentive*	BY2023 incentive*
Directly Installed by CLEAResult		
Domestic hot water		
Commercial showerheads	Full cost	Full cost
Faucet aerators	Full cost	Full cost
Pre-rinse spray valves	Full cost	Full cost
Envelope		
Commercial door air infiltration (i.e., weather stripping)	Full cost	Full cost
Lighting		
Integrated-ballast LED lamps	Full cost	Full cost
Outdoor—integrated-ballast LED lamps	Full cost	Full cost
Installed by trade ally		

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Measure			PY2022 incentive*	BY2023 incentive*
PC power management			$0.10/kWh	$0.10/kWh
Gaskets and strip curtains			100 percent, contact program staff	100 percent, contact program staff
All other measures**	1 measure	2 measures	3 measures	4+ measures
PY2022 incentive*	$0.12/kWh	$0.13/kWh	$0.14/kWh	$0.15/kWh
BY2023 incentive*	$0.12/kWh	$0.13/kWh	$0.14/kWh	$0.15/kWh

* Source: PY2022 Program Manual CitySmart Manual.

** To qualify for an additional tier, an energy efficiency measure must exceed 25,000 kWh of savings. Measures can be grouped to meet the 25,000 kWh minimum threshold, but only one such grouping is allowed per customer. *Direct-install* measures only count as one measure tier.

11.4.1 Program Documentation and Tracking Data Review

To understand the PIS program, the EM&V team interviewed program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- ArchEE data tracking system extract containing BY2023 participant information and savings;
- supplemental project-level documentation received during quarterly data requests for sampled accounts, which typically included:
  - signed customer proposals and project agreements—sometimes files included initial and final proposals if projects had changed during development;
  - customer proposals that typically included a detailed inventory of site-captured measure-level details such as:
    - *Domestic hot water* measures (e.g., *low-flow faucet aerators*, *commercial showerheads*, and *low-flow showerheads*) were all directly installed by the implementer. A Direct Install Report typically inventoried the device and quantity installed by room. Additional notes typically included a flow rate as the new equipment may be multiple flow rates (e.g., 0.5 gallons per minute (GPM), 1.0 GPM). Also, photo documentation of the water heater and its nameplate was provided. Details of the exact installed equipment flow rates were not included, and a specification of the new equipment was not provided.
    - The implementer directly installed *commercial door air infiltration* measures (e.g., *weather stripping, door sealing*). A Direct Install Report typically inventoried the device, quantity (by gap size), and new weather stripping length installed by room. Additional notes typically included the gap size as the new equipment may have been multiple widths (e.g., one-eighth inch, one-quarter inch) and the type (e.g., *weather stripping*, *door sweep*). Also, photo documentation of a sample of doors with the existing

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condition and gap noted by a view of a tape measure was provided. A clear description or documentation of the *HVAC type* was not included.

- *HVAC* measures included new equipment type, make and model numbers, capacity, and quantity. Manufacturers' specification sheets and Air Conditioning, Heating and Refrigeration Institute (AHRI) certificates were also provided.
- *Lighting* and *lighting controls* measures included existing and new fixture types, make and model numbers, wattages, quantity, and control type. Also, DLC and ENERGY STAR certification sheets were typically provided for all models. Manufacturer specification sheets were generally not provided.

- invoices;
- pre- or post-inspection forms indicating field inspectors' notes and results;
- photographic documentation pre- or post-installation;

- a Quality Control and Assurance Manual for EAL commercial programs, dated February 1, 2023; and
- the PY2022 Program Manual for the PIS program obtained from the EAL website, which was verified to be in use for BY2023.

11.4.2 Detailed Tracking System/Database Review

The EM&V team reviewed all program-claimed tracking data to assess the extent to which it provided the key input parameters needed for TRM 9.1-based algorithms and the final claimed values necessary for each measure. The tracking system data review began using TRM 9.1 as a reference in our review of measure-level savings assumptions. Chapters of TRM 9.1 utilized for the tracking system review are described above in Section 11.3.1.

The EM&V team reviewed the tracking systems linkage to the TRM 9.1 deemed savings algorithms used to estimate savings; this review was completed across a census of the program measures. The utility's tracking database stores all the critical input variables and assumptions necessary for savings calculations. The EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy after the measure-level review.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified whether the savings estimates in the tracking system were consistent with the savings outlined in TRM 9.1 used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

The ArchEE tracking system, which supplied all participant- and measure-level data, was the primary tool for checking claimed savings and performing evaluation savings calculations. These results were informed and supplemented with the findings from the engineering desk reviews and site visits, as further outlined in Section 11.4.6.

The overall PIS program evaluated tracking system savings resulted in slightly higher savings (102.0 percent kilowatt and 100.0 percent kilowatt-hour realization rates) than those calculated by the program implementer. The evaluated savings were based on adjustments made from completing engineering reviews of the program's tracking data. The overall realization rates

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were affected negligibly by variances between the reported and evaluated energy savings (kilowatt-hour) for *lighting* and *domestic hot water* projects. Further details of measure-based findings are provided below.

Overall, the tracking system review found the following:

- Except for the *custom, CEI, overhead door weather stripping,* and *tune-up* measures in the PIS program, all measures utilize TRM 9.1, Volume 2 deemed algorithms. The savings equations were confirmed consistent with TRM 9.1. As described above, the *overhead door weather stripping* and *tune-up* measures follow custom approaches developed from assumptions and methodologies in the TRM. The EM&V team confirmed the *overhead door weather stripping* measures following the M&V plan through this tracking system review. A tracking system review of the *tune-up* measures was completed to inform *tune-up* evaluated savings separately from the mid-year tracking system review.
- The PIS program measures utilized TRM 9.1, Volume 2 deemed savings assumptions, with two notable exceptions. The *overhead door weather stripping* measure used extrapolated savings values based on the *commercial door air infiltration* measure in TRM 9.1. Also, some *lighting efficiency* measures used site-specific AOH instead of the deemed values in TRM 9.1 for *lighting* projects.
- The overall tracking review realization rates were 102.0 percent kilowatts and 100.0 percent kilowatt-hours, not including the *tune-up* measures. Tracking review realization rates for most measures were at 100 percent.

Table 167. BY2023 Q1–Q2 Tracking System Energy Savings and Realization Rates by Measure Category

Measure category	Claimed savings		Evaluated savings		Realization rate	
	kW	kWh	kW	kWh	kW	kWh
Domestic hot water	0	7,715	0	7,714	100%	100%
Envelope	5	79,459	5	73,045	100%	92%
HVAC	23	108,162	33	104,883	144%	97%
Lighting	414	2,270,141	413	2,270,641	100%	100%
Lighting-new construction	41	269,663	42	278,149	102%	103%
Total	**483.0**	**2,735,140**	**493.0**	**2,734,432**	**102.0%**	**100.0%**

11.4.2.1 Domestic Hot Water

- No issues were found.

11.4.2.2 Envelope

- Project number EA-0001035514 reported *Weather Zone 9* in the *WeatherZone* field. However, the address and zip code for the project show these facilities to be in *Weather Zone 7*. Reported savings used *Weather Zone 9* deemed savings values for the normal

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temperature. The EM&V team recalculated savings for this project using *Weather Zone 7* deemed values, resulting in decreased demand and energy savings.

- Project number EA-0000994391 reported savings for the *commercial door air infiltration* measure, which were found to be more than the calculated savings by the EM&V team. The reason for this discrepancy is unknown to the evaluation team.

11.4.2.3 HVAC

- Project number EA-0000803602 reported savings for replacing a *chiller* with a new one with a capacity of *193.7 tons*. The ArchEE data did not include a value for the full-load Energy Efficiency Ratio (EER), but did provide an Integrated Part-Load Values (IPLV) of *8.76 EER*. The installed unit catalog showed different values from the ArchEE: a capacity of *195.3 tons*, a full-load EER of *10.2*, and an IPLV EER of *16.1*. The EM&V team recalculated the savings for this project using the values from the installed unit catalog, which resulted in increased demand savings and decreased energy savings.

11.4.2.4 Lighting (i.e., Retrofits Including Controls and New Construction)

- EA-0000805801 had an 88.8 percent kilowatt and kilowatt-hour realization rate for *NC-interior project savings* and a 272 percent kilowatt realization rate for *outdoor-NC-lighting project savings*. The EM&V team could not identify the reason for the savings gap without the ante documentation.
- EA-0001037720 had a 112.8 percent kilowatt and kilowatt-hour realization rate for *NC-interior project savings (court level, 028),* a 98.6 percent kilowatt and kilowatt-hour realization rate for *NC-interior project savings (concourse level, 028)*, and a 131.6 percent kilowatt realization rate for *outdoor-NC-lighting project savings (ext. stairways, 128)*. The EM&V team could not identify the reason for the savings gap.

11.4.3 Tune-Up and Wi-Fi Thermostat Measurement and Verification Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review began using the TRM 9.1, the CoolSaver Program M&V Plan[109], and the Memorandum of Understanding for the review of measure-level savings assumptions. The EM&V team reviewed the tracking systems linkage to the TRM deemed savings and supplemental documentation methods used to estimate savings. The EM&V team verified energy savings calculations for engineering fundamentals, appropriateness, and accuracy after the measure-level review.

Our review accomplished three primary objectives. First, it identified any initial high-level tracking system concerns. Second, it verified that the savings estimates in the tracking system are consistent with the savings outlined in TRM 9.1, used to estimate project savings. Third, it assessed the ability of the tracking system to support future evaluation needs.

[109] The *tune-up* measure methodology was developed separately under the CoolSaver program prior to being included in the PIS program.

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The ArchEE database included the key data for all projects and reported savings for *AC* and *heat pump tune-up* and *Wi-Fi thermostat* measures, which totaled 975 measures.

As part of the BY2023 evaluation, CLEAResult provided a tracking system extract, including pre- and post-test-out projects used as the basis for CLEAResult's PY2020–PY2022 efficiency loss (EL) calculations. The EM&V team reviewed this dataset, examined it for outliers, and used it to calculate two EL values for the commercial sector: one for projects *with* a refrigerant charge adjustment and one for projects *without* a refrigerant charge adjustment. (In BY2023, separate EL factors were no longer calculated for *HVAC* units less than or greater than 25 tons).

The findings from the *tune-up* tracking system showed similar findings to last year's review. Most of the key *tune-up* measure data were maintained in a separate database outside of ArchEE. The supplemental database was required for verifying the EL values, as ArchEE did not capture all four refrigerant charge values from iManifold[110]. As recommended last year, with continuous development and changes, the EM&V team recommends developing and maintaining a data dictionary to describe the data and document changes within this database.

Finally, as with previous years, it appears that the *commercial Wi-Fi thermostat* measures still require manual input of deemed energy (kilowatt-hours/ton) and demand savings (kilowatts/ton) values. This led to many instances of human error, leading to savings deviations (described in further detail below). Automating this process in the future will allow for more effective QA/QC and reduce the likelihood of errors.

11.4.3.1 Tune-Up and Wi-Fi Thermostat Measurement and Verification Findings

The EM&V team evaluated CLEAResult's savings calculations by reviewing the M&V sample of participants to confirm the savings methodology and results obtained, repeating the steps, and making calculation adjustments.

The ArchEE tracking system supplied all participant and unit-level data, and claimed savings was the primary tool for checking reported savings and performing evaluation savings calculations.

Detailed findings from the M&V review for *tune-up* and *Wi-Fi thermostat* measures are presented below.

- Nineteen *commercial Wi-Fi thermostats* measures installed on *air conditioning with electric resistance heat* systems were using incorrect energy savings. For energy savings, reported savings were calculated as if the thermostat was installed on a *heat pump* system by including energy savings associated with the *heat pump* heating algorithms. The EM&V team adjusted the energy savings to include only the *air conditioning cooling* algorithm;; this adjustment decreased energy savings. Ten of the affected *JobIds* are listed below, with the complete list available upon request:
    - 2022-370180
    - 2022-342329
    - 2022-343843

[110] https://imanifold.com/

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  - 2022-351289
  - 2022-351288
  - 2022-371061
  - 2022-371062
  - 2022-371063
  - 2022-371082, and
  - 2022-371348

- One project (2022-336975) that was reported in ArchEE as a *commercial central air conditioning (tune-up)* was a *commercial Wi-Fi thermostat* project, according to CLEAResult. The misclassification was due to a data entry issue. The EM&V team adjusted the calculation for this project to the *Wi-Fi thermostat methodology*, but there was no impact on reported savings.

11.4.4 Engineering Desk Reviews

The EM&V team evaluated CLEAResult's savings calculations by reviewing the program tracking data and project documentation to confirm the savings methodology and results, repeating the calculation steps, and making adjustments.

The engineering desk reviews included reviewing the available project documentation in determining the source of key parameters for the deemed savings protocols from TRM 9.1. After selecting the best source of the key parameters from the available documentation, the savings were calculated based on TRM 9.1 algorithms and compared to the claimed savings.

In addition to the tracking system review, the engineering desk reviews also showed a consistent use of TRM 9.1 algorithms across all the measures claimed in the PIS program. The EM&V team made various minor adjustments to specific projects described in detail in the project review results section below.

The EM&V team completed 30 engineering desk reviews of the PIS program accounts. These projects represented all measure categories in the program, except for *tune-up* measures, and had gross savings of 2,938,728 kWh, or 17 percent of the total PIS program recorded gross savings of 17,288,936 kWh. This percentage of total program savings is based on finalized ArchEE data from January 3, 2024.

11.4.5 Site Visits

The EM&V team's evaluation plan included conducting 15 site visits to PIS program customers. These site visits also received an engineering review, as discussed above. The EM&V team's field inspector recorded the verified quantities, operation, building type, and space conditioning for each measure observed while on-site and collected additional information on critical parameters. For the PIS program, some of the key data and spot measurements obtained for essential parameters, as applicable, included:

- *domestic hot water* measures: type of service, number of installed units, and rated output of installed units;

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- *envelope* measures: length of the installed door, gap width, and heating/cooling system type;
- *HVAC* measures: quantity, building type, and make/model of installed units; and
- *lighting* measures: base/new wattage, number of lamps per fixture, lamp/fixture make/model/type, base/new control type, building type, space heating/cooling type, and AOH.

The site visits found that most parameters recorded in the project documentation to calculate savings were accurate. Out of the 15 site visits conducted, there were three adjustments. One site found that the *building type* was different than reported in the documentation. Another site visit found different *working hours* for some of the reported installed fixtures. The third site visit found *fewer fixtures retrofitted* as part of the project and not recorded in the documentation. The following section describes the adjustments from the site visits in further detail.

11.4.6 Desk Review and Site-Visit Results

As noted earlier, the BY2023 PIS program impact evaluation efforts included an engineering analysis for a sample of 30 projects and a site visit for 15 of those projects reviewed. For 13 of the projects in the sample, no savings adjustments were made. For the remaining 17 projects, the impact evaluation found various discrepancies in the project documentation or the site visit that required adjustments of parameters from the claimed savings estimates. The table below provides project-level realization rates, by measure category, for the 30 PIS projects reviewed during the evaluation. Detailed descriptions of the 17 projects with energy or demand savings adjustments follow Table 168.

Table 168. Public Institutions Solutions—BY2023 Desk Review and Site Visit Results by Project

EM&V participant ID	EM&V review type*	Ex-ante savings		Ex-post savings		Realization rate	
		kW	kWh	kW	kWh	kW	kWh
Custom—CEI							
123002	Desk review	0.1	584	0.0	0	0.0%	0.0%
123006	Desk review	0.0	20,394	0.0	20,418	N/A	100.1%
123007	Desk review	37.4	138,488	51.9	192,372	138.9%	138.9%
323001	Desk review	201.5	1,021,346	201.5	1,021,346	100.0%	100.0%
323003	Desk review	6.3	50,326	7.3	49,149	115.9%	97.7%
323005	Desk review	7.9	39,167	7.9	39,164	99.8%	100.0%
323008	Desk review	-3.9	12,815	-3.9	12,815	100.0%	100.0%
423007	Desk review	1.7	3,184	2.1	2,928	123.5%	92.0%
423008	Desk review	1.7	7,150	1.7	8,493	100.0%	118.8%
Custom—CEI total		**252.7**	**1,293,453**	**268.5**	**1,346,685**	**106.2%**	**104.1%**
Custom—other							
123008	Site visit	220.0	344,498	186.0	344,498	84.5%	100.0%

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EM&V participant ID	EM&V review type*	Ex-ante savings		Ex-post savings		Realization rate	
		kW	kWh	kW	kWh	kW	kWh
323009	Site visit	6.7	35,776	6.7	35,776	100.0%	100.0%
423001	Site visit	20.6	21,788	17.4	21,788	84.5%	100.0%
423002	Site visit	14.3	125,041	14.3	125,041	100.0%	100.0%
Custom—other total		**261.6**	**527,102**	**224.3**	**527,102**	**85.8%**	**100.0%**
Lighting—deemed							
123001	Site visit	13.8	74,145	13.8	74,145	100.0%	100.0%
223001	Site visit	3.4	19,381	3.4	15,830	100.0%	81.7%
223002	Site visit	5.5	33,740	5.5	33,740	100.0%	100.0%
223003	Desk review	14.6	69,068	14.6	69,068	100.0%	100.0%
223004	Desk review	8.4	39,488	8.4	39,488	100.0%	100.0%
323002	Site visit	11.6	67,439	11.6	67,439	100.0%	100.0%
323004	Desk review	7.7	41,488	7.7	41,488	100.0%	100.0%
323010	Site visit	19.6	94,535	19.0	91,478	96.7%	96.8%
323011	Desk review	0.6	2,555	0.6	2,555	100.0%	100.0%
423004	Desk review	0.0	86,645	0.0	86,645	N/A	100.0%
423005	Site visit	0.0	74,925	0.0	71,928	N/A	96.0%
423006	Site visit	67.2	359,136	67.1	335,999	99.9%	93.6%
Lighting—deemed total		**152.4**	**962,545**	**151.7**	**929,804**	**99.5%**	**96.6%**
Lighting—non-deemed							
123003	Desk review	14.0	71,245	14.0	71,245	99.9%	100.0%
123004	Site visit	3.9	18,306	3.9	18,306	100.0%	100.0%
Lighting—non-deemed total		**18.0**	**89,551.6**	**18.0**	**89,551.6**	**99.9%**	**100.0%**
Other							
423001	Site visit	2.7	15,607	2.8	15,802	103.8%	101.2%
223005	Site visit	1.6	27,236	1.5	20,836	95.8%	76.5%
423003	Site visit	-24.6	22,369	-24.5	22,483	99.5%	100.5%
423009	Site visit	0.0	864	0.0	876	101.2%	101.4%
Other total		**-20.4**	**66,075.6**	**-20.2**	**59,996.1**	**99.2%**	**90.8%**

The project-based savings adjustments are provided below by measure category and EM&V participant ID.

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11.4.6.1 Custom

The *custom* strata consist of custom measures that do not have a prescriptive algorithm outlined in the TRM. The projects rely heavily on metered data for analysis and follow one of the four prescribed paths for energy efficiency analysis outlined in the International Performance Measurement & Verification Protocol (IPMVP). For the PIS program, the *custom* strata included desk reviews for two *HVAC* projects, one *custom non-heating and cooling*, and nine *CEI* projects, with three site visits conducted on the non-CEI projects, with eight adjustments to savings.

- **Participant ID 123002 adjustment incorrect *calculation* type**. This project is for *CEI* at a school district. Participants receive tools, coaching, and the resources to identify and implement operations and maintenance energy savings opportunities. These savings are tracked and reported using a whole-site statistical model(s) for the *CEI* measure. The reported savings were calculated using a regression model with a cooling degree days (CDD) base of 75. The analysis compared the predicted data points to the actual data points and found that the overall magnitude of the differences was smaller than the standard error. Further, the M&V team found that using a CDD base of 70 was slightly more statistically significant, which resulted in proposed energy use that was higher than the baseline. Since the savings could not be statistically distinguished from zero, the evaluated savings were adjusted to *zero* for the energy savings.
- **Participant ID 123006 adjustment incorrect *calculation* type**. This project is for CEI at a university. Participants receive tools, coaching, and the resources to identify and implement operations and maintenance energy savings opportunities. These savings are tracked and reported using a whole-site statistical model(s) for the *CEI* measure. The reported savings used a regression model with a heating-degree-day (HDD) base of 60. The savings evaluated showed an HDD base of 55, which was slightly more statistically significant. The evaluated savings were adjusted using the WX_LIT_HDD55 weather variable, which resulted in slightly increased energy savings.
- **Participant ID 123007 adjustment incorrect *calculation* type**. This project is for *CEI* at a school district. Participants receive tools, coaching, and the resources to identify and implement operations and maintenance energy savings opportunities. These savings are tracked and reported using a whole-site statistical model(s) for the CEI measure. The reported savings used a regression model with a CDD base of 75. The savings evaluated showed that a CDD base of 80 was slightly more statistically significant. The evaluated savings were adjusted using the WX_LIT_CDD80 weather variable, which resulted in increased demand and energy savings.
- **Participant ID 123008 adjustment *input parameter*.** This project was for a school that installed four *energy recovery units (ERV)*. The CF was taken as 0.84, but the deemed CF is 0.71 for K-12 schools in the TRM 9.1. Also, in the *custom* calculation, the *outside air entering temperature* was adjusted from 10ºF to 19ºF for *high school - POU1&2* as per the unit documentation. These adjustments decreased the demand and therms savings.
- **Participant ID 323003 adjustment incorrect *calculation* type**. This project is for *CEI* at a university administration building. Participants receive tools, coaching, and the resources to identify and implement operations and maintenance energy savings opportunities. These savings are tracked and reported using a whole-site statistical

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model(s) for the *CEI* measure. The reported savings used a regression model with a CDD base of 60. The savings evaluated showed that a CDD base of 65 was slightly more statistically significant. The evaluated savings were adjusted using the *WX_LIT_CDD65* weather variable, which resulted in increased demand and energy savings.

- **Participant ID 323005 adjustment incorrect *calculation* type**. This project is for *CEI* at a high school sports complex. Participants receive tools, coaching, and the resources to identify and implement operations and maintenance energy savings opportunities. These savings are tracked and reported using a whole-site statistical model(s) for the *CEI* measure. The reported savings used a regression model with a CDD base of 70 and an HDD of 55. The savings evaluated showed that a CDD base 75 and an HDD base 70 were slightly more statistically significant. The evaluated savings were adjusted using the *WX_LIT_CDD75* and *WX_LIT_HDD70* weather variables, which resulted in slightly decreased demand and energy savings.
- **Participant IDs 423007 and 423008 calculation *methodology* and *weather data* adjustment.** These two projects were for end-of-year of CEI-reported savings on two buildings at a college. First, the weather data file was adjusted from the implementer's partially modeled data to surface-level observations at KSRC airport, with limited backfill from KLIT. Second, the evaluated savings found a slightly different regression formula for these claims that had a higher R-squared. For Participant ID 423008, these adjustments increased energy savings; for Participant ID 423007, these adjustments decreased energy savings and increased demand savings.

11.4.6.2 Other

The *other* strata consist of prescriptive *non-lighting* measures, including *HVAC replace-on-burnout*, *commercial showerheads*, *faucet aerators*, and *commercial door air infiltration* projects. Four desk reviews and site visits were conducted on this stratum, with four adjustments to savings.

- **Participant ID 223005 savings adjustment for weather data**. This project was for a county fairgrounds horticulture building that installed envelope measures, including weather strips for outside swinging and overhead doors. The weather zone of the project was adjusted from zone 9 to zone 7 for the deemed values to match the tracking system, as verified by the EM&V team. Correcting the deemed values resulted in decreased energy and demand savings.
- **Participant ID 423001 savings adjustment for incorrect efficiencies, and capacites.** This project was for a school that installed three energy recovery ventilators (ERVs) and split and package air handling units (AHUs. For the HVAC measure, a series of adjustments were made based on documentation. First, the cooling capacity for unit CU-16 was adjusted from 113,800 Btuh to 117,000 Btuh, per the AHRI certificate. Second, the post-EER for line 7 was adjusted from 12.35 to 13, as per the AHRI certificate, and the post part-load SEER from 15.2 to 16. For the ERV measure, the reported CF was 0.84, but the deemed CF for schools is 0.71. Overall, these adjustments increased energy savings and decreased demand savings.
- **Participant ID 423003 savings adjustment for incorrect efficiencies, and capacities.** This project involved a college academic building that installed various split-system air conditioning units. For the RA1648AJ1NA unit, the cooling capacity was

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adjusted from 43,000 Btuh to 43,500 Btuh, as per the AHRI certificate. Similarly, for the RA1636AJ1NA unit, the cooling capacity was adjusted from 35,800 Btuh to 35,500 Btuh, as per the AHRI certificate. Additionally, the post-EER for the RA1648AJ1NA unit was adjusted from 11.87 to 12.35, and the post part-load SEER2 from 14.34 to 14.72, as per the AHRI certificate. These adjustments resulted in increased energy savings and decreased demand savings.

- **Participant ID 423009 savings adjustment for building type**. This project was for an office building that installed two 34,400 Btuh and one 18,000 Btuh split unit. However, during the on-site inspection, it was discovered that the building was not a small office as reported, but rather a health clinic. This adjustment energy and demand savings.

11.4.6.3 Lighting—Deemed

The *lighting—deemed* strata consist of lighting projects that strictly adhere to the deemed lighting AOH and CF outlined in the TRM. The deemed lighting strata consisted of 103 projects with over 6,400 MWh of claimed savings. Twelve desk reviews and seven site visits were conducted for this stratum, with four adjustments to the claimed savings.

- **Participant ID 223001 savings adjustment for operating hours.** This project involved a fire department building that replaced its existing fluorescent, incandescent, halogen, and HID lighting with LED lighting. During the on-site inspection, it was found that the fire station is manned 24 hours a day, 365 days a year. Inventory sheet line Items 11, 15, 16, 17, 18, 19, 21, 22, 23, 25, 26, 27, and 28 are operated for two hours a day. Line Items 2, 4, 5, 6, 7, 8, 12, 13, 29, 30, 31, 32, 33, 34, 35, and 36 are operated for twelve hours a day. Line Items 1, 3, 9, 10, 14, 20, and 24 are operated 24 hours a day. Adjusting the working hours resulted in decreased energy savings.
- **Participant ID 323010 savings adjustment for nonqualified fixtures.** This project was a technology center building that replaced its existing fluorescent, Incandescent, and HID lighting with LED lighting. One fixture type in the Interior Entryway was not DLC or ENERGY STAR certified (HL-OC-20W0E26). Removing the savings for these fixtures decreased energy and demand savings.
- **Participant ID 423005 savings adjustment for installed quantities.** This project involved the city hall and police department building, which replaced its existing sidewalk high-pressure sodium lighting with LED lighting. During the on-site inspection, a discrepancy in the quantity of fixtures installed was found compared to the project documentation. The quantity for exterior 100 South Main was adjusted from 6 to 3 for both the baseline and retrofit fixtures. This adjustment resulted in reduced energy savings.
- **Participant ID 423006 savings adjustment for nonqualified fixtures and installed quantities.** This project was for a school building that replaced existing fluorescent, incandescent, halogen, and HID lighting with LED lighting. A quantity of four LED fixtures (TCP model BH-3D-4000K) were found to be certified at 16 watts. The fixtures were adjusted from the not certified to DLC certified. Another 13 fixtures are GSL replacements and remain listed as Excluded as per CR comments. Also, the pre-retrofit fixtures quantity for "High School Hallway - by principal office to exit sign" was adjusted from 20 to 21 and fixtures quantity for "High School Hallway - faculty lounge to next exit" was adjusted from 29 to 26 as per the pre-inspection form. Overall, these adjustments decreased energy and demand savings.

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11.4.6.4 Lighting—Non-Deemed

The *lighting—non-deemed* strata consisted of lighting projects with an AOH or CF tracked in the tracking system different from the deemed TRM value. These TRM value differences sometimes consist of 8,760-hour safety lighting for individual projects or custom estimated AOH for each facility area. A total of six projects were in the *non-deemed lighting* strata, which accounted for over 554 MWh of claimed savings. Two desk reviews and one site visit were conducted on this stratum with one adjustment to the claimed savings.

- **Participant ID 123003 savings adjustment for calculation error.** This project was for a classroom building on a college campus that replaced exterior metal halide lighting and interior fluorescent and compact fluorescent lighting with LED lighting. The evaluated savings for four-line items were lower than the reported savings and all four-line items involved retrofitting fixtures with existing occupancy sensor controls. The demand savings realization rate for these four measures is 84 percent.

11.4.7 Program Website and Documentation Review

To understand the PIS program, the EM&V team interviewed program staff and reviewed all information available on EAL's website related to the program and supplemental documentation provided by EAL and CLEAResult. The EM&V team received the following documentation related to the program:

- ArchEE data tracking system extract containing BY2023 participant information and savings;
- Quality Control and Assurance Manual for EAL commercial programs, dated February 1, 2023;
- PY2022 Program Manual for the Public Institutions Solutions program obtained from the EAL website; and
- *overhead door weather stripping,* and *CEI* M&V plans.

11.4.7.1 Program Website Review

Information found on the PIS program website includes a general description of the program, such as eligibility and how participation works. It also provides a list of eligible measures and their incentive discounts. Example projects at an elementary school and a wastewater facility are displayed along with the estimated energy savings, incentive amount, and utility cost savings. A copy of the program manual was easily found on the website. A search link is provided to find a participating trade ally by zip code lookup.

11.4.7.2 Program Documentation Review

The EM&V team received program-related documentation—key to understanding the program and participation processes—including the PY2022 Program Manual and Quality Control and Assurance Manual. Key documents to understanding the program savings methodologies and measuring-level savings include the project-level files, ArchEE data, TRM 9.1, supplementary deemed savings methodologies for *overhead door weather stripping*, and ongoing reviews with EAL and CLEAResult staff.

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The project details and documentation collected by EAL, the implementer, and trade allies for many sampled projects were sufficiently extensive. As bulleted in the section above, the critical baseline and new equipment assumptions—drivers of the *prescriptive* measure savings—were well described in trade ally proposals and equipment inventories. Additional documents collected at project approval support the equipment quantities and performance metrics. The documentation included invoices (support claimed quantities, equipment make, and models) and manufacturers' specification sheets (confirm equipment makes, models, sizes, types, efficiencies). These are industry-standard best practices for documentation collection, which reduce the uncertainty of the project savings assumptions and development.

The EM&V team found that documentation, in most cases, matched the data recorded in the ArchEE tracking system. Equipment type, quantities, and in most cases, building/space conditions were accurately recorded compared to the efficient technology data and project file documentation reviewed. Also, across projects, most project files contained similar documentation. Most project files had, at a minimum, the signed customer proposal and project agreement. The proposal typically included the list of *retrofit* measures, with pre- and post-conditions and equipment parameters identified. Some files included multiple copies (e.g., initial proposal, final proposal) depending on whether the scope had changed during project development. Many project files included pre- and post-inspection forms with field inspector notes indicating site results.

Many projects also included pre- and post-installation photographic documentation. Photos were included with some proposals and inspection reports, but not all. Except for *direct install* projects, all project files included invoices. All invoices were found to have measure-level cost breakdowns, which helped support and confirm project details. Documentation of site-stipulated AOH was included in project file requests for the four projects that used stipulated AOH.

In BY2023, the EM&V team found the project documentation was as robust as PY2022, the previous evaluation, and as a result, additional data requests to the implementer remained low compared to prior evaluations.

The project proposals include various details; however, the EM&V team would recommend adding other key parameters captured at the site used for savings calculations—these include *building type* and *heating and cooling space types*.

BY2023 saw an improvement in the documentation's consistency for the make and model of all *lighting* products. Model numbers were often found on the work order forms and in all invoices with itemized quantities. DLC and ENERGY STAR certification sheets were also included for most *lighting* models. However, most *lighting* projects did not include the manufacturers' specification sheets. Manufacturers' specifications sheets are essential for *LED exit signs* because DLC or ENERGY STAR certification sheets are not available for these types of lights. As *lighting* measures contribute a significant portion of the program savings, documents that support key variables that are a driver of *lighting* measure savings include the post-installation lighting wattage. Having manufacturer's specification sheets would increase clarity between similar lighting types that may differ by color temperature, voltage, and other features that can impact the equipment's qualification and fixture input wattage.

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11.5 OVERALL SAVINGS ESTIMATES

The ArchEE tracking system was the primary tool for checking claimed savings and performing evaluation savings calculations across a participant census. The tracking system contained the key assumptions and parameters necessary for calculating measure savings. After performing evaluation savings calculations across all measures claimed by the PIS program, the EM&V team found discrepancies in some measure categories. Those discrepancies that had the most considerable impact on program savings were discrepancies found during the tracking system data review and project-level engineering reviews for *tune-up* and *lighting* measures, as detailed above.

The EM&V team calculated savings across the program measures based on the tracking data review and desk review results. The overall PIS program evaluated savings resulted in lower energy savings and slightly higher demand savings than those calculated by the program implementer (99.3 percent kilowatt-hour and 100.4 percent kilowatt realization rates). The evaluated savings were based on the results of savings calculations and adjustments made across the tracking system and supplemented by the results of the 30 sampled accounts, as discussed above. *Tune-up* measure savings were based on a comprehensive tracking system review.

The overall realization rates were affected most by variances between the claimed and evaluated savings (kilowatt and kilowatt-hour) for *lighting* and *CEI* measures. For *lighting* projects adjustments were made where different fixture types or quantities were found during site inspections and visits. Another major contributor to savings adjustments was from *Wi-Fi thermostat* measures due to incorrect energy savings values used for *electric resistance heat* in reported savings.

Table 169 shows that *lighting* measures had the most significant realization rate adjustments and the most significant gross changes in energy and demand savings.

Table 169. Public Institutions Solutions Program—Final Evaluated Energy Savings and Realization Rates by Measure Strata

Strata	Ex-ante savings		Ex-post savings		Realization rate		Data source
	kW	kWh	kW	kWh	kW	kWh	
Custom—CEI	975	4,858,626	1,036	5,058,582	106.2%	104.1%	Desk reviews
Custom—other	308	601,303	264	601,303	85.8%	100.0%	Desk reviews and site visits
Lighting—deemed	1,127	6,400,338	1,122	6,182,627	99.5%	96.6%	Desk reviews and site visits
Lighting—non-deemed	110	554,343	110	554,343	99.9%	100.0%	Desk reviews and site visits
Other	28	506,484	27	459,883	99.2%	90.8%	Desk reviews and site visits
Tune-ups	632	4,136,858	632	4,073,623	100.0%	98.5%	Tracking system and M&V review
Total	**3,180**	**17,057,952**	**3,191**	**16,930,362**	**100.4%**	**99.3%**	

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11.6 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

EAL worked with the implementer CLEAResult to develop a quality management process for all EAL commercial programs. This process can be used for projects with or without a trade ally. No changes were made to this procedure in BY2023.

For trade-ally projects, CLEAResult emphasizes trade ally training to remind trade allies of program processes, technical requirements for measures, application requirements, and awareness of the QC process. QC protocols include clear pass/fail thresholds for addressing trade ally performance. During the post-inspection for any project (trade-ally-driven or not), the fail condition results if the work scope is significantly incomplete, the efficient measures are found to be ineligible, or there are safety or code issues with the installation. A failed project causes the trade ally to be removed from the reduced inspection rate list that the program maintains and is put under probationary status. Once a trade ally is removed, that contractor must complete five consecutive projects without "failures" to be returned to the reduced inspection rate list. For a trade ally to qualify for the reduced inspection rate, they must complete five consecutive projects without a failure as determined by the program implementer.

Customers must sign a customer agreement to be eligible for the program; as part of this agreement, the customer is willing to allow a field inspector to perform a QC inspection. These inspections could happen to any project regardless of scope. An inspection form was developed to perform standardized and consistent inspections to ensure the equipment is being used following the guidelines outlined in the customer agreement.

Below are the steps that are followed during the QA/QC process, as outlined in the Quality Control and Assurance Process Manual:

- enrollment and customer verification,
- project documentation and completeness review,
- pre-engineering QC and approval,
- pre-installation inspection,
- pre-installation inspection corrections—trade-ally-driven projects,
- post-installation QC,
- post-installation inspection,
- post-installation inspection corrections—trade-ally-driven projects,
- post-engineering approval, and
- post-project review and closeout.

For all projects, the QA/QC process begins with verification that customers are eligible for participation in the program. Next, project documentation (including contact information, the signed proposal, W-9 form, and pre-installation photos) is verified to be complete. Following the documentation check, the engineering team at CLEAResult checks to ensure that the project is installing eligible equipment and that savings parameters and calculations are accurate. For QA, the program staff also conducts reviews of each incentive application. After the engineering QC check, proposals that do not pass all aspects of the review are rejected and sent back for completion.

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The next stage in the QA/QC process occurs during the pre-installation inspection stage, where pre-installation inspections are conducted to confirm pre-installation conditions. These inspections are completed for 100 percent of custom projects and the largest trade-ally projects (approximately 10 percent) identified by kilowatt-hour savings. For the PIS program, larger projects are defined as those with savings estimated at over 150,000 kWh. Inspections are also completed for all *prescriptive* projects submitted by a non-trade-ally or submitted by a trade ally under probation. A minimum of ten percent of all other projects between 10,000 and 150,000 kWh are also inspected. Also, for trade allies who are not under probationary status, at least ten percent of their total project quantities submitted are pre- or post-inspected. Any findings during the pre-inspection stage are returned to the trade ally to make corrections before the project may proceed.

Following the installation of the project, a post-installation QC check is performed via a review of documentation to verify invoicing, any changes to the project, and a review of submitted photos. Any findings during this QC check are once again returned to the trade ally to make corrections before the project may proceed. An on-site inspection is then conducted following the same sampling methodology as detailed in the pre-installation inspection described above.

At the final stage of the process, a final engineering review of the post-installation notes, completeness of documentation, and post-inspection photos is performed. Project savings calculations or incentives are adjusted as appropriate. When this is complete, the project and all required documentation are submitted to EAL for approval and closeout.

As part of the PIS program evaluation activities, the EM&V team assessed the program's documentation and the 30 sampled projects used to inform the impact evaluation. The documentation included:

- program manual;
- program tracking system/database extracts;
- supplemental project-level documentation:
    - customer proposals and project agreements,
    - invoices,
    - pre-inspection form (where applicable),
    - post-inspection form (where applicable), and
    - photographic documentation (where applicable).

As noted in the prior sections, the EM&V team confirmed that the information presented in the ArchEE tracking system was mostly accurate compared to that in the project documentation. In general, the documentation provided project information that aligned with the stated QC goals, though the EM&V team found three specific areas for improvement:

1. ensure photographic documentation provided is clear and legible and include nameplate photos of *lighting* model numbers and *HVAC* units, when possible;
2. provide *lighting* specification sheets; and
3. provide work orders and/or post-inspection reports on all projects.

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12.0 AGRICULTURAL ENERGY SOLUTIONS

The Agricultural Energy Solutions (AES) program offers farmers and agricultural customers the opportunity to make their property more efficient by offering farm audits, incentives for energy efficiency improvements, and education of agricultural equipment suppliers. The AES program aims to produce long-term, cost-effective electric savings for agribusinesses by installing energy efficiency measures and replacing aging, inefficient equipment. The program is available—on an agricultural commercial or industrial rate schedule—to all nonresidential Entergy Arkansas, LLC agribusiness customers, including various poultry, dairy, cattle, swine, delta/row crops, aquaculture, and horticulture facilities.

Incentives are available for agricultural customers to install energy efficiency equipment when building a new facility or replace aging, inefficient equipment. The program offers incentives for *custom* projects; *custom* is a comprehensive and customized approach for farmers who have energy efficiency needs. In some cases, *custom* measures use a combination of site-specific parameters as well as methodologies outlined in Arkansas Technical Reference Manual 9.1.

The program uses a streamlined process designed to overcome barriers to implementing energy efficiency projects. These barriers include:

- lack of customer awareness of energy efficiency technologies, benefits, and project payback;
- limited resources to identify energy efficiency opportunities;
- limited access to financial capital;
- absence of tools to quantify energy savings; and
- limited availability of energy efficiency technologies.

In bridge year 2023, six customers participated in the AES program, with two horticulture participants making up over 75 percent of the reported energy savings. In support of the impact evaluation, the evaluation, measurement, and verification team conducted desk reviews and on-site measurement and verification for two projects. Due to the limited participation, the EM&V team adjusted the sampling plan from ten desk reviews to two desk reviews. The sampled projects make up over 50 percent of the reported energy savings.

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Table 170. Agricultural Energy Solutions—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[111]
PY2022 EM&V research—participant surveys	Program staff interviews (2) Materials review	Census	2	2 (ride alongs)	None

12.1 KEY FINDINGS

Based on the BY2023 program tracking data,[112] the AES program reported implementing 1,752 *lighting* measures and 29 *lighting control* measures for six unique participants. Table 171 provides the program's participation and reported savings by measure category. In BY2023, *new construction lighting* projects provided the most savings for the program, similar to PY2022.

Table 171. Agricultural Energy Solutions—Reported Participation, Measures, and Savings

Measure category	Participants	Measures (quantity)	Reported program savings (kWh)	Percentage of program savings (kWh)
Custom—new construction	4	1,724	3,545,515	68.2%
Custom—retrofit	3	28	31,810	0.6%
Custom—non-lighting	1	29	1,621,276	31.2%
Grand total	**6**	**1,781**	**5,198,600**	**100.0%**

In BY2023, the AES program achieved 5,163 megawatt-hours in gross energy savings and 1.9 megawatts in gross demand savings, as shown in the table below. The AES program's evaluated savings resulted in slightly lower than reported energy savings and demand savings, resulting in realization rates of 99.3 percent and 99.9 percent for energy and demand savings, respectively. The program far exceeded the demand goals, achieving 214.4 percent of demand goals. However, the program achieved 85.2 percent of energy goals.

Table 172. Agricultural Energy Solutions—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	5,199	5,163	99.3%	99%	5,111	1.8%
Demand savings (MW)	2.0	1.9	99.9%	99%	1.9	2.2%

[111] This column refers to EAL customer meter data provided to the EM&V team instead of primary metered data collected as part of the on-site M&V.
[112] The tracking system data extract is from January 4, 2024.

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Table 173. Agricultural Energy Solutions—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	5,998	5,111	85.2%
Demand savings (MW)	0.9	1.9	214.4%

12.2 RECOMMENDATIONS

The EM&V team has identified five key findings and recommendations through the evaluation process for consideration by EAL.

Table 174. Agricultural Energy Solutions—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Continue to work collaboratively with the EM&V team and seek review of large or unique *custom* projects.	Engaging the EM&V team early in the project timeline provides the opportunity to agree on calculation approaches, assumptions, and data collection needs for projects. This process has worked particularly well in developing assumptions and calculation methodology for large horticulture projects, which can be complex and unique, but would also be beneficial for poultry projects.
	Recommendation 2: Collect photo documentation on-site when able.	For one project, additional documentation, such as photos of the exterior, would have helped verify an appropriate baseline.
	Recommendation 3: Limit *lighting* eligibility to ENERGY STAR®-, DesignLights Consortium (DLC)-, or Consortium for Energy Efficiency (CEE)- certified lamps, except in cases where the *lighting* is designed and used for animals.	The EM&V team found one non-compliant lamp model that was used in applications outside of animal use. The TRM specifies all *CFL* and *LED* products must be pre-qualified under ENERGY STAR, DLC, or CEE to be eligible, except when the fixture is designed for animal use.
	Recommendation 4: Define additional measure descriptions to ArchEE to clarify measure type as the program expands with new measure offerings beyond *lighting*.	The current AES measures are listed in the ArchEE field *MeasureDesc* as *custom—new construction, custom—retrofit,* and *custom—non-lighting.* In BY2023, the measure description *custom—non-lighting* was used for a *lighting controls* measure. This recommendation persists from PY2021 and PY2022.

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Type	Recommendation	Key finding
BY2023 process recommendations	**Recommendation 5:** Continue to monitor and respond to barriers to wider agricultural participation, including inflationary pressures and high interest rates.	The program has exceeded goals in recent years due to horticulture, but program design and delivery staff report persistent market barriers with poultry farms delaying planned participation, especially in new construction.

Table 175. Agricultural Energy Solutions—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Follow the guidance in Appendix F of the TRM (Table F4) to determine *exterior lighting* power density in the calculation methodology for *new construction exterior lighting*. ○ Continuing.
	• To clarify the measure type, define additional measure descriptions to ArchEE as the program expands with new measure offerings beyond *lighting*. ○ Continuing.
PY2020 process recommendations	• Consider increasing documentation for *custom* projects to verify new building types, annual operating hours (AOH), and lighting end-use. ○ Continuing.
PY2021 impact recommendations	• Define additional measure descriptions to ArchEE to clarify measure type as the program expands with new measure offerings beyond *lighting*. ○ Continuing.
PY2021 process recommendations	• Continue to work collaboratively with the EM&V team and seek review of large custom projects. ○ Continuing.
PY2022 impact recommendations	• Collect heating and cooling documentation when present on site. ○ Continuing.
PY2022 process recommendations	• Monitor the time it takes for incentive checks to be sent. ○ Continuing.

12.3 METHODOLOGY

12.3.1 Impact Evaluation

The evaluated savings results presented in this report are based on the results of savings calculations and adjustments made during the program documentation review, two engineering desk reviews, and on-site M&V.

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Program staff provided background information on the approach to energy savings, including savings calculations and data presented in those calculators and project close-out documents. The EM&V team also referred to relevant sections in TRM 9.1 to understand the savings methodology calculations used for *custom* projects and the general formulations of project savings approaches.

The EM&V team evaluated ICF Consulting's (ICF) savings calculations by reviewing the program tracking data and project documentation to confirm the savings methodology and results, repeating the calculation steps to verify accuracy.

12.3.1.1 Desk Reviews and Site Visit Ride-Alongs

The EM&V team coordinated post-installation site visits with program implementation staff as part of the BY2023 impact evaluation. These site visits were conducted with ICF program staff to reduce the burden on program participants and manage biosecurity access issues while allowing both the EM&V team and implementation staff to gather necessary post-installation data points. The EM&V team conducted ride-alongs and desk reviews on two large projects. Due to large horticulture projects, participation in the AES program in BY2023 was limited to six participants. Because of limited participation, the EM&V team reduced the evaluation scope from five ride-alongs and ten desk reviews to two ride-alongs and two desk reviews, accounting for over 50 percent of the program savings.

The EM&V team found that the approaches used to calculate savings were generally reasonable. The *lighting* calculation workbooks were comprehensive, detailed, high quality, and followed good industry practices. As a result, the EM&V team utilized the underlying calculation approaches to verify savings.

12.4 DETAILED IMPACT EVALUATION RESULTS

12.4.1 Reported Savings Methodology

The AES program's savings algorithms and approaches followed standard industry practice and TRM requirements for *custom* projects. There were distinct differences in the savings algorithms for *new construction lighting* and *retrofit lighting*. Using standard TRM algorithms for *lighting* projects involving heated spaces, a therms heating penalty was calculated. The details of each approach are described below.

12.4.1.1 New Construction Lighting for Poultry Houses

New construction lighting projects calculated savings based on an assumed lighting power density (LPD) of 0.8 W per square foot. This LPD was developed in 2015 by EAL, ICF, and the EM&V team. The algorithms for savings are:

$$kWh_{savings} = AOH \times \frac{LPD * Sq.Ft. - Installed\ Watts}{1{,}000} \times IEF_e$$

where:

AOH	= custom annual operating hours of the lit space
Sq. Ft.	= square footage of the lit space
LPD	= 0.8 W per square foot

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Installed Watts = sum of efficient lighting watts installed in the lit space

IEF_e = interactive effects factor for energy based on heating and cooling types

$$kW_{savings} = c.f. \times \frac{LPD * \ Sq.Ft. - Installed\ Watts}{1{,}000} \times IEF_d$$

where:

c.f. = coincidence factor (CF), typically 0.77

IEF_d = interactive effects factor for energy based on heating and cooling types

$$therm_{penalty} = IEF_g * kWh_{savings}$$

where:

IEF_g = 0.008 therms/kWh

kWh savings = savings calculated by the kilowatt-hour savings formula above for interior lighting projects

12.4.1.2 Lighting for Horticulture Applications

New construction and *retrofit lighting* applications for horticulture projects calculate savings using a *grow space square footage* method and industry-established grow lights that meet the photosynthetic photon efficacy (PPE) as required by the crop type as the baseline. The methodology is based on the Illinois TRM *Commercial Grow Lights* measure and incorporates key parameters from the Arkansas TRM, such as interactive effects, as well as site-specific *custom* parameters, such as AOH. The algorithms for savings are:

$$kWh_{savings} = AOH \times Sq.Ft. \times \frac{Watts/Sq.Ft_{Base} \ - Watts/Sq.Ft_{EE}}{1{,}000} \times IEF_e$$

where:

$Watts/Sqft_{Base}$ = Baseline wattage per square foot

$Watts/Sqft_{EE}$ = Efficient wattage per square foot

$$kW_{savings} = c.f. \times Sq.Ft. \times \frac{Watts/Sq.Ft_{Base} \ - Watts/Sq.Ft_{EE}}{1{,}000} \times IEF_d$$

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where:

c.f. = coincidence factor, typically 0.95 for vegetative crops or 0.76 for flowering crops

12.4.1.3 Retrofit Lighting

Savings are calculated for *retrofit lighting projects* by comparing the less efficient baseline wattage to the installed high-efficiency wattage. The algorithms for savings are:

$$kWh_{savings} = AOH \times \frac{Baseline\ Watts - Efficient\ Watts}{1{,}000} \times IEF_e$$

where:

Baseline Watts = total watts of the replaced lighting prior to the project

$$kW_{savings} = c.f. \times \frac{Baseline\ Watts - Efficient\ Watts}{1{,}000} \times IEF_d$$

$$therm_{penalty} = IEF_g * kWh_{savings}$$

12.4.2 Desk Review Results

As noted earlier, the BY2023 AES program impact evaluation efforts included an engineering analysis for a sample of projects from two unique account holders. Table 176 provides measure-level realization rates for the AES projects reviewed during the evaluation. Desk review findings from projects that did not receive 100 percent realization rates are detailed below.

Table 176. Agricultural Energy Solutions—BY2023 Desk Review Results by Measure Category

Measure category	Reported savings		Evaluated savings		Realization rate	
	kWh	kW[113]	kWh	kW[114]	kWh	kW
Custom—new construction	2,830,194	484.6	2,823,433	483.6	99.8%	99.8%
Custom—retrofit	15,409	-	2,222	-	14.4%	-
Total	**2,845,602**	**484.6**	**2,825,655**	**483.6**	**99.3%**	**99.8%**

Participant ID 421201. The project reported *new construction* and *retrofit lighting* at a poultry farm. Based on the documentation, the EM&V team found the lamp model was not eligible for savings in the

[113] A dash indicates that there are no kilowatt savings associated with the respective measure.
[114] Ibid

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program as it was not certified under ENERGY STAR, DLC, CEE, or other third-party certification. TRM 9.1 allows for exceptions to third-party certification for agricultural uses for fixtures designed for animal use. However, the lamps were installed in a computer room, exterior, and generator room. The EM&V team concluded an eligible alternative could have reasonably been installed and adjusted savings accordingly. The EM&V team also found that the baseline wattage for the exterior garage door could be overstated based on the installed fixture. The EM&V team adjusted the baseline to align with a typical metal halide wattage for *exterior lighting* based on input from the implementer. These two adjustments resulted in an overall project-level realization rate of 96.3 percent and 98.4 percent for energy and demand savings, respectively.

12.4.3 Site Visit Results

In BY2023, the EM&V team coordinated post-installation site visits with program implementation staff for two projects, reducing the burden on program participants and managing biosecurity access issues while allowing both the EM&V team and implementation staff to gather necessary post-installation data points. The two BY2023 projects received rebated *light-emitting diode (LED) lighting* through EAL's program; one project installed *custom—new construction lighting,* while the other included both *custom—new construction lighting* and *custom—retrofit lighting*.

At each project, the EM&V team confirmed the lamp type and location and that all lamps were successfully installed and operational. Additionally, the buildings' dimensions were confirmed—a key parameter for *new construction lighting* projects. *Lighting* schedules and programs were confirmed with farmers.

Overall, the EM&V team verified that all lamps on-site rebated through the AES program were installed, functional, and matched wattages claimed through program tracking data.

12.5 OVERALL SAVINGS ESTIMATES

The EM&V team calculated savings results at the measure category level. The overall AES program evaluated savings resulted in 99.3 percent and 99.9 percent realization rates for energy and demand, respectively. Table 177 shows the evaluated savings.

Table 177. Agricultural Energy Solutions—Final Evaluated Energy Savings and Realization Rates by Measure Category

Measure category	Reported savings		Evaluated savings		Realization rate		EM&V source
	kWh	kW	kWh	kW	kWh	kW	
Custom—new construction	3,545,515	569.1	3,537,046	568.0	99.8%	99.8%	Desk review and on-site M&V
Custom—retrofit	31,810	3.0	4,587	3.0	14.4%	100.0%	Desk review and on-site M&V
Custom non-lighting	1,621,276	1,378.5	1,621,276	1,378.5	100.0%	100.0%	N/A
Total	**5,198,600**	**1,950.6**	**5,162,908**	**1,949.5**	**99.3%**	**99.9%**	

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12.6 QUALITY CONTROL/QUALITY ASSURANCE PROCESSES

The AES program implementer, ICF, has developed quality assurance/quality control (QA/QC) processes. QA emphasizes trade ally training to keep trade allies updated on program processes, technical requirements for measures, application requirements, and awareness of the QC process. For QC, ICF reviews each incentive application, confirms pre-installation conditions, conducts on-site inspections to confirm post-installation conditions, and adjusts project savings calculations or incentives as appropriate.

As part of the AES evaluation activities, the EM&V team assessed the documentation provided for the ten sampled projects used to inform the impact evaluation. The documentation included the following:

- completed application,
- post-inspection form,
- invoices, and
- savings calculation workbook.

As noted in the prior section, the EM&V team confirmed that the tracking system's information was generally accurate in terms of that shown in the project documentation. Across the multiple projects and points for documentation, the AES documentation provided a mostly consistent description of the project aligned with the stated QC goals.

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13.0 RESIDENTIAL DIRECT LOAD CONTROL

The Residential Direct Load Control (DLC) (Residential DLC) program (Summer Advantage) is a demand response program focusing on residential air-conditioning (AC) loads. The program is implemented by Itron, who (1) provides marketing services, a call center, and load control receiver (LCR) equipment and services; (2) conducts program tracking; and (3) calculates event-level and program savings for Entergy Arkansas, LLC (EAL).

The program aims to reduce peak kilowatt loads during load control events in the summer months (June 1 through September 30). To reduce the amount of time an AC operates, participants in the program have an LCR installed on their AC. Participant incentives are based on the participant's choice of 50 percent cycling or 75 percent cycling. The participant receives an installation incentive based on their participation rate, and annually, the participant will receive a loyalty incentive equal to the installation bonus.

In bridge year (BY) 2023 (BY2023), the Residential DLC program responded to four events on four separate days. One of the events was a test event, used to verify equipment operability and measurement and verification (M&V) sample functionality, while the others were used to reduce load. An M&V sample is maintained by Itron, with 120 participants having interval data loggers that provide five-minute readings of equipment kilowatts. The M&V sample is structured to represent the program population (14,393 participants at the end of the event season) and provides the data to calculate savings. Calculating savings would not be possible with only the customers' standard utility revenue meters. The evaluation, measurement, and verification (EM&V) team estimated kilowatt savings via Midcontinent Independent System Operator (MISO) demand response curtailment algorithms and regression analysis to support the impact evaluation.

Table 178. Residential Direct Load Control—Data Collection and Program Inputs

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[115]
Stipulated at 1.0 as industry practice	Program staff interviews (2) Materials review	Census	None	None	Census

13.1 KEY FINDINGS

In BY2023, the program achieved 18.5 megawatts (MW) in gross demand savings, as shown in Table 179. The EM&V team found that the approach to using the M&V sample deployed on direct control units in demand response curtailment calculations was appropriate. The evaluated savings using the MISO-based calculations differed slightly from Itron's calculations due to rounding differences in calculating per-device savings. These differences resulted in a realization rate of 100.6 percent and will be further detailed in Section 13.4 of this report.

[115] This column refers to EAL customer meter data provided to the EM&V team as opposed to primary metered data collected as part of the on-site M&V.

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Table 179. Residential Direct Load Control Savings—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio*	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	-	-	N/A	N/A	N/A	N/A
Demand savings (MW)	18.4	18.5	100.6%	100.0%	18.5	20.9%

* The BY2023 NTG ratio was deemed 100 percent, keeping with industry practice for demand-response programs requiring participation in utility curtailment events.

The Residential DLC program does not claim energy savings. Therefore, these cells are represented with a dash.

The program met 64 percent of the demand savings goal, as detailed in Table 180.

Table 180. Residential Direct Load Control—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	-	-	-
Demand savings (MW)	29.0	18.5	63.9%

The Residential DLC program does not claim energy savings. Therefore, these cells are represented with a dash.

13.2 RECOMMENDATIONS

The EM&V team has identified two recommendations for consideration by EAL through the evaluation process, presented in Table 181.

Table 181. Residential Direct Load Control— BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Model the effect of weather on demand using a lagged time variable.	Demand is highly dependent upon the external air temperature, but this dependence is delayed by several hours. Adding a lagged variable to the temperature model could account for this delayed relationship.
BY2023 process recommendations	**Recommendation 2:** Continue to monitor and utilize opportunities to move participants from *radio technology* to *smart thermostats* in the next program cycle.	*Smart thermostats* are increasingly used as a demand response technology across the country and can replace older technologies, although grandfathering participants will minimize attrition from those who do not want a *smart thermostat* installed.

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Table 182. Residential Direct Load Control—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Calculate program savings using the highest current program year event instead of a previous year's event. ○ Complete.
PY2020 process recommendations	• Consider an annual *thank you* that includes information about the customer's financial benefit for participating and the benefit to the overall system. ○ Complete.
PY2021 impact recommendations	• Consider estimating kilowatt-hour savings for the Residential DLC program. ○ In progress.
PY2021 process recommendations	• There are no process recommendations in PY2021. The program appears to be operating as intended. ○ Complete.
PY2022 impact recommendations	• Explore the effects of limiting the baseline to periods with similar weather. ○ In progress.

13.3 METHODOLOGY

Itron provides three savings calculations to EAL, all evaluated by the EM&V team. Savings are calculated using three methods approved by MISO to support EAL's settlement with MISO. Each method used for EAL savings results is described below; Table 183 shows the events in BY2023.

Table 183. Residential Direct Load Control—BY2023 Load Control Events

Date	Start time (CDT)	End time (CDT)	Participants	Event type
06/01/2023	13:00	14:00	14,393	Test event
07/19/2023	13:00	15:00	14,393	Normal event
07/27/2023	16:00	18:00	14,393	Normal event
08/24/2023	15:00	18:00	14,393	Normal event

For each event, savings are based on the M&V sample meter data. The baseline is constructed using ten eligible days before the event and applying no adjustment (*MISO Calculation #1*), a symmetrical multiplicative adjustment (SMA) (*MISO Calculation #2*), or weather-based adjustment (*MISO Calculation #3*). These are described in more detail below.

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13.3.1 MISO Calculation Evaluated Savings

The EM&V team evaluated Itron's calculations of Residential DLC program savings registered with MISO. MISO's Business Practice Manual[116] specifies three calculation options.

13.3.1.1 MISO Calculation #1—Unadjusted Baseline

MISO's unadjusted baseline calculation approach utilizes the ten most recent eligible days (non-holiday, non-event weekdays) before the event. The average load for each 15-minute interval is calculated by averaging the five-minute kilowatt load intervals recorded by the data loggers for each M&V sample member. An average (per active device) load is calculated for the M&V sample for that interval. For a given 15-minute period, the average device load is averaged across the ten days to represent the unadjusted baseline load for that period.

13.3.1.2 MISO Calculation #2—Symmetrical Multiplicative-Adjusted Baseline

MISO's symmetrical multiplicative-adjusted baseline corrects the unadjusted baseline load schedule to represent actual event-day loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without a DLC event. The adjustment factor uses pre-event loads during baseline and event days to inform the degree of adjustment required. If pre-event loads on event days exceed baseline loads, baseline loads will be scaled upwards. If pre-event loads on event days are less than baseline loads, baseline loads will be scaled downwards. The multiplicative adjustment procedure is as follows:

1. Extract three hours of pre-event loads beginning four hours prior to the event start from both the unadjusted baseline load and the event-day load. For example, for an event starting at 14:00, extract unadjusted baseline and event-day loads for three hours spanning 10:00 to 13:00.
2. Calculate the *symmetrical multiplicative adjustment factor* by taking the ratio of (1) the sum of the three hours of event-day loads and (2) the sum of three hours of unadjusted baseline loads. This adjustment factor may not adjust the baseline by more than 20 percent in either direction. If the multiplicative adjustment exceeds 1.2, then assume the multiplicative adjustment is 1.2. If the multiplicative adjustment is less than 0.8, assume the multiplicative adjustment is 0.8.
3. Calculate the *symmetrical multiplicative-adjusted baseline* by multiplying the unadjusted baseline load by the *symmetrical multiplicative adjustment factor*.

13.3.1.3 MISO Calculation #3—Weather-Adjusted Baseline

MISO's weather-adjusted approach to baseline calculations incorporates an unadjusted baseline with a factor describing how temperature affects non-event loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without a DLC event. Instead of using pre-event loads to determine the adjustment to baseline loads, the sensitivity of loads to temperature changes is used to predict what loads would have been without an event. The procedure is as follows:

[116] Business Practices Manual Demand Response, Manual No. 26. MISO, October 2023.

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1. Determine the change in loads relative to a change in temperature (the temperature adjustment, expressed in kilowatt per degree Fahrenheit) using data from eligible non-event, non-holiday weekdays.
2. Determine the average temperature during baseline days' hours corresponding to each hour of an event. These baseline days are the same ten prior non-event, non-holiday weekdays used to calculate the unadjusted baseline load.
3. Calculate the difference in temperature between (1) the average of the baseline days' hours corresponding to the event hours and (2) the actual temperatures recorded during the event's hours.
4. Calculate the weather adjustment factor by multiplying the temperature difference by the temperature adjustment.
5. Calculate the weather-adjusted baseline by adding the weather adjustment factor to the unadjusted baseline load.

13.3.1.4 Baseline Calculation

A baseline calculation uses the five eligible days prior to the event and the four days with the highest energy usage across the entire day. Eligible days include non-holiday weekdays without events. Next, the average load for each 15-minute interval is calculated by averaging the five-minute kilowatt load intervals recorded by the data loggers for each M&V sample member. An average (per active device) load is calculated for the M&V sample for each 15-minute period. For a given 15-minute period, the average device load is averaged across the four days to represent the unadjusted baseline load for those 15 minutes.

A baseline adjustment factor is calculated by comparing the loads on the hour before the event starting for baseline days and event days (the pre-event load). For example, in an event beginning at 14:00, kilowatt loads are drawn for the hour spanning 13:00 to 14:00 for baseline and event days. For this hour before the event, the sum of the 15-minute pre-event load on the event day is divided by the sum of the 15-minute pre-event unadjusted baseline load to arrive at the adjustment factor.

The final baseline kilowatt for a 15-minute period is the unadjusted baseline multiplied by the adjustment factor. For baseline days with loads lower than the event day loads for the hour before the event starts, the result is a multiplier greater than 1.0. If baseline days' pre-event loads are more significant than event day pre-event loads, the result is a multiplier less than 1.0.

13.3.1.5 Savings Calculation

Savings for a given 15-minute period are calculated by subtracting the event-day per-device load from the adjusted baseline per-device load. The resulting per-device savings are multiplied by the number of devices active in the program. For contract purposes, the number of devices used to calculate savings is the device count at the end of the BY2023 load control season (14,393 active devices in BY2023). Using the ending device count is a conservative approach since some participant attrition occurs during the control season.

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13.3.1.6 Kilowatt-Hour Savings Method

The EM&V team developed estimates of kilowatt-hour impacts produced by the Residential DLC program; however, results had a high level of instability dependent primarily on baseline definitions. Due to this, the EM&V team recommends estimating energy savings at zero kilowatt-hours in BY2023. For the Summer Advantage program, kilowatt-hour savings occur when cycling HVAC compressors lower demand. However, after the event, kilowatt-hour consumption can be higher than expected as HVAC systems are released from control and work to address cooling loads unmet during the event hours. This post-event increase in consumption is termed *snapback*, with the snapback consumption subtracted from the in-event kilowatt-hour savings.

The team developed a baseline model to estimate kilowatt-hour savings of loads that would have occurred absent the event being called. Energy impacts are then calculated using the actual metered consumption of the M&V sample. Average hourly per-device kilowatt demand was estimated from 15-minute average per-device kilowatt demand schedules used in kilowatt demand savings calculations. This approach generated one hourly load schedule for the entire period spanning June 1, 2023, through September 30, 2023. Data used in the model included only kilowatt demand recorded during event days and eligible non-holiday, non-event weekdays.

The EM&V team developed two models to determine baseline load that would have occurred without an event. The sections below describe the methods used to generate these baseline loads.

Baseline Calculation #1

The EM&V team's first baseline calculation method developed a baseline estimate using a load forecast model; the model was derived from a regression analysis of the M&V sample loads. Each day's hours receive its own regression model, and its kilowatt-hour impacts are analyzed.

Calculated Baseline

For each hour, the following model is estimated using the following equation:

$$kW_t = \alpha_t + \beta Event_t + \gamma temp_t + \lambda temp_t^2 + \omega hum_t + e_t$$

Where:

kW_t = average per-device kilowatt load for a given hour

α_t = hour-specific intercept to capture baseload for hour *t*

$Event_t$ = indicator for whether an hour period occurred on an event day

$temp_t$ = hourly temperature in Fahrenheit for the hour period

$temp_t^2$ = squared value of $temp_t$ to model nonlinear impact on kilowatt load

hum_t = relative humidity for the hour period

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Kilowatt-Hour Savings Calculation

Energy impacts are calculated by fitting each event day's consumption for the baseline condition. The baseline for a given event day is then constructed by generating a fitted estimate of kilowatt load using the above model's parameter estimates. The load predicted by the above model uses the exact temperature and humidity observed during a specific event day but absent the $\beta Event_t$ effect. For example, the June 1 event that occurred between 13:00 and 14:00 has a baseline kilowatt load for hour-ending 14:00 equal to:

$$\widehat{kW}_{13} = \hat{\alpha}_{13} + \hat{\gamma} temp_{13} + \hat{\lambda} temp_{13}^2 + \hat{\omega} hum_{13}$$

Once the baseline condition has been calculated, savings are computed by subtracting the average per-device load recorded by the M&V loggers during a specific one-hour event period. The value of this difference determines energy savings, as kilowatt load was the average over one hour. Changes in kilowatt-hour consumption are computed during the event and post-event hours for each event day. The results are summed within each event day to determine the total change in event-day consumption to capture in-event savings and any snapback that may have occurred.

Baseline Calculation #2

The EM&V team's second baseline calculation method developed a baseline estimate using another load forecast model; the model was derived from a regression analysis of the M&V sample loads. Instead of running individual regressions for each hour of the day, one all-in model is estimated to generate an estimate of the load. Each hour of the day receives a dummy variable to capture how kilowatt load moves throughout the day.

One concern associated with the model used under *Baseline Calculation #1* above is modeling event-day hour differences in kilowatt load. Modeled in the baseline calculation method, *Baseline Calculation #1* is the average impact of *any* event-day hour on kilowatt load. However, one specific event day's hours may impart larger or smaller impacts on kilowatt load than another event day's hours. Failure to control for this variation in event-day hour impacts can affect the precision of the modeled baseline; therefore, the EM&V team incorporates event-day specific-hour intercepts to better control the impact of a specific event-day on kilowatt load.

Another concern of the EM&V team is the potential for the demand of prior hours to impact current kilowatt demand. That is, during a particularly hot morning, the cooling-based load is expected to be higher than it would on an average morning. Further, cooling-based loads could remain higher than average during future hours of the same day as HVAC systems work to maintain a comfortable indoor temperature. With this concern in mind, the EM&V team conducted a *Breusch-Godfrey test* for autocorrelation (correlation of current load with past iterations of itself). The EM&V team identified the existence of autocorrelation, reaching as far back as six hours. To model baseline kilowatt demand more accurately, the EM&V team incorporated six additional controls for the pre-existing load before hour *t*.

Calculated Baseline

For the entire load control season, one all-in model is estimated using the following equation:

$$kW_t = \gamma temp_t + \lambda temp_t^2 + \omega hum_t + \sum_{hour=0}^{23} \alpha_{hour} + \sum_{Event\ j=1}^{6} \left(\sum_{hour=0}^{23} \beta_{hour} * Event_{j,t} \right) + \sum_{k=1}^{6} \sigma_k kW_{t-k} + e_t$$

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Where:

kW_t	= average per-device kilowatt load for a given hour
$temp_t$	= hourly temperature in Fahrenheit for the hour period
$temp_t^2$	= squared value of $temp_t$ to model nonlinear impact on kilowatt load
hum_t	= relative humidity for the hour period
α_{hour}	= hour-of-day indicator
$\beta_{hour} * Event_{j,t}$	= hour-of-day indicator for event day *j* during hour *t*
kW_{t-k}	= kilowatt load recorded *k* hours prior to the current time *t*.

Kilowatt-Hour Savings Calculation

The baseline for a given event day is then constructed by generating a fitted estimate of kilowatt load using the parameter estimates of the above model. The load predicted by the above model uses the exact temperature and humidity that were observed during a specific event day, but absent the $\beta_{hour} * Event_t$ effect. However, loads observed for the six prior hours now enter the expected kilowatt load calculation for the current hour. For example, the July 19 event that occurred between 14:00 and 15:00 has a baseline kilowatt load for hour ending 15:00 equal to:

$$\widehat{kW}_{14} = \hat{\alpha}_{14} + \hat{\gamma} temp_{14} + \hat{\lambda} temp_{14}^2 + \hat{\omega} hum_{14} + \hat{\sigma}_{13}\widehat{kW}_{13} + \cdots + \hat{\sigma}_8\widehat{kW}_8$$

Once the baseline condition has been calculated, savings are computed by subtracting the average per-device load recorded by the M&V loggers during each one-hour period. The change in kilowatt-hour consumption is determined by the value of this difference, as kilowatt load was the average over one hour. Changes in kilowatt-hour consumption are computed during event and post-event hours for each event day to capture in-event savings and any snapback that may have occurred.

13.4 DETAILED IMPACT EVALUATION RESULTS

13.4.1 MISO Calculation Evaluated Savings

The EM&V team evaluated Itron's MISO savings calculations by reviewing the M&V sample load data, confirming the methodology and results, repeating the calculation steps, and making adjustments. To conduct the evaluation, the EM&V team received the following from Itron:

- M&V sample five-minute load data, spanning June 1 through September 30, 2023;
- a savings report Itron provides to EAL describing Itron's methodology for sampling and savings calculations, along with a description of the sample, descriptions of each event, and other pertinent BY2023 program details; and
- discussions to clarify data definitions, calculation methodology steps, and information interpretations in their report.

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The EM&V team and Itron's per-device savings calculations were nearly identical, as were the overall evaluated savings. Itron reported savings of 18.42 MW, calculated using the weather-adjusted savings from the event on August 24 from 15:00 to 16:00 of 1.28 kW per device multiplied by 14,393 active endpoint devices. The EM&V team calculated a savings value of 1.29 kW per meter during the same event. Using this per-device savings value multiplied by the same 14,393 active endpoint devices, the EM&V team estimated evaluated savings of 18.54 MW.

MISO Calculation #1—Unadjusted Baseline

All MISO Calculation methods require the selection of baseline days. The *MISO Business Practices Manual (MISO BPM) method* stipulates that the ten prior non-event event eligible days are selected to represent the baseline. The average load during those baseline days is calculated for a given event hour, representing an unadjusted baseline. Table 184 below highlights the unadjusted baseline calculations Itron and the EM&V team undertook.

Table 184. Residential Direct Load Control—MISO Calculation #1—MISO Unadjusted Baseline Calculations

Date	Start time (CDT)	End time (CDT)	Itron baseline	EM&V team baseline
06/01/2023	13:00	14:00	0.51	0.52
07/19/2023	13:00	14:00	1.00	1.01
07/19/2023	14:00	15:00	1.15	1.16
07/27/2023	16:00	17:00	1.54	1.55
07/27/2023	17:00	18:00	1.54	1.55
08/24/2023	15:00	16:00	1.60	1.60
08/24/2023	16:00	17:00	1.65	1.65
08/24/2023	17:00	18:00	1.63	1.63

MISO Calculation #2—Symmetrical Multiplicative-Adjusted Baseline

MISO's *symmetrical multiplicative-adjusted baseline* corrects the unadjusted baseline load schedule calculated above to be more representative of actual event-day loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without a DLC event. The adjustment factor uses pre-event loads during baseline and event days to inform the degree of adjustment required. If pre-event loads on event days exceed baseline loads, baseline loads will be scaled upwards. If pre-event loads on event days are less than baseline loads, baseline loads will be scaled downwards. The multiplicative adjustment procedure is as follows:

1. Extract three hours of pre-event loads beginning four hours before the event starts from both the unadjusted baseline load and the event-day load.
2. Calculate the *symmetrical multiplicative adjustment factor* by taking the ratio of (1) the sum of the three hours of event-day loads and (2) the sum of three hours of unadjusted baseline loads.
3. Calculate the *symmetrical multiplicative-adjusted baseline* by multiplying the unadjusted baseline load by the *symmetrical multiplicative adjustment factor*.

The MISO BPM requires that the *symmetrical multiplicative adjustment* does not lead to an adjustment greater than 20 percent of the unadjusted baseline load. Calculated *symmetrical multiplicative adjustment factors* exceeded 1.20 for all event days; therefore, all event days are assigned a

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symmetrical multiplicative adjustment of 1.20. The EM&V team's assignment of these 20 percent adjustment caps matches Itron's.

Savings Calculation

The savings calculation for each event hour is as follows:

kW Savings = Symmetrical Multiplicative Adjusted Baseline kW – Metered Load

Across all the event hours during BY2023, the highest single hour represents the program savings. Under the *symmetrical multiplicative adjustment method*, both Itron and the EM&V team determined this hour to be on July 27 from 16:00 to 17:00. For this hour, the realization rate is 100.6 percent. Table 185 summarizes each hour's load reduction, with Table 186 summarizing the corresponding event-hour total kilowatt savings and realization rates.

Table 185. Residential Direct Load Control—MISO Calculation #2—MISO Adjusted Baseline and Per-Device Savings Comparisons

Date	Start time (CDT)	End time (CDT)	Itron adjusted baseline	EM&V team adjusted baseline	Itron SMA adjusted reduction (per device kW)	EM&V team SMA adjusted reduction (per device kW)
06/01/2023	13:00	14:00	0.62	1.20	0.23	0.24
07/19/2023	13:00	14:00	1.20	1.20	0.52	0.53
07/19/2023	14:00	15:00	1.38	1.20	0.44	0.45
07/27/2023	16:00	17:00	1.85	1.20	1.06	1.07
07/27/2023	17:00	18:00	1.85	1.20	0.85	0.86
08/24/2023	15:00	16:00	1.92	1.20	1.05	1.05
08/24/2023	16:00	17:00	1.98	1.20	0.88	0.88
08/24/2023	17:00	18:00	1.96	1.20	0.90	0.90

Table 186. Residential Direct Load Control—MISO Calculation #2 Results

Date	Start time (CDT)	End time (CDT)	Number of participating devices	Itron per device kW savings	EM&V team per device kW savings	Itron event-hour savings	EM&V team event-hour savings	Realization rate (%)
06/01/2023	13:00	14:00	14,393	0.23	0.24	3,310	3,490	105.4
07/19/2023	13:00	14:00	14,393	0.52	0.53	7,484	7,611	101.7
07/19/2023	14:00	15:00	14,393	0.44	0.45	6,333	6,426	101.5
07/27/2023	16:00	17:00	14,393	1.06	1.07	15,257	15,341	100.6
07/27/2023	17:00	18:00	14,393	0.85	0.86	12,234	12,341	100.9
08/24/2023	15:00	16:00	14,393	1.05	1.05	15,113	15,045	99.6
08/24/2023	16:00	17:00	14,393	0.88	0.88	12,666	12,691	100.2
08/24/2023	17:00	18:00	14,393	0.90	0.90	12,954	12,930	99.8

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MISO Calculation #3—Weather-Adjusted Baseline

Itron calculated a temperature adjustment by developing a regression equation that explained air temperatures' influence[117] on the resulting M&V sample loads. As detailed in Itron's Evaluation Report, five-minute load data were aggregated to create a single per-device load covering the hours of 12:00 to 20:00 from June 1 through September 30, 2023. Event days, as were holidays and weekends, were excluded from the temperature adjustment analysis. Itron's regression model used the entirety of the date range, absent the excluded days. The result is a dataset of the average load for each hour.

Itron then conducted a regression analysis using the following equation:

$$kW_t = \alpha + \beta\, Temperature_t + \gamma HE_t + \lambda HE_t^2 + e_t$$

This equation posits that load during a given hour (*t)* can be primarily explained by (1) the hour of the day (represented by HE_t) and (2) a given hour's dry-bulb air temperature. Itron's resulting regression output showed a temperature coefficient of 0.073 kW per degree Fahrenheit. The statistical results showed that the model explained 84.6 percent of the variability in load.

The EM&V team replicated the analysis utilizing the same equation structure as Itron and limited the date range to the control season (June 1 through September 30, 2023), excluding holidays, weekends, and event days. Consistent with Itron, the EM&V team also limited the hours of the selected days to fall between 12:00 and 20:00. The EM&V team's regression equation results for temperature ($\hat{\beta}$) of 0.075 kW per degree Fahrenheit is identical to Itron's coefficient. Additionally, the EM&V team found a comparable percentage of variability (87.5 percent) in load.

The EM&V team and Itron have nearly identical calculation results for the weather-adjusted baseline method. For the event hour with the highest performance—August 24, 2023, from 15:00 to 16:00—Itron calculated a savings of 1.28 kW per device, while the EM&V team calculated a savings of 1.29 kW per device.

Weather-Adjusted Baseline

All MISO Calculation methods require the selection of baseline days. The MISO BPM method stipulates that the ten prior non-event, event-eligible days are selected to represent the baseline. The average load during those baseline days is calculated for a given event hour, representing an unadjusted baseline. Next, the average temperature for that same hour on the baseline days is calculated. The temperature of the event day's hour is then subtracted from the average baseline days' temperature for that hour to determine the temperature differential between the baseline days' and event day's temperature. The temperature coefficient is multiplied by the temperature difference to calculate an additive kilowatt adjustment to the unadjusted baseline kilowatt.

The baseline condition is based on the average hourly load per device for EAL's MISO calculation. This baseline is calculated using the M&V sample's metered results, averaging each sampled participant's five-minute metered data into hourly increments. The resulting equation for the weather-adjusted baseline for a given event hour is as follows:

*Baseline kW = Unadjusted Baseline Load + Temperature Coefficient * (Baseline Temperature – Event Hour Temperature)*

[117] Temperature data provided by NOAA for Little Rock, AR, weather station KLIT; two-meter dry bulb temperature. See: www.ncdc.noaa.gov.

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The EM&V team's calculation of the baseline loads and temperature records is identical to those presented in Itron's MISO Calculation, shown in Table 187. Minor differences of 0.05 kW per device or less are attributable to rounding temperature values and are not consequential.

Table 187. Residential Direct Load Control—MISO Calculation #3—MISO Temperature and Per-Device Savings Comparisons

Date	Start time (CDT)	End time (CDT)	Itron baseline temperature	EM&V team baseline temperature	Itron weather-adjusted reduction (per-device kW)	EM&V team weather-adjusted reduction (per-device kW)
06/01/2023	13:00	14:00	83.4	83.4	0.40	0.41
07/19/2023	13:00	14:00	86.9	87.2	0.98	0.98
07/19/2023	14:00	15:00	87.9	87.6	0.87	0.92
07/27/2023	16:00	17:00	90.7	90.7	1.21	1.23
07/27/2023	17:00	18:00	90.2	90.2	0.96	0.98
08/24/2023	15:00	16:00	93.4	93.5	1.28	1.29
08/24/2023	16:00	17:00	92.6	92.7	1.17	1.17
08/24/2023	17:00	18:00	91.6	91.5	1.04	1.06

Savings Calculation

The savings calculation for each event hour is as follows:

kW Savings = Weather Adjusted Baseline kW – Metered Load

Across all the event hours during BY2023, the highest single hour represents the program savings. Itron and the EM&V team determined the highest performing hour to be August 24, 2023, from 15:00 to 16:00. The realization rate is 100.6 percent for this hour, with a kilowatt savings of 1.29 per device. Table 188 summarizes each hour's load reduction, with

Table 189 summarizing the corresponding event-hour realization rates, ranging from 100.4 percent to 105.6 percent across events.

Table 188. MISO Calculation #3 Results

Date	Start time (CDT)	End time (CDT)	Number of participating devices	Itron per device kW savings	EM&V team per device kW savings	Itron event-hour savings	EM&V team event-hour savings
06/01/2023	13:00	14:00	14,393	0.40	0.41	5,757	5,868
07/19/2023	13:00	14:00	14,393	0.98	0.98	14,105	14,177
07/19/2023	14:00	15:00	14,393	0.87	0.92	12,522	13,222
07/27/2023	16:00	17:00	14,393	1.21	1.23	17,416	17,664
07/27/2023	17:00	18:00	14,393	0.96	0.98	13,817	14,127

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Date	Start time (CDT)	End time (CDT)	Number of participating devices	Itron per device kW savings	EM&V team per device kW savings	Itron event-hour savings	EM&V team event-hour savings
08/24/2023	15:00	16:00	14,393	1.28	1.29	18,423	18,536
08/24/2023	16:00	17:00	14,393	1.17	1.17	16,840	16,910
08/24/2023	17:00	18:00	14,393	1.04	1.06	14,969	15,241

Table 189. MISO Calculation #3 Realization Rates

Date	Start time (CDT)	End time (CDT)	Itron event-hour savings (kW)	EM&V team event-hour savings (kW)	Realization rate (%)
06/01/2023	13:00	14:00	5,757	5,868	101.9
07/19/2023	13:00	14:00	14,105	14,177	100.5
07/19/2023	14:00	15:00	12,522	13,222	105.6
07/27/2023	16:00	17:00	17,416	17,664	101.4
07/27/2023	17:00	18:00	13,817	14,127	102.2
08/24/2023	15:00	16:00	18,423	18,536	100.6
08/24/2023	16:00	17:00	16,840	16,910	100.4
08/24/2023	17:00	18:00	14,969	15,241	101.8

13.4.2 Evaluated Kilowatt-Hour Savings Results

The following discussion highlights the kilowatt-hour impacts calculated across the events using two regression models to construct baseline kilowatt loads. Only event and post-event hours with statistically significant ($p<0.05$) coefficients are used for calculating kilowatt-hour impacts and savings. Otherwise, differences between the baseline and actual event-day load observed are assumed to be zero.

Baseline Calculation #1

Calculation of the baseline under the *Baseline Calculation #1* approach utilizes an average impact of the average event hour during the load control season spanning June 1 through September 30, 2023. It is important to note that the effect described for any event is not specific to that event's actual performance; instead, the regression model's effect is to identify average savings associated with all times that events were being called during the 2023 load-control season.

Under *Baseline Calculation #1*, loads during event hours were not significantly different ($p<0.05$) from the baseline. Post-event snapback was substantially different from the baseline only for the hour ending at 15:00. On average, hourly regressions explained 88.3 percent of the variation in load.[118] Table 190

[118] R-squared should not be used to directly compare the fitness of *Baseline Calculation #1* to that of *Baseline Calculation #2*. R-squared values will always be higher for models with more covariates.

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illustrates that each participant had negative savings of 3.09 kWh across all event days after accounting for both in-event savings and post-event snapback.

Table 191 illustrates that the net effect of all BY2023 events shows a kilowatt-hour consumption increase of 44.47 MWh.

Table 190. Residential Direct Load Control—Baseline Calculation #1—BY2023 Per-Device Load-Control Savings

Date	Modeled in-event per-device kWh savings	Modeled post-event per-device snapback kWh	Net program per-device kWh savings
06/01/2023	0.41	0.75	1.16
07/19/2023	1.63	-2.44	-0.81
07/27/2023	2.00	-1.65	0.35
08/24/2023	3.57	-1.18	2.39
Total	**7.61**	**-4.52**	**3.09**

Table 191. Residential Direct Load Control—Baseline Calculation #1—BY2023 Total Load-Control Savings

Date	LCRs participating	Modeled in-event kWh savings	Modeled post-event snapback kWh	Net program kWh savings
06/01/2023	14,393	5,901	10,795	16,696
07/19/2023	14,393	23,461	-35,119	-11,658
07/27/2023	14,393	28,786	-23,748	5,038
08/24/2023	14,393	51,383	-16,984	34,399
Total		**109,531**	**-65,056**	**44,474**

Note negative event savings (or consumption increase) with only the July 19 event. As illustrated in

Table 191, post-event snapback associated with July 19 was higher than in-event savings. The EM&V team attributes this to average event-hour effects modeled in the regression used to model the baseline load. Under this approach, the effect of individual event-day hours may not be sufficiently controlled, thus affecting the accuracy of the modeled baseline. Further, average event-day hour effects may indicate significant in-event or post-event hour differences in kilowatt load that does not hold within some specific event days, a finding highlighted in the discussion of *Baseline Calculation #2* below. Regression modeling within *Baseline Calculation #2* remedies this problem by modeling baseline load while controlling individual event-day hour effects on load. The EM&V team further illustrates improvements in baseline load calculations using this approach below.

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Figure 42. Residential Direct Load Control—Calculated Baseline #1—June 1 Test Direct Load Control Event

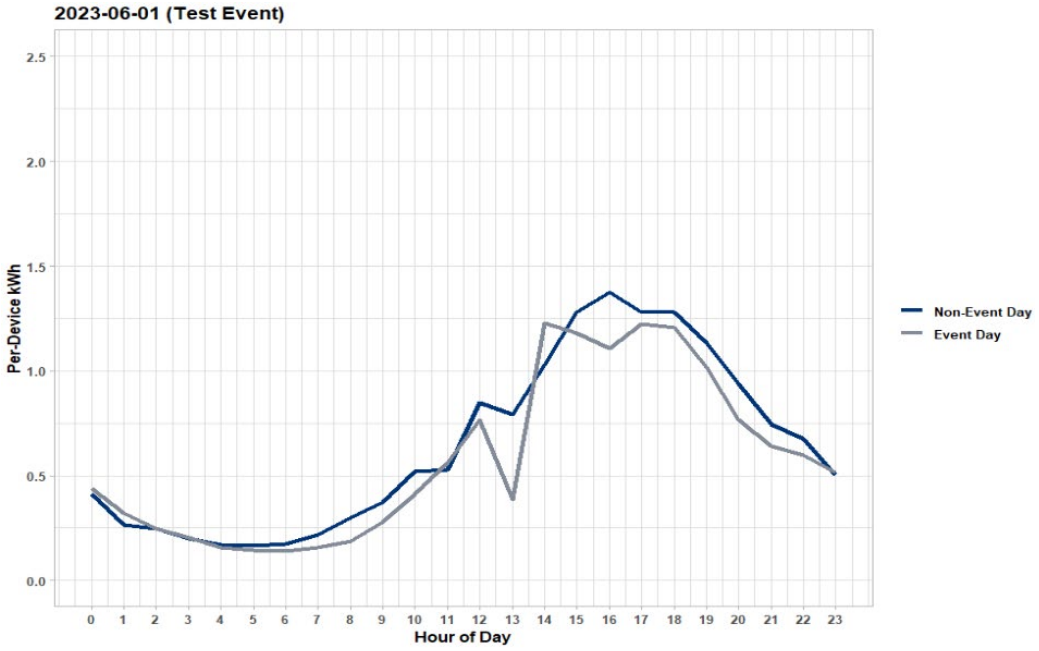
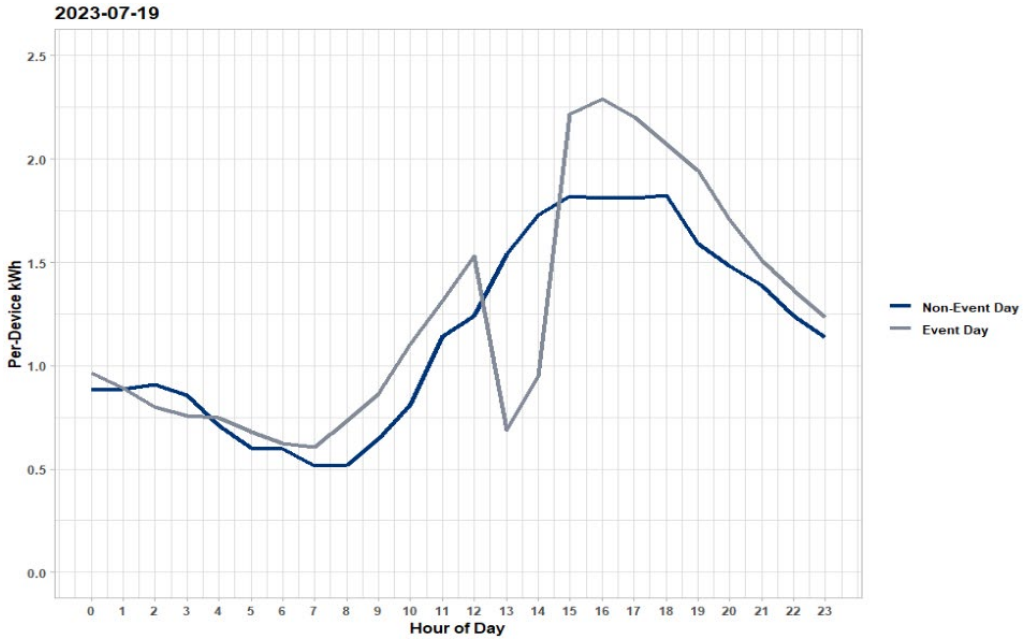


Figure 43. Residential Direct Load Control—Calculated Baseline #1—July 19 Direct Load Control Event



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Figure 44. Residential Direct Load Control Program—Calculated Baseline #1—July 27 Direct Load Control Event

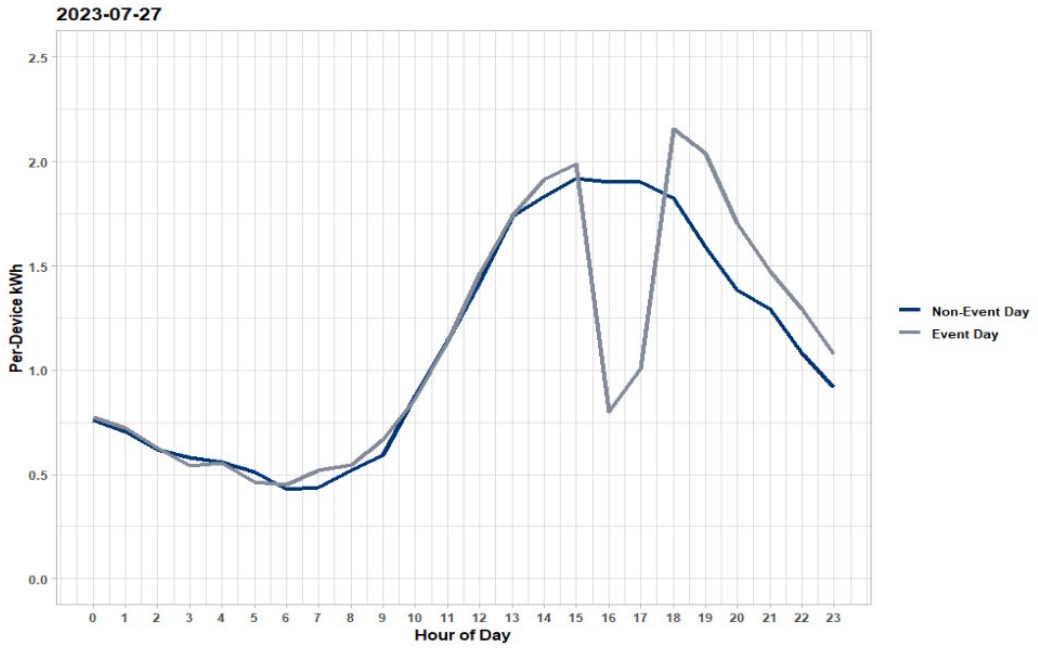
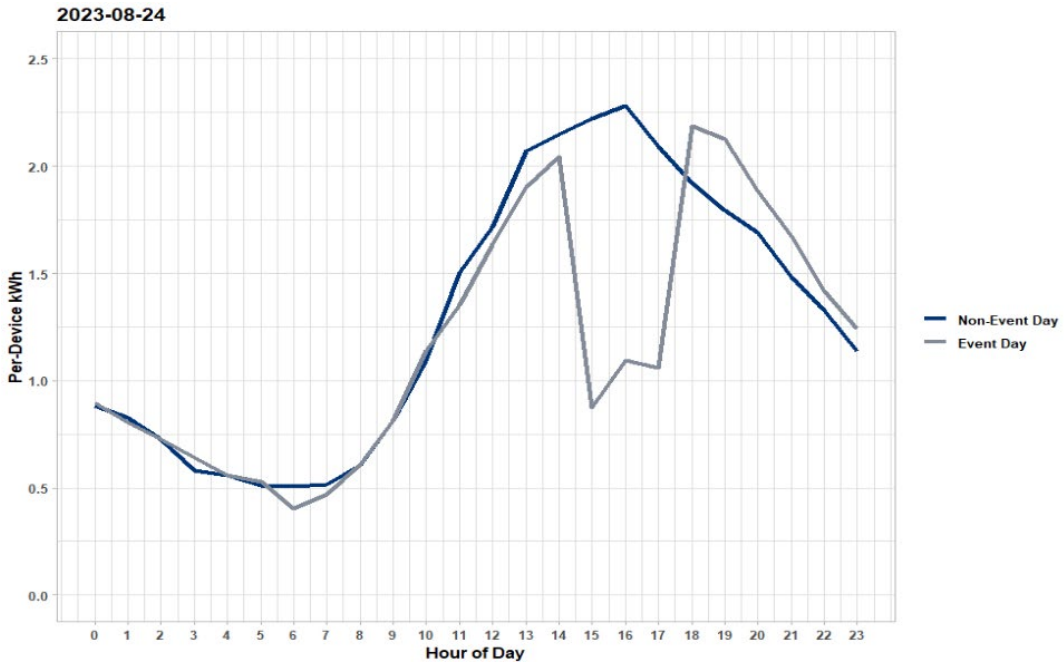


Figure 45. Residential Direct Load Control—Calculated Baseline #1—August 24 Direct Load Control Event



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Baseline Calculation #2

Calculation of the *Baseline Calculation #2* utilizes event-day specific hour-of-day intercepts to better control each event-day hour during load control season spanning June 1 through September 30, 2023. Further, after the EM&V team identified the risk of autocorrelation (current kilowatt load being correlated with past iterations of itself), the *Baseline Calculation #2* approach incorporated six hours of prior kilowatt load to inform modeling of current baseline kilowatt load.

Under *Baseline Calculation #2*, on average, both in-event hours yielded kilowatt loads significantly different ($p<0.05$) from the baseline. Post-event snapback was substantially different from the baseline for up to three hours following an event, depending on the event day. The model under the *Baseline Calculation #2* approach explained 99.7 percent of the variation in load.[119] Table 192 illustrates that each participant saved 3.21 kWh across all event days after accounting for in-event savings and post-event snapback. Table 193 illustrates that the net effect of all BY2023 events shows a kilowatt-hour consumption decrease (savings) of 12.52 MWh.

Table 192. Residential Direct Load Control—Baseline Calculation #2—BY2023 Per-Device Load-Control Savings

Date	Modeled in-event per-device kWh savings	Modeled post-event per-device snapback kWh	Net program per-device kWh savings
06/01/2023	0.57	0.00	0.57
07/19/2023	0.83	-0.32	0.51
07/27/2023	1.11	-0.24	0.87
08/24/2023	1.36	-0.10	1.26
Total	**3.87**	**-0.66**	**3.21**

Table 193. Residential Direct Load Control—Baseline Calculation #2—BY2023 Load-Control Events

Date	Load control receivers participating	Modeled in-event kWh savings	Modeled post-event snapback kWh	Net program kWh savings
06/01/2023	14,393	8,204	0	8,204
07/19/2023	14,393	11,946	-4,606	7,340
07/27/2023	14,393	15,976	-3,454	12,522
08/24/2023	14,393	19,574	-1,439	18,135
Total		**55,701**	**-9,499**	**46,202**

Note that the negative event savings (or consumption increase) associated with the first calculation on the July 19 event have fallen away. As shown in Table 193, post-event snapback associated with these events has significantly diminished. The EM&V team attributes this to modeling specific event-day hour loads in the regression. Depending on the event, modeling specific event-day-hour effects revealed that

[119] R-squared should not be used to directly compare the fitness of *Baseline Calculation #1* to that of *Baseline Calculation #2*. R-squared values will always be higher for models with more covariates.

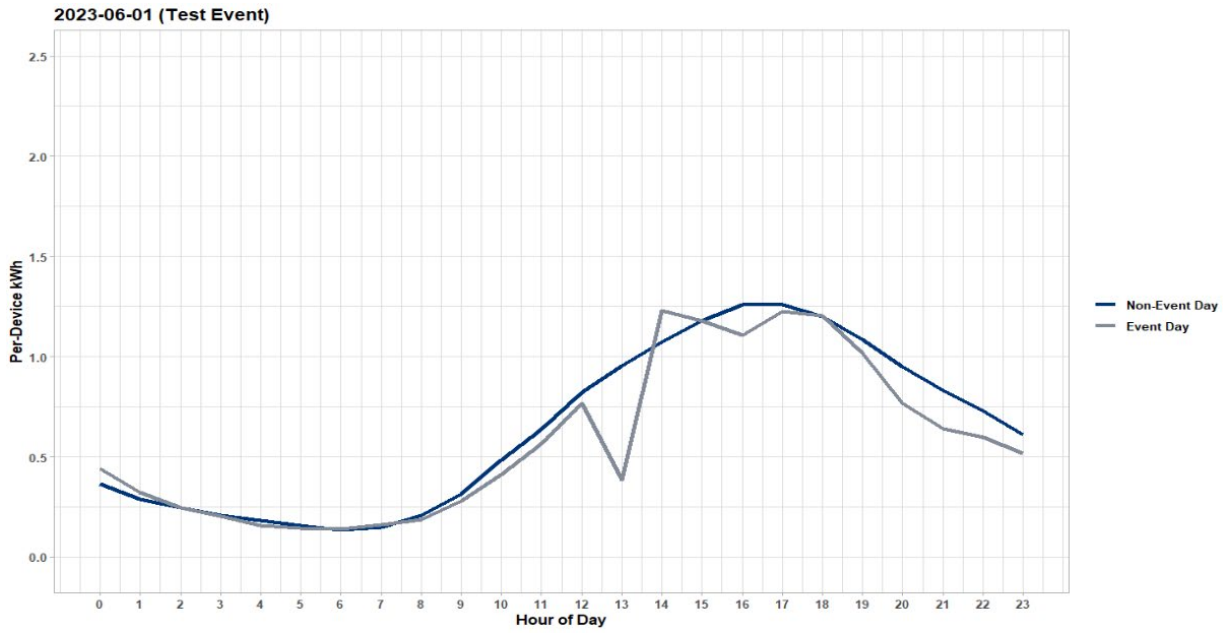
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snapback was statistically significant during hours-ending 14:00 through 16:00. This result contrasts with solely hour-ending 14:00 being significant under *Baseline Calculation #1*.

As highlighted in Figure 46 through Figure 49, baseline loads modeled under *Baseline Calculation #2* appear to follow actual pre-event and post-event consumption more closely than under *Baseline Calculation #1*. The EM&V team believes this can be attributed to a combination of controls for individual event-day hours and the incorporation of controls for autocorrelation. First, specific event-day hour controls can better identify non-event-day hourly loads by excluding these event-day hours from representing the modeled baseline. One event day's hour may impart larger or smaller impacts on kilowatt load than another event day's hours. Failure to control for this variation in event-day hour impacts can affect the precision of the modeled baseline.

On the other hand, autocorrelation imparts a smoothing effect on the baseline. Smoothing is observed during post-event hours for the baseline on both events compared to the first calculation baseline.

Figure 46. Residential Direct Load Control—Calculated Baseline #2—June 1 Test Direct Load Control Event



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Figure 47. Residential Direct Load Control—Calculated Baseline #2—July 19 Test Direct Load Control Event

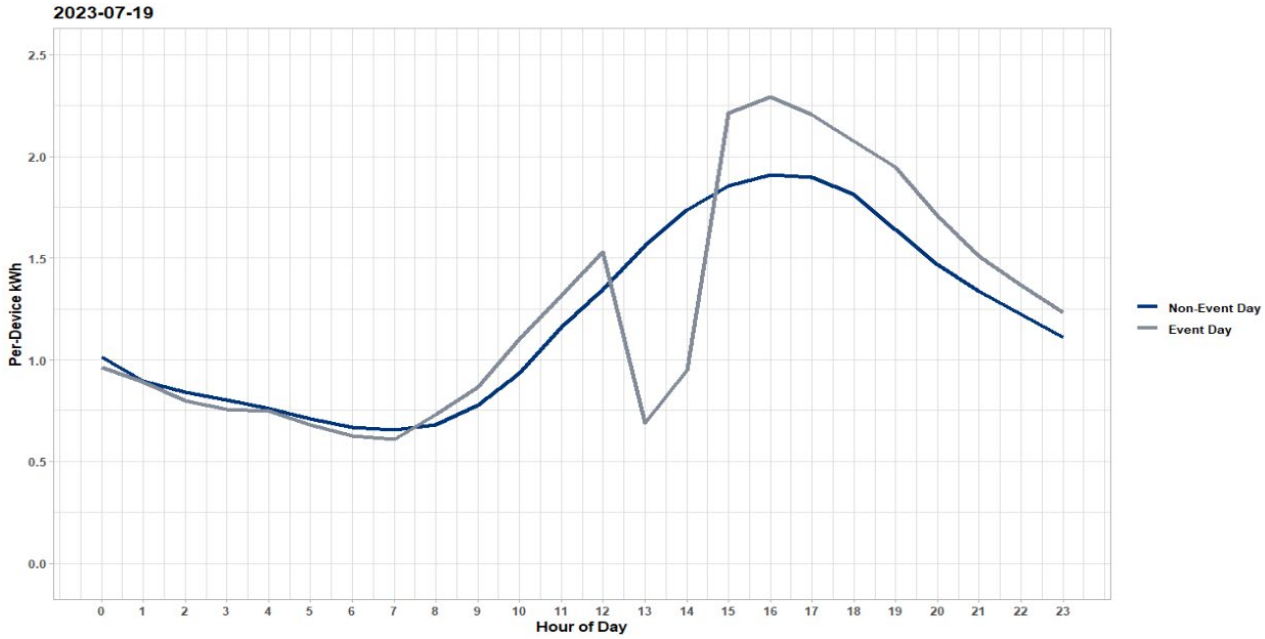
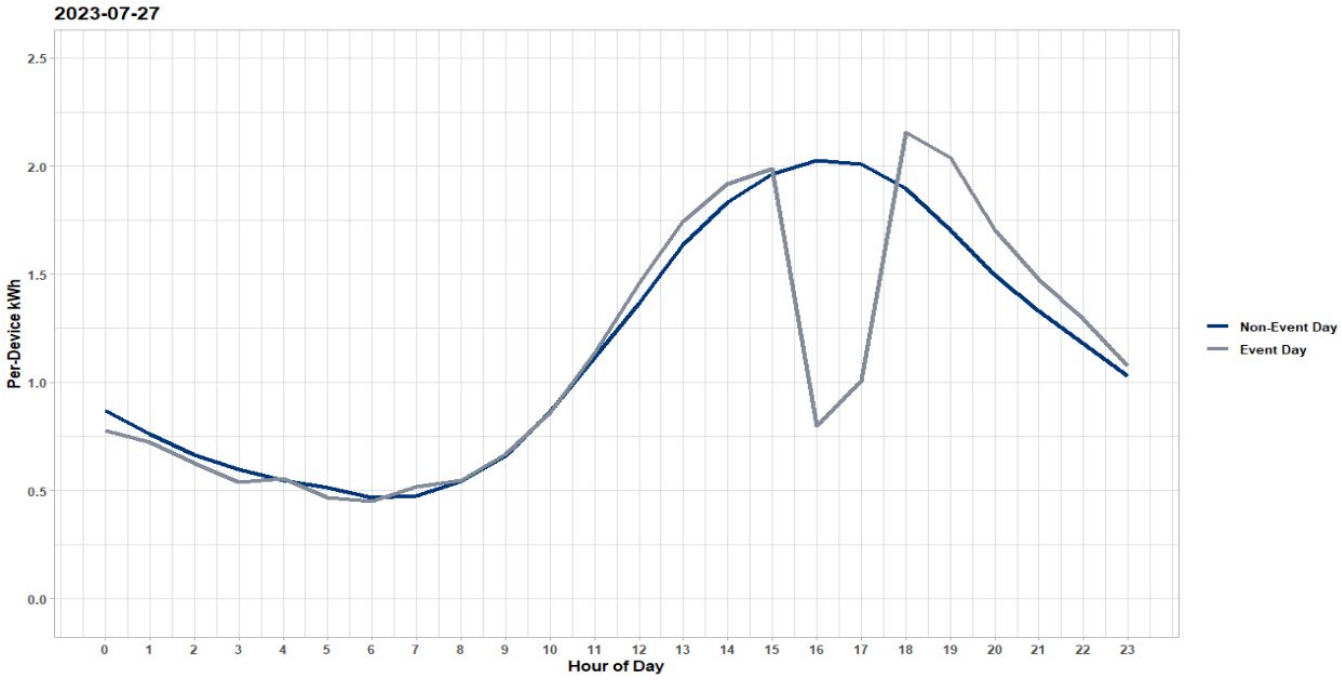
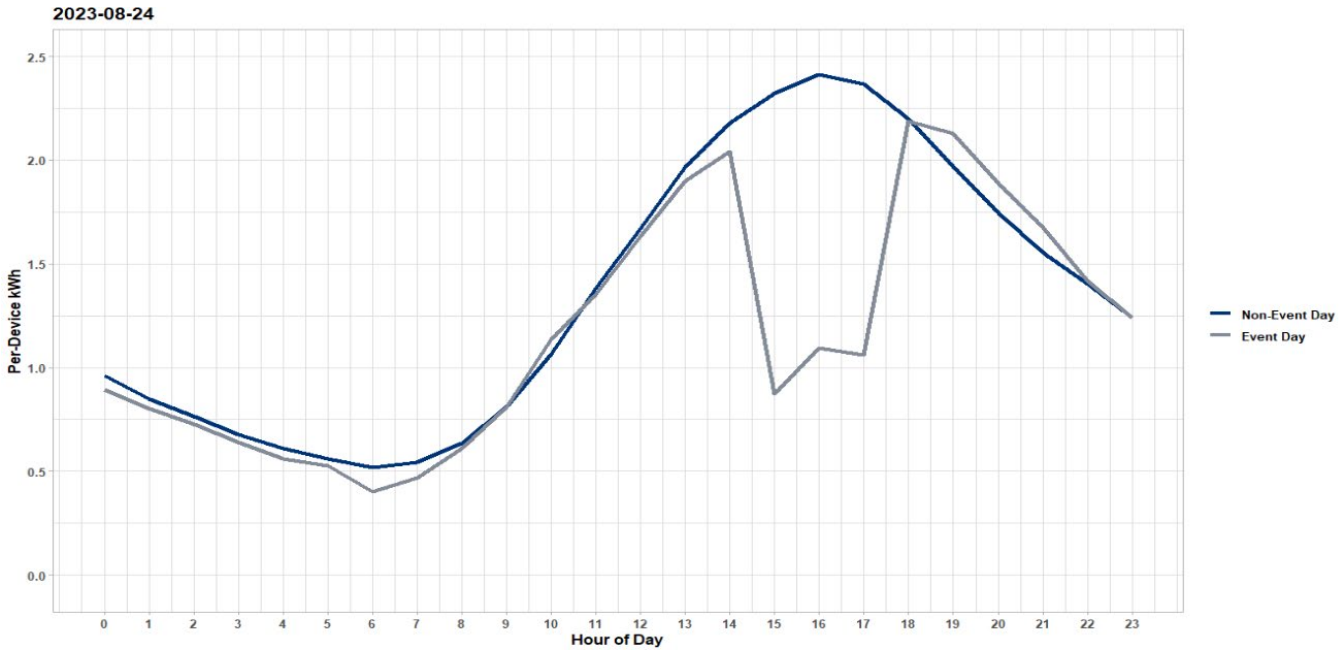


Figure 48. Residential Direct Load Control—Calculated Baseline #2—July 27 Test Direct Load Control Event



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Figure 49. Residential Direct Load Control—Calculated Baseline #2—August 24 Test Direct Load Control Event



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14.0 SMART DIRECT LOAD CONTROL PILOT

The Smart Direct Load Control (SDLC) pilot program is a demand response pilot focusing on controlling load through *smart thermostats* in residential and small nonresidential buildings. The pilot is in its third year of existence and is implemented by ICF Consulting (ICF), which (1) provides marketing services and a call center, and (2) conducts program tracking.

The SDLC pilot program aims to reduce peak kilowatt loads during load control events in the summer months (June 1 through September 30). Participants in the program have *smart thermostats* and allow Entergy Arkansas, LLC (EAL) to reduce the time an individual air conditioner (AC) operates remotely.

Incentives for participation are divided into two payment streams: one for annual enrollment and one based on participation in load-control events. Customers with an existing, qualifying thermostat receive an enrollment incentive of up to $50 (residential) or $100 (nonresidential). In comparison, customers without an existing *smart thermostat* receive a *smart thermostat*, including free installation, and an annual enrollment incentive of up to $40 (residential) or up to $100 (nonresidential).

Upon completion of the load-control season, customers receive rebates based on participation. If a customer participates in all load-control events (i.e., does not opt out of any events) or opts out of a single event, the customer receives $40 (residential) or $100 (nonresidential). Customers who opt out of two or three events receive $25 (residential) or $50 (nonresidential), and customers who opt out of more than three events receive no annual participation rebate.

In bridge year 2023, the SDLC pilot called four events on four days, spanning June through August of 2023. The first event, which occurred on June 1, 2023, was a test event used to verify equipment operability; the remaining events were used to reduce load across EAL's territory.

In support of the impact evaluation, the evaluation, measurement, and verification (EM&V) team calculated energy savings achieved by installing new thermostats and demand savings from load-control events during the 2023 load-control season. The EM&V team deployed three different methods for estimating load reductions, all summarized in the Midcontinent Independent System Operator's (MISO) *Business Practice Manual for Demand Response*[120] (*MISO's Business Practice Manual*, or *MISO BPM*). Process evaluation activities included biweekly meetings with implementation and EAL staff for the duration of BY2023. Table 194 details the evaluation activities conducted for the program in BY2023.

Table 194. Smart Direct Load Control Pilot—Data Collection and Program Inputs

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site M&V	Metered data analysis[121]
PY2020 EM&V research— participant surveys and market actor interviews	Program staff interviews (2) Materials review	Census	None	None	Census

[120] Midcontinent Independent System Operator Demand Response Business Practices Manual. BPM-026-r10. Effective October 1, 2023.

[121] This column refers to EAL customer runtime data provided to the EM&V team as opposed to primary metered data collected as part of the on-site M&V.

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14.1 KEY FINDINGS

In BY2023, the SDLC pilot achieved 3,173 MWh in gross energy savings and 5.9 MW in gross demand savings, as shown in Table 195 and detailed in Table 213. The EM&V team found that energy savings using deemed values in the Arkansas Technical Reference Manual 9.1 were applied correctly to residential applications. No energy savings were claimed for *smart thermostats* that received rebates during previous program years. Energy savings among small business participants were accurately calculated, resulting in a realization rate of 100.0 percent for energy savings. The program met 64 percent of the energy savings goal, as detailed in Table 196. The pilot achieved 5.9 MW in demand reduction during the load control season, resulting in a realization rate of 90.6 percent.

Table 195. Smart Direct Load Control Pilot Savings—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio*	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	3,173	3,173	100.0%	100.3%	3,182	1.1%
Demand savings (MW)	6.6	5.9	90.6%	100.0%	5.9	6.7%

*The BY2023 NTG ratio uses a weighted average of residential (Home Energy Solutions) and commercial (CoolSaver) *smart thermostats* for energy savings.

Table 196. Smart Direct Load Control Pilot—Goals vs. Achieved

Savings	Goal	Actual	Percentage achieved
Energy savings (MWh)	4,973	3,182	64.0%
Demand savings (MW)	27.5	5.9	21.6%

14.2 RECOMMENDATIONS

The EM&V team identified two recommendations for EAL's consideration through the evaluation process, presented in Table 197.

Table 197. Smart Direct Load Control Pilot—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Collaborate with the EM&V team to update energy savings for *commercial smart thermostats*.	The current methodology for estimating energy savings of *smart thermostats* installed in commercial buildings relies on limited data from a small number of building types. Exploring options to update these savings values could provide more accurate savings estimates.
BY2023 process recommendations	**Recommendation 2:** Continue to investigate opportunities to increase program participation in small business segments as well as residential to improve the underperformance of this pilot in relation to planning estimates.	The SDLC Pilot has struggled with meeting planning goals each program year. In addition to residential customers, small business segments hold potential for this program.

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Table 198. Smart Direct Load Control Pilot—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 impact recommendations	• Install sufficient M&V devices to estimate demand savings in future years accurately. ○ Review and rejected as potentially unneeded. If AC runtime is collected from the program population, an M&V sample is unnecessary.
	• Update energy savings methodology for *commercial thermostats*. ○ Continuing. Both the implementor and EM&V team monitor this as more *commercial thermostats* join the program to provide sufficient data.
PY2020 process recommendations	• Consider an annual *thank you* that includes information about the customer's financial benefit for participating and the benefit to the overall system, reported by program staff as already in progress. ○ Complete.
PY2021 impact recommendations	• Estimate demand savings after each event during the season. ○ Complete.
PY2021 process recommendations	• Consider tracking opt-outs by event. ○ Complete.
PY2022 impact recommendations	• Model the effect of weather on demand using a lagged time variable. ○ Ongoing.

14.3 METHODOLOGY

The evaluated savings results are based on savings calculations made during the tracking system review, using deemed savings values in TRM 9.1 and characteristics of each participant's heating system, square footage, and previous thermostat. *Commercial thermostats* applied a deemed savings value per ton of cooling capacity, an average value based on past evaluations of *commercial smart thermostats*.

Estimates of demand savings used AC runtime data from participating thermostats during the control season and deployed three evaluation methods defined in MISO's BPM.

14.3.1 Tracking System Review

The EM&V team reviewed all program-reported tracking data to assess the extent to which it provided the algorithms and ex-ante values necessary for each measure. The tracking system data review referenced TRM 9.1 for savings assumptions; the EM&V team checked the tracking systems' linkage to TRM deemed savings and methods used to estimate savings.

Our review accomplished three primary objectives: (1) identify initial high-level tracking system concerns, (2) verify whether the savings estimates in the tracking system are consistent with the savings algorithms' results as outlined in TRM 9.1, and (3) assess the tracking system's ability to support quality assurance and quality control (QA/QC) activities, including future evaluation needs.

Participants in the SDLC pilot program come from several distinct streams. The most direct participation route is through the SDLC pilot program web portal. Participants can choose between self-

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installation or direct installation of their thermostat by a trade ally. Customers with an existing *smart thermostat* that was *not* rebated or provided through an EAL energy efficiency program can enroll the thermostat to participate in demand response events through the SDLC pilot program portal as well. Additional participants come from other residential energy efficiency programs provided by EAL and participate in programs that no longer exist in EAL's portfolio. It is important to note that energy savings are only claimed for new participants who receive a rebated *smart thermostat* (i.e., only new SDLC pilot program participants who did not have a *smart thermostat* before enrollment). Regardless of installation or registration method, all thermostats can claim demand savings.

14.3.2 Impact Evaluation

The EM&V team used different methods to estimate energy savings for residential and commercial participants, ensuring that thermostats rebated during prior program years or through other EAL Solutions programs were not attributed to BY2023 SDLC pilot program energy savings.

14.3.2.1 Residential Participants

The EM&V team used Section 2.1.12 of TRM 9.1 to calculate savings for *smart thermostats* installed for residential customers. Table 199[122] provides the kilowatt-hour savings per square foot of conditioned space for *smart thermostats* installed residentially.

Table 199. Smart Thermostats—Deemed Savings Value per Square Foot of Conditioned Space

Baseline	Electric cooling (kWh/ft²)	Electric resistance heat (kWh/ft²)	Electric HP heating (kWh/ft²)
Manual thermostat	0.450	0.845	0.395
Programmable thermostat	0.113	0.212	0.099
Default	**0.399**	**0.750**	**0.351**

The EM&V team calculated savings for each new *residential smart thermostat* rebated through the SDLC pilot program using Equation 1, using the square footage of each site's conditioned space and the appropriate energy savings factor from Table 199 to estimate energy savings.

Equation 1. Smart Thermostat Energy Savings (Residential)

$$kWh_{i,b,h} = \left(\frac{kWh_{b,h}}{ft^2}\right) \times ft_i^2$$

where:

$kWh_{i,b,h}$ is the savings of household *i* with baseline thermostat *b* and heating type *h*

$\frac{kWh_{b,h}}{ft^2}$ is the savings of baseline thermostat *b* and heating type *h*

[122] Reproduced from Table 70, Page 80, Volume 2, TRM 9.1.

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ft_i^2 is the square footage of household *i*

Most *residential smart thermostats* were in homes with *AC* and *gas heat*, and 30 percent of participants had *heat pumps*. Table 200 provides full results, while Table 201 details the types of thermostats customers had before installing their new *smart thermostats*.

Table 200. Distribution of Heating Type (Residential)

Heating	Unique devices	Percentage
AC with resistance heat	257	16.8%
AC with gas heat	808	52.8%
Heat pump	466	30.4%
Total	**1,531**	**100.0%**

Table 201. Type of Thermostat Removed (Residential)

Type of thermostat removed	Unique devices	Percentage
Manual	1,520	99.3%
Programmable	11	0.7%
Total	**1,531**	**100.0%**

Using participants' square footage, previous thermostat type, heating type, and participation method, the EM&V team estimated energy savings for *residential smart thermostat* installation in BY2023. As noted above, participants who enrolled in the SDLC pilot's demand response portion after receiving a *smart thermostat* from another EAL program, or participants who enrolled a previously purchased (non-rebated) device, produced no energy savings for the SDLC pilot program.

Energy savings are only applicable for customers who enrolled through the SDLC pilot portal, received a rebated *smart thermostat*, and either self-installed the thermostat or had the thermostat installed by a trade ally.

The SDLC pilot program saved 1,645,589 kWh in BY2023 residential installations, resulting in a 100.0 percent realization rate. Net savings, which applied an NTG ratio of 100.0 percent,[123] were also 1,645,589 kWh.

14.3.2.2 Commercial Participants

In BY2023, the SDLC pilot program rebated 462 *smart thermostats*. Energy savings for *smart thermostats* installed in *commercial buildings* used an energy savings factor of 819 kWh/ton of cooling capacity, as shown in Equation 2.

Equation 2. Smart Thermostat Energy Savings (Commercial)

$$kWh_i = tonnage_i \times \left(819 \frac{kWh}{ton}\right)$$

[123] Based on primary NTG research conducted in BY2023 for *residential smart thermostats* in HES program.

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Table 202 summarizes the distribution of AC and heat pump cooling capacities for BY2023 SDLC pilot program commercial participants. Over 50 percent of *commercial smart thermostats* are connected to HVAC units under four tons; an additional 37 percent of commercially installed *smart thermostats* connect to HVACs with four to six tons of capacity. However, some larger units also participated in the pilot.

Table 202. Commercial Cooling Tonnage (SDLC)

Cooling capacity (tons)	Count	Percentage	Cumulative percentage
< 2 tons	10	2.2%	2.2%
≥ 2 tons and < 3 tons	166	35.9%	38.1%
≥ 3 tons and < 4 tons	75	16.2%	54.3%
≥ 4 tons and < 5 tons	43	9.3%	63.6%
≥ 5 tons and < 6 tons	126	27.3%	90.9%
≥ 6 tons and < 7 tons	1	0.2%	91.1%
≥ 7 tons and < 8 tons	4	0.9%	92.0%
≥ 8 tons and < 9 tons	6	1.3%	93.3%
≥ 9 tons and < 10 tons	0	0.0%	93.3%
≥ 10 tons and < 11 tons	23	5.0%	98.3%
≥ 11 tons and < 20 tons	8	1.7%	100.0%
Total	**462**	**100.0%**	**100.0%**

After applying the energy savings factor of 819 kWh/ton of capacity, the EM&V team estimated 1,527,681 kWh in energy savings achieved through the installation of *smart thermostats* in commercial buildings in BY2023. These findings were marginally less than the reported savings of 1,527,713 kWh, resulting in a realization rate of 100.0 percent among commercial installations. Based on previous evaluations, the NTG ratio for commercial thermostats was 100.6 percent,[124] resulting in a net savings of 1,536,847 kWh.

14.3.3 Demand Response

Tetra Tech received five-minute HVAC runtime data for SDLC participants spanning the load control season. Opt-outs were removed from the data for each event, and unenrolled devices were removed from the analysis file. In BY2023, EAL called four events that spanned eight hours, including a test event on June 1, 2023. Table 203 summarizes called events during BY2023. The total number of participating thermostats for each event is calculated as the total number of thermostats curtailed after removing thermostats that opted out of the event.

[124] Based on primary research conducted for *smart thermostats* installed in commercial buildings in EAL's Large Commercial and Industrial program (PY2022).

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Table 203. Smart Direct Load Control Pilot—BY2023 Load Control Events

Date	Start time (CST)	End time (CST)	Participating thermostats	Event type
06/01/2023	13:00	14:00	7,066	Test event
07/19/2023	13:00	15:00	6,975	Normal event
07/27/2023	16:00	18:00	6,998	Normal event
08/24/2023	15:00	18:00	6,698	Normal event

To aid in determining thermostats that opted out of the event, Tetra Tech received data on each thermostat for each curtailment. The data determined whether a thermostat was eligible, online, selected for curtailment, and whether it opted out. Table 204 provides a summary of the curtailment data for each event.

Table 204. Smart Direct Load Control Pilot—BY2023 Curtailment and Opt-outs

Date	Eligible for curtailment	Selected while online	Called for curtailment	Opted out[125]	Participating thermostats
06/01/2023	8,877	7,524	7,519	453	7,066
07/19/2023	9,001	7,562	7,557	582	6,975
07/27/2023	8,993	7,541	7,533	535	6,998
08/24/2023	9,031	7,560	7,549	851	6,698

For each event, savings are based on runtime data. Depending on the calculation method, the baseline is constructed using ten eligible days before the event and applying no adjustment (*MISO Calculation #1*), a symmetrical multiplicative adjustment (*MISO Calculation #2*), or weather-based adjustment (*MISO Calculation #3*). These are described in more detail below.

14.3.3.1 MISO Calculation Evaluation Methodology

The EM&V team evaluated SDLC runtime data using three calculation options detailed in MISO's BPM.

14.3.3.2 MISO Calculation #1–Unadjusted Baseline

MISO's unadjusted baseline calculation approach utilizes the ten most recent eligible days (non-holiday, non-event weekdays) before the event. The average load for each hour is calculated by averaging the five-minute kilowatt load intervals recorded for each thermostat. A total load is calculated for participating thermostats for that interval. For a given hour, the total load is averaged across the ten days to represent the unadjusted baseline load for that period.

[125] Only thermostats that were both called for curtailment and chose to opt out are counted here.

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14.3.3.3 MISO Calculation #2–Symmetrical Multiplicative-Adjusted Baseline

MISO's symmetrical multiplicative-adjusted baseline modifies the unadjusted baseline load schedule to represent actual event-day loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without an SDLC event. The adjustment factor uses pre-event loads during baseline and event days to inform the degree of adjustment required. If pre-event loads on event days exceed baseline loads, baseline loads will be scaled upwards. If pre-event loads on event days are less than baseline loads, baseline loads will be scaled downwards. The multiplicative adjustment procedure is as follows:

1. Extract three hours of pre-event loads beginning four hours before the start of the event from both the unadjusted baseline load and the event-day load. For example, for an event starting at 14:00, extract unadjusted baseline and event-day loads for three hours spanning 10:00 to 13:00.
2. Calculate the *symmetrical multiplicative adjustment factor* by taking the ratio of (1) the sum of the three hours of event-day loads and (2) the sum of three hours of unadjusted baseline loads. This adjustment factor may not adjust the baseline by more than 20 percent in either direction. If the multiplicative adjustment exceeds 1.2, then set the multiplicative adjustment to 1.2. If the multiplicative adjustment is less than 0.8, set the multiplicative adjustment to 0.8.
3. Calculate the *symmetrical multiplicative-adjusted baseline* by multiplying the unadjusted baseline load by the *symmetrical multiplicative adjustment factor*.

14.3.3.4 MISO Calculation #3–Weather-Adjusted Baseline

MISO's weather-adjusted approach to baseline calculations incorporates an unadjusted baseline with a factor describing how temperature affects non-event loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without an SDLC event. Instead of using pre-event loads to determine the adjustment to baseline loads, the sensitivity of loads to temperature changes is used to predict what loads would have been in the absence of an event. The procedure is as follows:

1. Determine the *change in loads* relative to a change in temperature (the temperature adjustment, expressed in kilowatt per degree Fahrenheit) using data from eligible non-event, non-holiday weekdays.
2. Determine the *average temperature* during baseline days' hours corresponding to each hour of an event. These baseline days are the same ten prior non-event, non-holiday weekdays used to calculate the *unadjusted baseline load*.
3. Calculate the *difference in temperature* between (1) the average of the baseline days' hours corresponding to the event hours and (2) the actual temperatures recorded during the event's hours.
4. Calculate the *weather adjustment factor* by multiplying the temperature difference by the temperature adjustment.
5. Calculate the *weather-adjusted baseline* by adding the *weather adjustment factor* to the *unadjusted baseline load.*

The EM&V team used two models to estimate weather-adjusted load reductions. The first used only average hourly temperature, while the second used a lagged temperature to simulate the delay

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between a change in exterior temperature and AC usage. Ultimately, the model with the lagged temperature outperformed the model that only incorporated exterior temperature.[126]

14.4 DETAILED IMPACT EVALUATION RESULTS

14.4.1 Evaluated Kilowatt-Hour Savings Results

Applying the deemed savings methodology to *residential smart thermostats* detailed in Table 70 of Section 2.1.12 of TRM 9.1 resulted in gross savings of 1,645,589 kWh in BY2023 and a 100.0 percent realization rate. Net savings, which applied an NTG ratio of 100.0 percent,[127] also totaled 1,645,589 kWh.

Among commercial installations, the EM&V team estimated 1,527,681 kWh in gross energy savings after applying the energy savings factor of 819 kWh/ton of capacity. These findings were very close to reported savings, resulting in a realization rate of 100.0 percent. After applying the NTG ratio of 100.6 percent[128] for commercial thermostats, net savings totaled 1,536,847 kWh.

Combining the residential and commercial energy savings achieved through the SDLC pilot program in BY2023 resulted in gross energy savings of 3,173,270 kWh, with a corresponding realization rate of 100.0 percent. Based on NTG rates of 100.0 percent for *residential smart thermostats* and 100.6 percent for *commercial smart thermostats*, net savings were estimated at 3,182,436 kWh in BY2023. Table 205 details savings for the SDLC pilot program in BY2023.

Table 205. Final Evaluated Energy Savings—Smart Direct Load Control Pilot

Sector	Participants	Device count	Reported savings (kWh)	Evaluated savings (kWh)	Realization rate	NTG ratio	Net savings
Residential	1,302	1,531	1,645,589	1,645,589	100.0%	100.0%	1,645,589
Commercial	91	462	1,527,713	1,527,681	100.0%	100.6%	1,536,847
Total	**1,393**	**1,993**	**3,173,303**	**3,173,270**	**100.0%**	**100.3%**	**3,182,436**

14.4.2 Evaluated Kilowatt Savings Results (MISO Calculations)

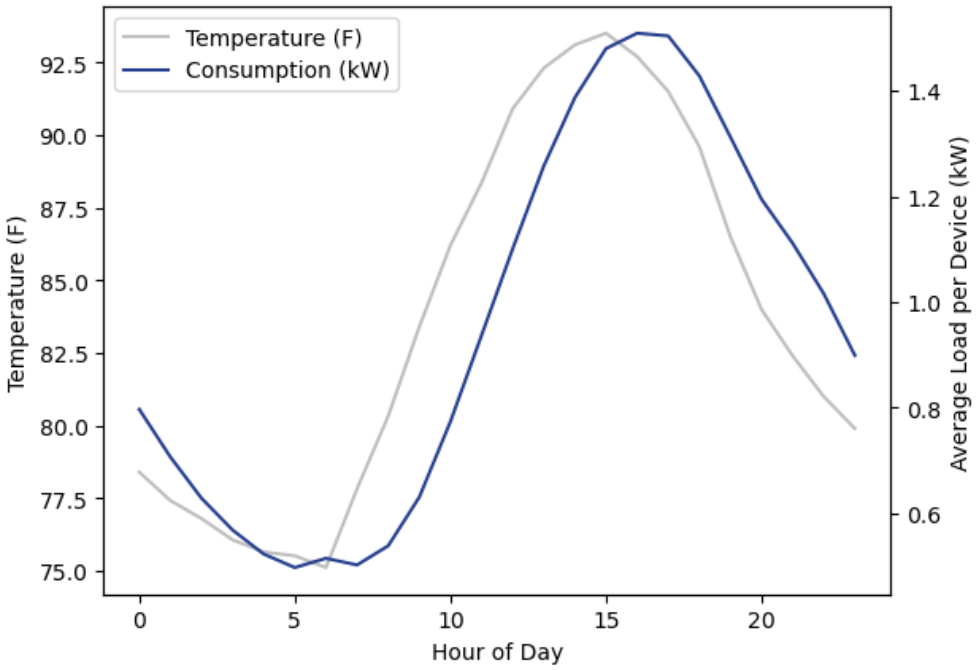
In support of the SDLC evaluation, the EM&V team received five-minute HVAC runtime data from ICF for event days and the periods preceding each event day. After removing opt-outs from each respective event (and pre-event baseline period), the EM&V team aggregated data to hourly records by thermostat; this allowed for straightforward estimation of demand reductions using each of the three MISO calculation methods. The EM&V team's final estimated demand reduction total of 5.94 MW occurred during the July 19, 2023, event using *MISO Calculation #3* (weather-adjusted baseline). The opinion of the EM&V team is that the weather-adjusted baseline methodology provides the best estimation of counterfactual events, as it incorporates historical loads from days immediately preceding an event and the important interaction between observed load and observed temperature. Figure 50

[126] All weather data for the SDLC evaluation are from Bill and Hillary Clinton National Airport (KLIT).
[127] Based on primary NTG research conducted in BY2023 for *residential smart thermostats*.
[128] Based on primary NTG research conducted in PY2022 for *commercial smart thermostats*.

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shows the relationship between demand and temperature using data from the ten baseline days before August 24, 2023.

Figure 50. Kilowatt per Device and Temperature (Degrees Fahrenheit)



MISO Calculation #1—Unadjusted Baseline

All MISO Calculation methods require the selection of baseline days. The *MISO BPM* method stipulates that the ten prior non-event, non-holiday weekdays are selected to represent the baseline. The average load during those baseline days is calculated for a given event hour, representing an unadjusted baseline. Table 206 below highlights the unadjusted baseline calculations undertaken by the EM&V team.

Table 206. Smart Direct Load Control Pilot—MISO Calculation #1—MISO Unadjusted Baseline Calculations

Date	Start time (CST)	End time (CST)	Baseline (kW per device)
6/1/2023	13:00	14:00	0.71
7/19/2023	13:00	14:00	1.08
7/19/2023	14:00	15:00	1.17
7/27/2023	16:00	17:00	1.47
7/27/2023	17:00	18:00	1.48
8/24/2023	15:00	16:00	1.48
8/24/2023	16:00	17:00	1.51
8/24/2023	17:00	18:00	1.50

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MISO Calculation #2—Symmetrical Multiplicative-Adjusted Baseline

MISO's *symmetrical multiplicative-adjusted baseline* modifies the unadjusted baseline load schedule calculated above to be more representative of actual event-day loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without an event. The adjustment factor uses pre-event loads during baseline and event days to inform the degree of adjustment required. If pre-event loads on event days exceed baseline loads, baseline loads will be scaled upwards. If pre-event loads on event days are less than baseline loads, baseline loads will be scaled downwards. The multiplicative adjustment procedure is as follows:

1. Extract three hours of pre-event loads beginning four hours before the event's start from both the unadjusted baseline load and the event-day load.
2. Calculate the *symmetrical multiplicative adjustment factor* by taking the ratio of (1) the sum of the three hours of event-day loads and (2) the sum of three hours of unadjusted baseline loads.
3. Calculate the *symmetrical multiplicative-adjusted baseline* by multiplying the unadjusted baseline load by the *symmetrical multiplicative adjustment factor*.

The MISO BPM requires that the *symmetrical multiplicative adjustment* not lead to an adjustment greater than ±20 percent of the unadjusted baseline load. The symmetrical multiplicative adjustments are outlined in Table 207; in BY2023, the symmetrical multiplicative adjustment was always an increase of 20 percent.

Table 207. Smart Direct Load Control Pilot—Symmetrical Multiplicative Adjustment Factor by Event Date

Date	Symmetrical multiplicative adjustment factor
6/1/2023	1.20
7/19/2023	1.20
7/27/2023	1.20
8/24/2023	1.20

Savings Calculation

The savings calculation for each event hour is as follows:

kW Savings = Symmetrical Multiplicative Adjusted Baseline kW – Observed Load

Table 208 summarizes each hour's load reduction, with Table 209 summarizing the corresponding event-hour total kilowatt savings.

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Table 208. Smart Direct Load Control Pilot—MISO Calculation #2—MISO Adjusted Baseline and Per-Device Savings

Date	Start time (CST)	End time (CST)	Adjusted baseline	Symmetrical multiplicative adjustment adjusted reduction (per device kW)
6/1/2023	13:00	14:00	0.85	0.54
7/19/2023	13:00	14:00	1.30	0.60
7/19/2023	14:00	15:00	1.40	0.66
7/27/2023	16:00	17:00	1.76	0.47
7/27/2023	17:00	18:00	1.77	0.52
8/24/2023	15:00	16:00	1.78	0.41
8/24/2023	16:00	17:00	1.81	0.49
8/24/2023	17:00	18:00	1.80	0.59

Table 209. Smart Direct Load Control Pilot—MISO Calculation #2 Results

Date	Start time (CDT)	End time (CDT)	Number of participating devices	Per device kW savings	Event-hour savings (kW)
6/1/2023	13:00	14:00	7,066	0.54	3,815.6
7/19/2023	13:00	14:00	6,975	0.60	4,185.0
7/19/2023	14:00	15:00	6,975	0.66	4,603.5
7/27/2023	16:00	17:00	6,998	0.47	3,289.1
7/27/2023	17:00	18:00	6,998	0.52	3,639.0
8/24/2023	15:00	16:00	6,698	0.41	2,746.2
8/24/2023	16:00	17:00	6,698	0.49	3,282.0
8/24/2023	17:00	18:00	6,698	0.59	3,951.8

MISO Calculation #3—Weather-Adjusted Baseline

All MISO Calculation methods require the selection of baseline days. The *MISO BPM* method stipulates that the ten prior non-event, event-eligible days are selected to represent the baseline. The average load during those baseline days is calculated for a given event hour, representing an unadjusted baseline. Next, the average temperature for that same hour on the baseline days is calculated. To account for the lag between the temperature and the consumption rising, the temperature is shifted by two hours. That temperature is then subtracted from the average baseline days' temperature for that same shifted hour to determine the temperature differential between the baseline days' and event days' temperature. The temperature coefficient is multiplied by the temperature difference to calculate an additive kilowatt adjustment to the unadjusted baseline kilowatts.

Tetra Tech created a model that incorporated the effect of weather on load, developing a regression equation that explained air temperatures' influence on the resulting load for each event. Five-minute load data were aggregated to create average hourly loads covering the ten eligible baseline days prior to each event. Event days were excluded from the temperature adjustment analysis, as were holidays and weekends. The result is a dataset of the average load for each hour on eligible baseline days.

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The resulting regression analysis explored the equation:

Equation 3. Modeling Demand as a Function of Temperature

$$kW_t = \alpha + \beta * (Temperature)_{t-2} + e_t$$

Table 210 estimates the effect to which load during a given hour (*t*) can be primarily explained by the dry-bulb air temperature two hours prior (*t-2*). Different values for the number of hours to lag the temperature were explored, with a lag of two hours producing the most accurate regression. The resulting regression, run for each event, produced coefficients that were then applied to observed conditions during each event hour to estimate the counterfactual demand that would have occurred in lieu of the load control event.

Table 210. Smart Direct Load Control Pilot—Weather-Adjusted Regression Output by Event Day

Date	Start time (CST)	End time (CST)	kW per degree Fahrenheit	Adjusted R^2 value
6/1/2023	13:00	14:00	0.037	0.912
7/19/2023	13:00	15:00	0.053	0.867
7/27/2023	16:00	18:00	0.058	0.899
8/24/2023	15:00	18:00	0.052	0.955

Savings Calculation

The savings calculation for each event hour is as follows:

kW Savings = Weather Adjusted Baseline kW – Observed Load

For each event hour, Table 211 outlines the lagged temperature for both the baseline days and the event day. The table also shows the new weather-adjusted baseline and the calculated per-device savings.

Table 211. Smart Direct Load Control Pilot—MISO Calculation #3 Adjusted Baseline and Per-Device Savings

Date	Start time (CST)	End time (CST)	Unadjusted baseline (kW per device)	Baseline temperature (two-hour lag, °F)	Event temperature (two-hour lag, °F)	Weather-adjusted baseline (kW per device)	Per device savings (kW)
6/1/2023	13:00	14:00	0.71	81.7	85	0.83	0.52
7/19/2023	13:00	14:00	1.08	85.3	94	1.55	0.85
7/19/2023	14:00	15:00	1.17	86.5	94	1.57	0.83
7/27/2023	16:00	17:00	1.47	91.0	98	1.87	0.58
7/27/2023	17:00	18:00	1.48	91.1	98	1.87	0.62

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Date	Start time (CST)	End time (CST)	Unadjusted baseline (kW per device)	Baseline temperature (two-hour lag, °F)	Event temperature (two-hour lag, °F)	Weather-adjusted baseline (kW per device)	Per device savings (kW)
8/24/2023	15:00	16:00	1.48	92.3	101	1.93	0.57
8/24/2023	16:00	17:00	1.51	93.1	101	1.92	0.60
8/24/2023	17:00	18:00	1.50	93.5	101	1.89	0.68

Across all the event hours during BY2023, the highest single hour is selected to represent the program savings. Table 212 summarizes each hour's load reduction, with the final evaluated load reduction in **bold**.

Table 212. Smart Direct Load Control Pilot—MISO Calculation #3 Results

Date	Start time (CST)	End time (CST)	Number of participating devices	Per device savings (kW)	Event-hour savings (kW)
6/1/2023	13:00	14:00	7,066	0.52	3,665.4
7/19/2023	**13:00**	**14:00**	**6,975**	**0.85**	**5,942.1**
7/19/2023	14:00	15:00	6,975	0.83	5,768.3
7/27/2023	16:00	17:00	6,998	0.58	4,063.1
7/27/2023	17:00	18:00	6,998	0.62	4,345.3
8/24/2023	15:00	16:00	6,698	0.57	3,809.0
8/24/2023	16:00	17:00	6,698	0.60	3,996.2
8/24/2023	17:00	18:00	6,698	0.68	4,556.1

Based on the results from the regression analysis, the SDLC event on July 19, 2023, produced the highest savings among participants. Overall, 6,975 participating *smart thermostats* reduced load by an average of 0.85 kW per device from 13:00 to 14:00, equating to 5,942.1 kW in total load reduction.

Table 213 details the demand reduction estimates for each event in the 2023 season. The event with the highest savings occurred on July 19, with 5.9 MW of load reduction.

Table 213. Overall Smart DLC Demand Response Results by Event

Date	Reported savings (MW)	Evaluated savings (MW)	Realization rate
6/1/2023	6.49	3.67	56.4%
7/19/2023	**6.56**	**5.94**	**90.6%**
7/27/2023	6.56	4.35	66.2%
8/24/2023	4.71	4.56	96.8%

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15.0 AGRICULTURAL IRRIGATION LOAD CONTROL

The Agricultural Irrigation Load Control (AILC) program is a demand response program focusing on irrigation systems employed in the agricultural sector. The program is implemented by Connected Energy, which (1) provides marketing, a call center, control devices, and metering equipment and services; (2) conducts program tracking; and (3) calculates event-level savings for Entergy Arkansas, LLC (EAL).

The AILC program aims to reduce kilowatt demand loads when load control events occur during the summer (June 1 through August 31). Participants in the program have a control device installed on their motor, allowing the program to turn the motor off or on remotely. Participants can remotely control their motors, subject to program limits associated with event participation, or protect the motor from rapid on/off cycles. Except in emergency events, curtailment events are scheduled on weekdays for up to four hours and are limited between 12:00 p.m. and 9:00 p.m. Participants receive an email or text notification of the upcoming event two hours before the event starts, including the duration of the curtailment. Incentives are paid to participants every month and vary according to the horsepower (HP) of the enrolled motors.

The EM&V team deployed two methods for estimating load reductions, all summarized in the Midcontinent Independent System Operator's (MISO) *Business Practice Manual for Demand Response*[129] (*MISO Business Practice Manual*, or *MISO BPM*). Table 214 details the evaluation activities completed for the program in bridge year 2023.

Table 214. Agricultural Irrigation Load Control—Data Collection and Evaluation Activities

NTG approach	Process evaluation activities	Gross impact evaluation completes			
		Tracking system review	Desk reviews	On-site verification	Metered data analysis[130]
Stipulated at 1.0 as industry practice	Program staff interviews (2) Material review	N/A	N/A	N/A	Census

15.1 KEY FINDINGS

In BY2023, the AILC program responded to five events called on five separate days. The first of the events was a test event (June 1, 2023), used to verify equipment operability and verify measurement and verification data collection, while the other events were used to reduce load during the event hours. Of the five events, the test event on June 1, 2023, was one hour. The events on July 19 and July 27, 2023, were two hours; the events on August 3 and August 24, 2023, were four hours. The data collected by the metering equipment allows each participant to have their load metered in a 15-minute interval for the entire load-control season, providing highly granular data to support program baseline and event savings calculations.

[129] Midcontinent Independent System Operator Demand Response Business Practices Manual. BPM-026-r10. Effective October 1, 2023.
[130] This column refers to EAL customer meter data provided to the EM&V team instead of primary metered data collected as part of the on-site M&V.

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The AILC program's evaluated savings match those calculated by the program implementer, Connected Energy. The approach taken by Connected Energy and the evaluation, measurement, and verification team uses the MISO *symmetric multiplicative adjustment* (SMA) *baseline calculation*, which is appropriate for registering savings with MISO.

In BY2023, the AILC program achieved 17.7 MW in gross demand savings and a realization rate of 100.0 percent, highlighted in Table 215. These savings are based on the maximum event savings during the hour ending 16:00 on August 3. Overall, 1,605 customers participated in the AILC program during BY2023.

Table 215. Agricultural Irrigation Load Control—Reported, Evaluated, and Net Savings

Energy/demand savings	Reported savings	Evaluated savings	Realization rate	NTG ratio[131]	Net savings	Program contribution to portfolio savings
Energy savings (MWh)	-	-	N/A	N/A	N/A	N/A
Demand savings (MW)	17.7	17.7	100.0%	100.0%	17.7	20.0%

The AILC program does not claim energy savings. Therefore, these cells are represented with a dash.

The program fell short of savings goals, achieving 35.5 percent of the demand savings goal, as detailed in Table 216.

Table 216. Agricultural Irrigation Load Control—Savings Goals and Achievements

Energy/demand savings	Savings goal	Net savings achieved	Percentage of goal achieved
Energy savings (MWh)	-	-	-
Demand savings (MW)	49.9	17.7	35.5%

* The AILC program does not have an energy savings goal. Therefore, these cells are represented with a dash.

15.2 RECOMMENDATIONS

The EM&V team found two areas for program improvement, detailed in Table 217.

Table 217. Agricultural Irrigation Load Control—BY2023 Recommendations

Type	Recommendation	Key finding
BY2023 impact recommendations	**Recommendation 1:** Consider tracking opt-outs by event or event-hour.	The specific set of devices opting out of load control events is essential to estimate load and demand reductions accurately.

[131] NTG for demand response programs is inherently 100 percent.

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Type	Recommendation	Key finding
BY2023 process recommendations	**Recommendation 2:** Continue to assess the role of this program in EAL's overall demand response opportunities.	This program provides a unique participation path in EAL's demand response portfolio.

Table 218. Agricultural Irrigation Load Control—Status of Prior Year Recommendations

Status of prior year recommendations	
PY2020 process recommendations	• Streamline the evaluation process by providing MISO with a savings report earlier in the analysis process. ○ Complete.
PY2021 process recommendations	• Streamline the evaluation process by providing a MISO savings report with 15-minute-level data. ○ In progress.
PY2022 process recommendations	• Continue to educate customers on the functionality of the equipment and their ability to control their pumps remotely. ○ Complete.

15.3 METHODOLOGY

The subsections below summarize the methodology used to evaluate demand savings achieved through the AILC program.

15.3.1 Impact Evaluation

Connected Energy's methodology follows the *SMA method* to calculate the baseline conditions. The *SMA method* is one of the three methods approved by MISO to register program savings with MISO and is used by the EM&V team to evaluate the program's event savings. The *SMA method* is described in greater detail in subsequent sections of this report.

The events called in BY2023 are described in Table 219 below.

Table 219. Agricultural Irrigation Load Control—BY2023 Load Control Events

Date	Start time (CDT)	End time (CDT)	Active devices	Event type
06/01/2023	13:00	14:00	842	Test event
07/19/2023	13:00	15:00	786	Normal event
07/27/2023	16:00	18:00	926	Normal event
08/3/2023	14:00	18:00	940	Normal event
08/24/2023	14:00	18:00	739	Normal event

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For each event, savings are based on the participants' interval meter data. For each hour of the day, loads from event participants are summed together to create a single *irrigation load control* load. Observation of the loads on days before the event, on the same hour as an event hour, is adjusted by observing differences between pre-event hours on the baseline and event days. This process is described in more detail below.

15.4 DETAILED IMPACT EVALUATION RESULTS

Next, we present evaluation results by calculation method.

15.4.1 Baseline Calculation

MISO's *SMA baseline calculation* uses the ten most recent eligible days (non-holiday, non-event weekdays) before the event to construct a baseline load schedule. Since event- and non-event-day loads are not identical during non-event hours, an adjustment factor corrects the baseline load schedule to be more representative of actual event-day loads. MISO's *SMA baseline calculation* is used to measure both the implementer's performance for EAL and MISO savings registration. The baseline and resulting savings calculations focus on individual event hours.

The baseline calculation has three components: the *unadjusted baseline*, the *adjustment factor*, and the *application of the adjustment factor* to the unadjusted baseline to create a final baseline calculation.

15.4.1.1 Unadjusted Baseline Calculation

The baseline calculation is conducted in the following steps applied to each hour of the event:

1. Before the event, the ten most recent eligible days (non-holiday, non-event weekdays) are selected.
2. An *unadjusted hourly baseline* is calculated for a given hour by summing the participating 15-minute metered loads for each hour corresponding to the event hours for each of the ten baseline days.
3. The event's *baseline hourly load* is calculated by averaging the summed 15-minute metered intervals; the result is an *unadjusted hourly baseline*.

15.4.1.2 Symmetrical Multiplicative-Adjusted Baseline Factor

MISO's *SMA baseline* corrects the unadjusted baseline load schedule to better represent actual event-day loads. Adjustment is conducted to generate a more accurate counterfactual baseline load to represent what would have occurred on an event day without a load control event. The adjustment factor uses pre-event loads during baseline and event days to inform the degree of adjustment required. If pre-event loads on event days exceed baseline loads, baseline loads will be scaled upwards. If pre-event loads on event days are less than baseline loads, baseline loads will be scaled downwards. The multiplicative-adjustment procedure is as follows:

1. Extract three hours of pre-event load data beginning four hours before the event starts from the unadjusted baseline load and the event-day load. For example, for an event beginning at 14:00, extract unadjusted baseline and event-day loads for three hours spanning 10:00 to 13:00.

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2. Calculate the *SMA factor* by taking the ratio of (1) the mean of the three hours of event-day loads and (2) the mean of three hours of unadjusted-baseline loads. This adjustment factor may not adjust the baseline by more than 20 percent in either direction. If the multiplicative adjustment exceeds 1.2, then set the multiplicative adjustment is 1.2. If the multiplicative adjustment is less than 0.8, assume the multiplicative adjustment is 0.8.
3. Calculate the *SMA baseline* by multiplying the unadjusted baseline load by the *SMA factor*.

15.4.1.3 Final Baseline Calculation

The final baseline calculation combines the unadjusted baseline with the adjustment factor. A cap of 0.20 is placed on this adjustment factor, limiting the positive or negative adjustment to the baseline to 20 percent. If the calculated adjustment factor is greater than 1.20 or less than 0.80, the adjustment factor is set at the cap. The following formula is used to calculate a given event hour's baseline:

*Adjusted Baseline kW = Unadjusted Baseline kW * Adjustment Factor*

15.4.1.4 Savings Calculation

Savings under the MISO *SMA calculation method* are presented for each hour of an event. The savings formula is:

Savings kW = Adjusted Baseline kW - Event Hour kW

15.4.2 Materials Review

Information found on the AILC program website includes a general description of the program, detailing eligibility requirements and payment schedules for participating customers. The payment schedule accurately describes the relationship between pump size (HP) and payment. A copy of the program manual, a frequently-asked-questions section, and program contact information were easily found on the website.

15.5 OVERALL SAVINGS ESTIMATES

The EM&V team evaluated Connected Energy's savings calculation by reviewing the program's metered load data, confirming the methodology and results, repeating the calculation steps, and reviewing additional input assumptions. To conduct the evaluation, the EM&V team received the following information from Connected Energy:

- 15-minute load data spanning May 15, 2023, through August 31, 2023, and
- calculations of the savings for each event hour for 2023.

The EM&V team finds that the MISO *SMA baseline calculation* is the most appropriate for the AILC program; of the three MISO approaches, this method best captures the variability in irrigation loads. Irrigation presents a challenge for demand-response programs in that the key driver is precipitation. Precipitation is not a factor that MISO currently includes in its weather adjustment method, which is based solely on load responses to temperature. MISO's other option—a *10 of 10 unadjusted baseline method*—is appropriate for more stable loads less influenced by weather or scheduling factors during

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event hours. Given MISO's three options, the EM&V team finds this approach is the most appropriate, and no adjustments were made based on the calculation method.

Next, the EM&V team attempted to replicate the savings calculations provided by Connected Energy. The savings were based on average hourly baseline loads, the adjustment factor, and event-day hourly average loads. Table 220 describes the key calculation factors for each BY2023 event hour. Realization rates on savings ranged from 99.4 to 100.9 percent. Connected Energy and the EM&V team agreed that the peak performing event hour was 15:00 to 16:00 on August 3, 2023 (in bold in Table 220).

There are minor differences in both unadjusted baseline kilowatt and SMA factors between Connected Energy and the EM&V team; the baseline adjustment factors for the EM&V team and Connected Energy are the same for all four events. Unadjusted baseline loads are different for all event hours covered during BY2023; however, differences are minor in absolute terms and are similar in magnitude between Connected Energy and the EM&V team on all event days.

Table 220. Agricultural Irrigation Load Control—Load Control Event Baseline and Savings Comparison[132]

Date	Hour starting (CDT)	Event hour load (kW)	Connected energy unadjusted baseline load (kW)	EM&V team unadjusted baseline load (kW)	Baseline adjusted factor	Connected energy event hour savings (kW)	EM&V team event hour savings (kW)	Realization rate (%)
6/1/2023	13:00	996.0	1,001.4	3,714.6	1.20	3,456.1	3,461.5	100.2
7/19/2023	13:00	912.2	951.8	8,703.3	1.11	8,684.8	8,723.3	100.4
7/19/2023	14:00	1,053.4	1,053.4	8,799.6	1.11	8,690.4	8,688.7	100.0
7/27/2023	16:00	1,590.1	1,679.9	10,280.8	1.20	10,657.1	10,746.9	100.8
7/27/2023	17:00	1,277.4	1,277.4	10,160.6	1.20	10,915.3	10,915.3	100.0
8/3/2023	14:00	1,350.6	1,248.4	15,728.5	1.20	17,625.8	17,523.6	99.4
8/3/2023	**15:00**	**1,178.1**	**1,178.1**	**15,740.8**	**1.20**	**17,710.8**	**17,710.8**	**100.0**
8/3/2023	16:00	1,387.5	1,387.5	15,768.2	1.20	17,534.3	17,534.3	100.0
8/3/2023	17:00	1,548.7	1,548.7	15,672.0	1.20	17,257.7	17,257.7	100.0
8/24/2023	14:00	1,444.4	1,504.0	6,764.6	1.20	6,613.6	6,673.2	100.9
8/24/2023	15:00	1,271.9	1,271.9	7,202.0	1.20	7,370.5	7,370.5	100.0
8/24/2023	16:00	1,044.9	1,044.9	7,131.9	1.20	7,513.3	7,513.3	100.0
8/24/2023	17:00	1,441.9	1,441.9	7,181.1	1.20	7,175.5	7,175.5	100.0

[132] Savings results may not be exact per the data in the table due to rounding occurring at several steps of the calculation.

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16.0 CONSISTENT WEATHERIZATION APPROACH AND ACT 1102

This section presents the EM&V team's consistent weatherization approach (CWA) estimates for Entergy Arkansas, LLC residential programs in the BY2023. An overview of EAL's implementation of the CWA is outlined in the Arkansas Technical Reference Manual 9.1, Volume 1: EM&V Protocol C. EAL implements the CWA through four residential programs: Home Energy Solutions, Low-Income Solutions, Energy Solutions for Manufactured Homes, and Energy Solutions for Multifamily Homes.

Order No.7 in Docket No.13-002-U (Order) of the Arkansas Public Service Commission requires all investor-owned utilities (IOU) to implement a consistent approach to providing weatherization services to eligible Arkansas residents. The Order identified key programmatic features that this CWA must include; these features were further developed and refined into a recommended framework—referred to as the Core program—for implementation by the IOUs.

Critical components of the Core program are:

- direct installation of low-cost energy-saving measures;
- installation of a set of *weatherization* measures, including *insulation* and *air sealing*; and
- management of the contractors that deliver the home assessments and installations.

The EM&V team presents estimates of direct installation, *weatherization* measures, and information regarding the number of contractors that participated in these installations during bridge year (BY) 2023 (BY2023).

16.1 CONSISTENT WEATHERIZATION APPROACH FINDINGS

Table 221 provides program-specific counts of participants and quantities of energy-saving measures provided under the Home Energy Solutions, Low-Income Solutions, Energy Solutions for Manufactured Homes, and Energy Solutions for Multifamily Homes programs. A total of 12,403 unique participants were enrolled in the four programs, providing a total of 56,758 energy-saving measure units across the installed measures. The number of installed measures significantly decreased by 37 percent compared to 90,209 measures installed in program year 2022, even though the number of program participants slightly increased from 12,114 participants in PY2022. This decrease can be attributed to the *lighting* measure installation coming to a halt midyear in BY2023 due to new baseline standards coming into effect, resulting in no energy savings for this measure. There were 62,591 *lighting* measure units installed in PY2022 compared to 28,283 in BY2023.

Within the EAL residential program offerings, *weatherization* improvements continue to be among the most popular measures in the residential programs. *Air sealing* and *duct sealing* comprised over 13,806 of the energy efficiency units installed in BY2023, representing about 84 percent of energy savings across the year. These results were higher than PY2022, where 77 percent of savings were provided by *air sealing* and *duct sealing* measures across the Home Energy Solutions, Energy Solutions for Multifamily Homes, Energy Solutions for Manufactured Homes, and Low-Income Solutions programs.

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Table 221. BY2023 Participation in CWA Programs

Program	Participants[133]	Measure quantity
Home Energy Solutions	7,449	30,704
Energy Solutions for Multifamily Homes	2,673	13,470
Energy Solutions for Manufactured Homes	627	2,627
Low-Income Solutions	1,654	9,957
Total	**12,403**	**56,758**

Table 222 highlights the number of participants and quantities of measures received under the Home Energy Solutions, Energy Solutions for Manufactured Homes, and Energy Solutions for Multifamily Homes programs. A total of 56,758 energy efficiency measures were installed, most of which were *direct-install LED* bulbs.

Table 222. BY2023 Consistent Weatherization Measures Received—All Programs

Measure type	Measure description	Participants*	Measure quantity
Appliance	Advanced power strip	3,329	3,566
Domestic hot water	Faucet aerator	1420	3,228
	Low-flow showerhead	1215	1721
Envelope	Air infiltration	4358	4,363
	Ceiling insulation	2,571	2,674
HVAC	Central air conditioner tune-up	1,733	1,882
	Heat pump tune-up	1,069	1112
	Duct sealing/replacement	8,670	9,443
	Smart thermostat	413	486
Lighting	LED	3,732	28,283
Total		**12,389**	**56,758**

* A participant may install measures across multiple measure categories. Thus, the total count of participants may not equal the sum of the counts by measure category.

Below we highlight home energy audits and measures received by program participants within the Home Energy Solutions, Energy Solutions for Manufactured Homes, Energy Solutions for Multifamily Homes, and Low-Income Solutions programs.

[133] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the Smart Direct Load Control (SDLC) program, *health and safety* measures, *contractor performance bonus* measures, and *audit* measures.

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16.1.1 Home Energy Solutions Program

The Home Energy Solutions program helps single-family residential customers identify opportunities to improve their home's energy efficiency. Local home energy consultants work with customers to develop long-term, cost-effective energy savings by analyzing their energy use. Program participants receive home energy assessments conducted by a trained trade ally and direct installation of no-cost measures, including *LEDs, low-flow faucet aerators, low-flow showerheads, and advanced power strips (APS)*. When the home assessment results indicate additional energy-saving work could be performed on-site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *ceiling insulation, air infiltration, duct sealing*, *duct replacement*, *air conditioner and heat pump tune-ups*, and *smart thermostats*. The program offers incentives for these premium energy efficiency upgrades.

Table 223 highlights the Core program's types, quantities, and cost of *direct-install* and *weatherization* measures implemented under the Home Energy Solutions program. A total of 7,449[134] eligible customers took part in the program, ultimately installing 30,704 energy-saving measures.

Table 223. BY2023 Consistent Weatherization Measures Installed—Home Energy Solutions Program

Measure category	Measure type	Participants*	Measure quantity	Incentive ($)
Domestic hot water	Faucet aerator	183	317	1,156
	Showerhead	214	278	4,214
Envelope	Air infiltration	2,113	2,114	560,340
	Ceiling insulation	1,956	2,054	2,943,995
Appliances	Advanced power strip	1,910	2,116	61,862
HVAC	Air conditioner tune-up	1,326	1,468	367,000
	Residential central air conditioner tune-up	13	13	3,250
	Residential heat pump tune-up	429	467	139,850
	Duct sealing	4,930	5,656	4,281,162
	Smart thermostat	305	373	83,347
Lighting	LED	1,954	15,848	45,323
Total		**7,437**	**30,704**	**8,491,498**

* A participant may install measures across multiple measure categories. Thus, the total count of participants may not equal the sum of the counts by measure category.

[134] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the SDLC program, *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.

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A total of 1,159 Home Energy Solutions participants received a home energy audit (803 *Tier 1 Audits* and 356 *Tier 2 Audits*). All participants who received a home *energy audit* also installed at least one energy efficiency measure through the program, bringing the conversion rate (the ratio of *audits* to projects) to 1:1. Approximately four energy-saving units were installed per participating customer, on average. The program's cost[135] is estimated at $8,569,089 (including the cost associated with *smart thermostats—duplicate install to customer*, *energy audits,* and *DI Labor Fee to track additional incentive for contractors without savings*) across the 7,449 participating households throughout EAL's territory in BY2023, producing a total of 28,725 MWh and 9.5 MW in net savings. The average cost of the program was approximately $1,150 per participant.

Ultimately, 31 contractors conducted home *energy audits* or *installations* through the program. All 31 contractors installed at least one energy-efficiency measure type. All 31 contractors implemented *weatherization* measures; 21 of these 31 also implemented *direct-install* measures. All contractors that did weatherization work had Building Performance Institute (BPI)-certified team leads.

16.1.2 Energy Solutions for Manufactured Homes Program

The Energy Solutions for Manufactured Homes program provides cost-effective energy efficiency measures to manufactured home communities throughout EAL's service territory. After installing no-cost *direct-install* energy efficiency measures in participating customers' homes, program technicians provide an *audit* of the home to provide property owners and residents details about additional energy-saving opportunities. If additional energy-saving work could be performed on the site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *air conditioner and heat pump tune-ups*, *air sealing*, *duct sealing,* and *smart thermostats*. The program offers incentives for these premium energy efficiency upgrades.

Table 224 highlights the types and quantities of Core program *direct-install* and *weatherization* measures implemented under the Energy Solutions for Manufactured Homes program. A total of 627[136] eligible customers took part in the program, ultimately installing 2,627 energy-saving units.

[135] The program's cost is estimated based on the *Total Incentive Amount* per installed measure as reported by the program's tracking database.
[136] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.

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Table 224. BY2023 Consistent Weatherization Measures Received—Energy Solutions for Manufactured Homes Program

Measure category	Measure type	Participants*	Measure quantity	Incentive ($)
Domestic hot water	Faucet aerator	81	192	669
	Showerhead	82	126	1,402
Envelope	Air infiltration	230	230	67,823
Appliances	Advanced power strip	182	184	5,365
HVAC	Air conditioner tune-up	110	110	27,500
	Residential heat pump tune-up	18	18	5,350
	Duct sealing	477	479	560,151
	Smart thermostat	30	30	6,704
Lighting	LED	185	1,258	3,739
Total		**625**	**2,627**	**678,703**

* A participant may install measures across multiple measure categories. Thus, the total count of participants may not equal the sum of the counts by measure category.

A total of 94 Home Energy Solutions participants received a home *energy audit* (31 *Tier 1 Audits* and 63 *Tier 2 Audits*). All participants who received a home *energy audit* also installed at least one energy efficiency measure through the program, bringing the conversion rate (the ratio of *audits* to projects) to 1:1. Approximately four energy-saving units were installed per participating customer, on average. The program's cost[137] is estimated at $686,352 (including the cost associated with *energy audit* and *DI Labor Fee to track additional incentive for contractors without savings*) across the 627 participating households throughout EAL's territory in BY2023, producing a total of 5,631 MWh and 0.8 MW in net savings. The average cost of the program was approximately $1,095 per participant.

Ultimately, 23 contractors conducted home *energy audits* and *installations* through the program. All contractors installed at least one energy-efficiency measure. All contractors implemented *weatherization* measures, and 11 also implemented *direct-install* measures. All contractors that did weatherization work had BPI-certified team leads.

16.1.3 Energy Solutions for Multifamily Homes Program

The Energy Solutions for Multifamily Homes program provides cost-effective energy efficiency measures to multifamily residences with at least five units. After installing no-cost energy efficiency measures in units of participating customers, program contractors provide energy audits to multifamily property owners with details about additional energy-saving opportunities. If additional energy-saving work could be performed on the site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *commercial* and *residential air conditioner tune-ups, heat pump tune-ups*, *air sealing*, *duct sealing,* and *commercial Wi-Fi thermostats*. The program offers incentives for these premium energy efficiency upgrades.

[137] The program's cost is estimated based on the *Total Incentive Amount* paid per installed measure as reported by the program's tracking database.

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Table 225 highlights the types and quantities of the Core program *direct-install* and *weatherization* measures implemented under the Energy Solutions for Multifamily Homes program. A total of 2,673[138] eligible participants took part in the program, ultimately installing 13,470 energy-saving units.

Table 225. BY2023 Consistent Weatherization Measures Received—Energy Solutions for Multifamily Homes Program

Measure category	Measure type	Participants*	Measure quantity	Incentive ($)
Domestic hot water	Faucet aerator	809	1,969	6,720
	Showerhead	609	896	8,554
Envelope	Air infiltration	1,287	1,291	232,910
	Ceiling insulation	346	347	251,572
Appliances	Advanced power strip	572	573	16,207
HVAC	Air conditioner tune-up	265	265	44,625
	Residential heat pump tune-up	521	525	91,800
	Commercial central air conditioner (tune-up)	4	11	1,595
	Commercial Wi-Fi thermostat	2	4	894
	Duct sealing	1,903	1,922	952,877
Lighting	LED	812	5,667	25,616
Total		**2,673**	**13,470**	**1,633,370**

* A participant may install measures across multiple measure categories. Thus, the total count of participants may not equal the sum of the counts by measure category.

A total of 55 Home Energy Solutions participants received a home *energy audit* (26 *Tier 1 Audits* and 29 *Tier 2 Audits*). All participants who received a home *energy audit* also installed at least one energy efficiency measure through the program, bringing the conversion rate (the ratio of *audits* to projects) to 1:1. Approximately five energy-saving units were installed per participating customer, on average. The program's cost[139] is estimated at $1,641,525 (including the cost associated with *energy audits* and *DI Labor Fee to track additional incentive for contractors without savings*) across the 2,673 participating households throughout EAL's territory in BY2023, producing a total of 12,565 MWh and 2.3 MW in net savings. The average cost of the program was approximately $614 per participant.

Ultimately, 21 contractors conducted home *energy audits* and *installations* through the program. All contractors installed at least one energy-efficiency measure. Twenty contractors

[138] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.
[139] The program's cost is estimated based on the *Total Incentive Amount* paid per installed measure as reported by the program's tracking database.

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implemented *weatherization* measures; 12 also installed *direct-install* measures. All contractors that did weatherization work had BPI-certified team leads.

16.1.4 Low-Income Solutions Program

The Low-Income Solutions program helps low-income households become more comfortable, safe, and energy-efficient through *home weatherization* and *health and safety upgrades* at no cost to customers. The Low-Income Solutions program also helps with home repairs to correct minor problems that may otherwise prevent the building from receiving *weatherization* upgrades or pose a *health or safety* risk. As part of the Low-Income Solutions program, EAL offers the following services at no cost to qualifying customers: *home energy assessments* by qualified field technicians, *LEDs*, *low-flow showerheads*, *faucet aerators* (for kitchens and bathrooms), and *APSs*. EAL also offers the following measures at no cost to the customer: *air sealing*, *duct sealing*, *ceiling insulation*, *air conditioner and heat pump tune-ups, and smart thermostats*. Table 226 highlights the types and quantities of the Core program *direct-install* and *weatherization* measures implemented under the Low-Income Solutions program. A total of 1,654[140] eligible participants took part in the program, ultimately installing 9,957 energy-saving units.

Table 226. BY2023 Consistent Weatherization Measures Received Low-Income Solutions Program

Measure category	Measure type	Participants*	Measure quantity	Incentive ($)
Domestic hot water	Faucet aerator	347	750	2,555
	Showerhead	310	421	4,572
Envelope	Air infiltration	728	728	225,658
	Ceiling insulation	269	273	388,676
Appliances	Advanced power strip	665	693	20,428
HVAC	Air conditioner tune-up	15	15	3,750
	Residential heat pump tune-up	101	102	21,075
	Duct sealing	1,360	1,386	1,081,991
	Smart thermostat	76	79	17,653
Lighting	LED	781	5,510	15,860
Total		**1,654**	**9,957**	**1,782,217**

* A participant may install measures across multiple measure categories. Thus, the total count of participants may not equal the sum of the counts by measure category.

[140] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the Smart DLC program, *health and safety* measures, *DI Labor Fee to track additional incentive for contractors without savings,* and *audit* measures.

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Table 227 shows the types and quantities of the Core program *health and safety* measures implemented under the Low-Income Solutions program. A total of 1,537 participants, 93 percent, received *health and safety* measures out of 1,654 total program participants. On average, two *health and safety* measure units were installed per customer that received this measure. Average cost spent per customer that installed *health and safety* measure was $260.

Table 227. BY2023 Consistent Weatherization Health and Safety Measures Received Low-Income Solutions Program

Measure description	Health and safety incentives spent ($)	Percentage of health and safety incentives spent	Quantity installed
Battery	198	0.05%	50
Capping unvented gas wall heater	18	0.00%	2
CO/smoke detector	53,910	13.51%	1,360
Dryer vent (cleaning/repair)	127,200	31.87%	645
Drywall repair	3,456	0.87%	13
Duct repair/replacement	264	0.07%	1
Electrical repairs	220	0.06%	2
HVAC	28,077	7.03%	276
Other	768	0.19%	10
Plumbing repair	294	0.07%	1
Roof repair	455	0.11%	2
Subfloor repair	75	0.02%	1
Ventilation	183,805	46.05%	514
Window/door repair or replacement	385	0.10%	2
Total	**399,125**	**100.00%**	**2,879**

A total of 247 Low-Income Solutions participants received a home *energy audit* (217 *Tier 1 Audits* and 30 *Tier 2 Audits*). All participants that received a home *energy audit* also installed at least one energy efficiency measure through the program, bringing the conversion rate (the ratio of *audits* to projects) to 1:1. Approximately six energy-saving units were installed per participating customer, on average. The program's cost[141] is estimated at $2,190,571 (including the cost associated with *smart thermostats—duplicate install to customer*, *energy audits*, *DI Labor Fee to track additional incentive for contractors without savings*, and *health and safety* measures) across the 1,654 participating households throughout EAL's territory in BY2023, producing a total of 7,947 MWh and 1.8 MW in net savings. The average cost of the program was approximately $1,324 per participant.

[141] The program's cost is estimated based on the *Total Incentive Amount* paid per installed measure as reported by the program's tracking database.

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Ultimately, 14 contractors conducted home *energy audits* and *installations* through the program. All 14 contractors installed at least one energy-efficient measure type. Among them, all implemented *audit* or *weatherization* measures, and 12 contractors also installed *direct-install* measures. All contractors that did weatherization work had BPI-certified team leads. Contractors who work in the Low-Income Solutions program also have Healthy Homes Certification from BPI.

16.2 ACT 1102

To meet the objectives outlined in Act 1102, EAL launched the Low-Income Energy Solutions program in PY2020 and continued to implement the program in BY2023. The program is designed to serve low-income (defined as Low-Income Home Energy Assistance Program (LIHEAP)-eligible) or seniors (defined as 65 and older).

16.2.1 Key Findings

As by design, the Low-Income Energy Solutions program fully meets Act 1102 objectives, with roughly 90 percent of surveyed participants being LIHEAP-eligible and/or 65 years of age; households must be in one of the two categories to qualify to participate in the Low-Income Energy Solutions program.

At the same time, it is important to note that the other three existing programs—Home Energy Solutions, Energy Solutions for Manufactured Homes, and Energy Solutions for Multifamily Home—also continue to serve residential households to meet Act 1102 objectives.

16.2.2 Methodology Overview

Act 1102 information in this section is based on the results from BY2023 process evaluation participant surveys conducted for the Home Energy Solutions, Low-Income Solutions, Energy Solutions for Manufactured Homes and Energy Solutions for Multifamily Homes programs.

Table 228 provides program-specific counts of participants and the number of completed process evaluation surveys for EAL's four residential programs that directly serve customers' homes. A total of 12,403 unique accounts participated, with a total of 173 surveys completed.[142]

[142] Survey respondents were those in the household that were most knowledgeable of the details of and the overall experience from participation in residential program offerings.

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Table 228. BY2023 in Residential Programs (Excluding Upstream Programs)

Program	Participants[143]	Completed process surveys
Home Energy Solutions	7,449	72
Energy Solutions for Manufactured Homes	627	30
Energy Solutions for Multifamily Homes	2,673	50
Low-Income Solutions	1,654	41
Total	**12,403**	**193**

Combining data collected on household size and income, the EM&V team generated an estimate of the number and share of survey respondents eligible for assistance under LIHEAP. To do so, the EM&V team utilized a table of LIHEAP-eligibility cutoffs contained in Table 229, where LIHEAP eligibility is determined through a combination of household size and household income.

Table 229. BY2023 Income and Household Size Cutoffs to Determine LIHEAP Eligibility[144]

Household size	Annual income
1	$21,870
2	$29,580
3	$37,290
4	$45,000
5	$52,710
6	$60,420
7	$68,130
8	$75,840

16.2.3 Program-Level Results

Below we summarize program participant information for the Low-Income Solutions, Home Energy Solutions, Energy Solutions for Manufactured Homes, and Energy Solutions for Multifamily Homes programs. Consistent with guidance from the independent evaluation monitor, the most recent (BY2023) process evaluation survey results have been applied to each program's total number of participants in BY2023. The survey results are used to estimate the number of program participants falling into (1) age, (2) income, and (3) LIHEAP eligibility bins to determine the approximate total number of participants falling within each respective bin.

[143] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as *DI Labor Fee to track additional incentive for contractors without savings* and *audit* measures.

[144] LIHEAP eligibility is reported for the current program year and can be found at https://www.benefits.gov/benefit/1542. LIHEAP eligibility is updated annually, and the applicable program year is used in calculating process survey participants' eligibility. For households with more than eight people, $7,710 per additional person is added.

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16.2.3.1 Low-Income Solutions Program

This program targets low-income households eligible for LIHEAP or EAL customers aged 65 or older. In BY2023, the program incentivized *ceiling insulation*, *air infiltration*, *duct sealing*, *air conditioner and heat pump tune-ups,* and *smart thermostat* measures while providing direct installation of *faucet aerators*, *low-flow showerheads*, *APSs*, and *lighting* measures at no cost to the customers.

Table 230 highlights key demographic information for participants. The EM&V team applied process survey responses and demographic information from the Department of Housing and Urban Development (HUD) to estimate the resulting shares of participants falling into age, income, and LIHEAP eligibility bins.

Based on the survey conducted in BY2023, at least 37 percent of survey respondents were aged 65 or older, and approximately 54 percent identified as being eligible for LIHEAP benefits. Overall, the EM&V team verified Low-Income Solutions program eligibility through LIHEAP status and/or age within the household for 88 percent of survey respondents. Applying these shares to BY2023 participation numbers, at least 591 participants were 65 or older, and approximately 888 participants were eligible for LIHEAP benefits. However, examining criteria for program eligibility shows that 1,442 of 1,654 participants successfully confirmed program eligibility through either LIHEAP status or age within the home.

Table 230. BY2023 Demographic Information—Low-Income Solutions Program

Respondent characteristic		Percentage*	Participants[145]
Respondent age	18–24	2.4%	39
	25–34	11.9%	197
	35–44	23.8%	394
	45–54	11.9%	197
	55–64	14.3%	236
	65 or older	35.7%	591
	Participants (n)		**1,654**
LIHEAP status	LIHEAP-eligible	53.7%	888
	Not LIHEAP-eligible	46.3%	766
	Participants (n)		**1,654**

*Percentages are estimated from BY2023 process surveys, follow-up surveys, and census data (HUD).

16.2.3.2 Home Energy Solutions Program

Home Energy Solutions helps single-family residential customers analyze their energy use and identify opportunities to improve their homes' energy efficiency. Program participants receive

[145] Participant count includes all participants reported in each program including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the SDLC program, *health and safety* measures, *contractor performance bonus* measures, and *audit* measures.

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home *energy assessments* conducted by a trained trade ally and *direct installation* of low-cost measures, including *LEDs*, *low-flow faucet aerators*, *low-flow showerheads*, and *APSs*. When the home assessment results indicate additional energy-saving work could be performed at the site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *ceiling insulation*, *air infiltration*, *duct sealing* or *duct replacement*, *air conditioner and heat pump tune-ups* and *smart thermostat* measures.

Table 231 highlights key demographic information for the Home Energy Solutions program participants. The EM&V team applied BY2023 process survey responses and the resulting shares of respondents falling into age, income, and LIHEAP-eligibility bins to determine the approximate total number of participants falling within each respective bin. In BY2023, approximately 34 percent of surveyed Home Energy Solutions participants were aged 65 or older. Applying these shares to BY2023 participation numbers, 2,518 participants were 65 or older. Approximately 71 percent of surveyed participants were LIHEAP-eligible, resulting in an estimated 2,175 participants for BY2023.

Table 231. BY2023 Demographic Information—Home Energy Solutions

Respondent characteristic		Percentage*	Participants[146]
Respondent age	25–34	9.9%	737
	35–44	16.9%	1,259
	45–54	22.5%	1,676
	55–64	16.9%	1,259
	65 or older	33.8%	2,518
	Participants (n)		**7,449**
LIHEAP status	LIHEAP-eligible	70.8%	5,274
	Not LIHEAP-eligible	29.2%	2,175
	Participants (n)		**7,449**

*Percentages are estimated from BY2023 process surveys.

[146] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as duplicate *smart thermostat* measures claimed in the SDLC program, *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.

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16.2.3.3 Energy Solutions for Manufactured Homes Program

The Energy Solutions for Manufactured Homes program provides cost-effective energy efficiency measures to manufactured home communities throughout EAL's service territory. After installing no-cost *direct-install* energy efficiency measures in participating customers' homes, program technicians provide an audit of the home to provide property owners and residents details about additional energy-saving opportunities. If additional energy-saving work could be performed on-site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *air conditioner and heat pump tune-ups*, *air sealing*, *duct sealing* and *smart thermostats*. The program offers incentives for these premium energy efficiency upgrades.

Table 232 highlights key demographic information for participants in the Energy Solutions for Manufactured Homes program. The EM&V team applied BY2023 process survey responses and the resulting shares of respondents falling into age, income, and LIHEAP-eligibility bins to determine the approximate total number of participants falling within each respective bin. In BY2023, approximately 36 percent of surveyed Energy Solutions for Manufactured Homes participants were aged 65 or older, and approximately 47 percent were eligible for LIHEAP benefits. Applying these shares to BY2023 participation numbers, approximately 228 were 65 or older and approximately 291 participants were eligible for LIHEAP benefits in BY2023.

Table 232. BY2023 Demographic Information—Energy Solutions for Manufactured Homes Program

Respondent characteristic		Percentage*	Participants[147]
Respondent age	18–24	6.1%	38
	25–34	15.2%	95
	35–44	24.2%	152
	45–54	12.1%	76
	55–64	6.1%	38
	65 or older	36.4%	228
	Participants (n)		**627**
LIHEAP status	LIHEAP eligible	46.4%	291
	Not LIHEAP eligible	53.6%	336
	Participants (n)		**627**

*Percentages are estimated from BY2023 process surveys.

16.2.3.4 Energy Solutions for Multifamily Homes Program

The Energy Solutions for Multifamily Homes program provides cost-effective energy efficiency measures to multifamily residences with at least five units. After installing no-cost energy efficiency measures in units of participating customers, program technicians provide energy

[147] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.

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audits to multifamily property owners with details about additional energy-saving opportunities. When additional energy-saving work could be performed on-site, contractors encourage customers to install premium efficiency upgrades and cost-effective *weatherization* measures, including *ceiling insulation*, *air conditioner* and *heat pump tune-ups*, *air sealing*, and *duct sealing*. The program offers incentives for these premium energy efficiency upgrades.

Table 233 highlights key demographic information for participants in the Energy Solutions for Multifamily Homes program. The EM&V team applied BY2023 process survey responses and the resulting shares of respondents falling into age, income, and LIHEAP-eligibility bins to determine the approximate total number of participants falling within each respective bin. In BY2023, approximately 31 percent of surveyed Energy Solutions for Multifamily Homes participants were aged 65 or older, and 50 percent were eligible for LIHEAP benefits. Applying these shares to BY2023 participation numbers, approximately 823 participants were 65 or older in BY2023. Approximately 1,336 participants were eligible for LIHEAP benefits in BY2023.

Table 233. BY2023 Demographic Information—Energy Solutions for Multifamily Homes

Respondent characteristic		Percentage*	Participants[148]
Respondent age	25–34	11.5%	307
	35–44	15.4%	412
	45–54	26.9%	719
	55–64	15.4%	412
	65 or older	30.8%	823
	Participants (n)		**2,673**
LIHEAP status	LIHEAP-eligible	50.0%	1,336
	Not LIHEAP-eligible	50.0%	1,336
	Participants (n)		**2,673**

*Percentages are estimated from BY2023 process surveys.

[148] Participant count includes all participants reported in each program, including those that did not claim energy or demand savings such as *DI Labor Fee to track additional incentive for contractors without savings*, and *audit* measures.

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17.0 NON-ENERGY BENEFITS

The key measure of success for electric energy efficiency programs is the direct savings achieved in energy (kilowatt-hours, kWh) and demand (kilowatts, kW). However, the energy efficiency industry recognizes that other benefits related to the implementation of these measures exist. These additional benefits can include reductions in maintenance, water usage, wastewater needs, fossil fuel consumption, arrearages, terminations and reconnections, cooling loads due to the reduced heat inputs, and potentially even insurance premiums. These benefits can account for increases in health, safety, comfort, property values, and even productivity.

In 2015, the Arkansas Public Service Commission issued a directive to the independent evaluation monitor to establish an approach for quantifying non-energy benefits (NEB) in cases where they are material and quantifiable. The Arkansas Technical Reference Manual (TRM) Evaluation, Measurement, and Verification (EM&V) Protocol L (Protocol L) provides a framework and orientation for quantifying benefits not included under standard forms of EM&V savings calculations. Sections of Protocol L identify three types of NEB calculations:

- *Protocol L1:* NEBs for electricity, natural gas, and liquid propane (*other fuels*);
- *Protocol L2:* NEBs for water savings; and
- *Protocol L3:* NEBs of avoided and deferred equipment replacement costs (ADRC).

Protocol L1: NEBs for Electricity, Natural Gas, and Liquid Propane

Measures installed through Entergy Arkansas, LLC's (EAL) energy efficiency programs occasionally generate savings for multiple fuel types. NEBs are calculated for *other fuels* (i.e., not electricity) not supplied by EAL when the EM&V team can identify them, and gas utilities cannot claim the savings. Projects delivered jointly through EAL and gas utilities cannot provide other fuel NEBs to EAL, as the respective gas utility already claims gas savings. These other fuels typically include natural gas and propane.[149] Such calculations multiply the additional benefits of other fuels by the present value of the avoided cost-per-unit energy savings. The analysis of *other fuel NEBs* uses the following equation:

$$Benefit = Energy\ Savings \times Avoided\ Other\ Fuel\ Costs$$

Where:

Benefit	*= avoided economic costs per unit of energy savings of the other fuel savings over the lifetime of the measure, expressed in current dollars*
Energy savings	*= annual number of other fuel kilowatt-hours, therms, or gallons of propane saved per measure installed*
Avoided costs	*= present value of the avoided cost-per-unit energy saving*

[149] Propane savings = therm savings * 1.1.

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Protocol L2: NEBs for Water Savings

Some energy efficiency measures reduce water and wastewater consumption. NEBs calculations for *water savings* use an algorithm to estimate the value of avoided water and wastewater consumption due to measures installed in energy efficiency programs. Bridge year (BY) 2023 (BY2023) marginal water rates were $0.00957 (residential) and $0.00931 (commercial) per gallon.[150] The EM&V team multiplied projects' total gallons by these rates to obtain total avoided costs.

The calculation of avoided costs resulting from *water savings* uses the following equation:

$$Benefit = Water\ Savings \times Avoided\ Water\ Costs$$

Where:

Benefit	*= avoided cost of water and water savings (per gallon) over the lifetime of the measure, expressed in current dollars*
Water savings	*= annual number of gallons saved per measure installed*
Avoided water costs	*= present value of the avoided costs-per-unit energy saving*

Protocol L3: NEBs of Avoided and Deferred Equipment Replacement Costs

The EM&V team quantified ADRCs by estimating the future value of the current price of not replacing a less energy-efficient piece of equipment with a more energy-efficient piece of equipment. This calculation accounts for the disparity between the estimated useful life (EUL) of baseline measures and their more efficient replacements. There are two main types of ADRCs: *replace-on-burnout (ROB)* and *early replacement (ER)*; many of the NEBs identified for each measure in EAL's portfolio fall under the *ER* category.

17.1 CALCULATION INPUTS

The NEBs calculations for EAL's 2023 energy efficiency portfolio use the static inputs presented in Table 234. Where appropriate, prices have been updated to 2023 dollars using a compounding annual inflation rate of 2.09 percent.

Table 234. BY2023 Static Non-Energy Benefit Parameters

Parameter	Value	Source
Nominal discount rate	6.33%	EAL
Inflation rate	2.09%	EAL
Real discount rate	4.15%	Equation 4
Propane	$2.48 per gallon	Arkansas TRM 9.1 (2023 dollars)
Natural gas	$0.61 per therm	EAL 2017; updated to 2023 dollars

[150] Arkansas TRM 9.1, Volume 1: Section L2, Table 9.

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Parameter	Value	Source
Water (residential)	$0.00957 per gallon	TRM 9.1 (2023 dollars)
Water (commercial)	$0.00931 per gallon	TRM 9.1 (2023 dollars)
Water (unknown)	$0.00944 per gallon	TRM 9.1 (2023 dollars)
Net-to-gross (NTG) ratio	Variable by program and measure	EM&V team research

Equation 4. Real Discount Rate

$$RDR = \frac{(0.0633 - 0.0209)}{(1 + 0.0209)} = 0.0415$$

Equation 5. Compound Interest

$$Price_{2020} = Price_y \left(1 + \frac{i}{(2023 - y)}\right)^{2023-y}$$

Where:

$Price_y$ = original price in year y

i = inflation rate

y = year corresponding to original price

The EM&V team employed algorithms defined in TRM 9.1 for each measure and NEB category. The EM&V team adapted the Excel-based calculator created by the Parties Working Collaboratively (PWC). Using this calculator, the EM&V team estimated the avoided and deferred replacement costs of installed measures, using a dual baseline when warranted under TRM 9.1.

17.2 IDENTIFICATION OF NON-ENERGY BENEFITS IN THE BY2023 PORTFOLIO

Using data extracts from the tracking system,[151] the EM&V team identified energy-efficient measures offered to customers through EAL's portfolio of energy-efficiency programs and determined which type(s) of NEBs were attributable to each measure. Table 235 and Table 236 summarize EAL's BY2023 portfolio measures and NEBs the EM&V team calculated for each measure. The table also provides the relevant TRM subsection for each measure used to calculate primary energy impacts and NEBs.

[151] Files for analysis were downloaded in February and March 2024 and contain finalized BY2023 data.

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Table 235. Non-Energy Benefits by Measure (Residential Sector)

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs	TRM 9.1, Vol. 2 subsection
Advanced power strips				2.6.1
Air conditioner tune-up				2.1.5
Air infiltration		✓		2.2.9
Ceiling insulation		✓		2.2.2
Duct sealing—air conditioner (AC) with resistance heat				2.1.11
Duct sealing—electric cooling		✓		2.1.11
Duct sealing—heat pump				2.1.11
Duct sealing electric resistance no cooling				2.1.11
Efficient hot water heaters				2.3.1
ENERGY STAR® dehumidifiers				2.4.4
ENERGY STAR freezers				N/A
ENERGY STAR directional light-emitting diode (LED)		✓	✓	2.5.1
ENERGY STAR omnidirectional LEDs		✓	✓	2.5.2
ENERGY STAR pool pumps				2.6.2
ENERGY STAR room air-cleaners				2.4.5
ENERGY STAR window AC replacement				2.1.10
Faucet aerators	✓	✓		2.3.4
Hard-wired LED fixtures		✓	✓	2.5.2
Heat pump tune-up				2.1.5
Low-flow showerheads	✓	✓		2.3.5
Smart thermostats		✓		2.1.12
Variable frequency drive				N/A

Table 236. Non-Energy Benefits by Measure (Commercial Sector)

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs	TRM 9.1, Vol. 2 subsection
Commercial AC/HP tune-up				3.1.6
Commercial door air infiltration		✓		3.2.10
Commercial showerheads	✓	✓		3.3.5
Commercial Wi-Fi thermostats		✓		N/A

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Measure	Water reduction	Other fuel	Avoided/deferred replacement costs	TRM 9.1, Vol. 2 subsection
Continuous energy improvement		✓		N/A
Custom—heating and cooling		✓		N/A
Custom—non-heating and cooling		✓		N/A
Custom controls		✓		N/A
Custom—non-lighting		✓		N/A
Electronically commutated motors for refrigeration				3.4.1
Evaporator fan controls				3.7.10
Faucet aerators	✓	✓		3.3.2
Halogens				3.6.3
High-efficiency battery chargers				3.9.6
High-intensity discharge (HID) lamps		✓	✓	3.6.3
Integrated-ballast compact fluorescent lamps (CFL)		✓	✓	3.6.3
Integrated-ballast LED lamps		✓	✓	3.6.3
LEDs		✓	✓	3.6.3
Lighting controls		✓		3.6.2
Low-flow pre-rinse spray valves	✓			3.7.12
Low-flow showerheads	✓			3.3.5
Magnetic ballast T5 or premium T8 retrofit of T12		✓	✓	3.6.3
Midstream: exterior fixtures			✓	3.6.3
Midstream: interior fixtures		✓	✓	3.6.3
Midstream: interior lamps		✓	✓	3.6.3
Modular CFLs and cold cathode fluorescent lamp (CCFL)		✓	✓	3.6.3
Occupancy-based PTHP/PTAC controls (packaged terminal heat pump/packaged terminal air conditioner)		✓		3.1.14
Other linear fluorescents		✓	✓	3.6.3
Refrigeration door gaskets				3.5.7
Refrigeration strip curtains				3.5.6
Unitary and split system AC/HP equipment				3.1.16

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Measure	Water reduction	Other fuel	Avoided/deferred replacement costs	TRM 9.1, Vol. 2 subsection
Variable frequency drives				N/A
Water-chilling equipment—air-cooled				3.1.17
Water-chilling equipment—water-cooled centrifugal				3.1.17
Zero energy doors				3.5.8

17.3 NON-ENERGY BENEFITS METHODOLOGIES

Below, we describe the methodologies used by the EM&V team to calculate savings associated with three primary categories of NEBs: ADRCs (associated with *lighting* measures), NEBs for *water savings*, and NEBs for *other fuels*. Note that all NEB calculations are at the program-by-measure level for which the EM&V team conducted NTG research. To ensure that we present net NEBs in the final results, we multiply the calculations detailed below by NTG ratios at the program-by-measure level.

17.3.1 Avoided and Deferred Replacement Costs: Lighting Measures

Installed energy-efficient *lighting* may have a longer EUL than the inefficient/baseline equipment it replaced. Customers avoid replacing the technology that would have been present absent the efficient equipment over the efficient equipment's lifetime (*avoided replacement costs*). When customers replace energy-using equipment before the end of its functional life, this ER accelerates the replacement cycle, deferring the replacement of baseline equipment (*deferred replacement costs*).

Participants in energy efficiency programs can receive energy-efficient *lighting* technologies. Typically, these technologies have longer-rated lives than the baseline technologies they replace. For example, consider a customer with *incandescent lamps* throughout their home that they replace with *LED lamps*. *Incandescent lamps* have a rated measure life that is one-eighth the life of an *LED lamp*. Had the customer not participated in an energy-efficient *lighting* program, they would have replaced the *incandescent lamp* with one-eighth the life of an *LED lamp* eight times over the *LED lamp's* life. This longevity affords the customer savings in replacement costs they would have incurred in the program's absence. Therefore, efficient *lighting* technology comes with savings from avoided replacement. The extent of these savings depends on the baseline *lighting* technology replaced and the efficient technology's lifetime replacing it.

Baseline technology assumptions for efficient *lighting* technologies depend on whether efficient *lighting* is installed at a residential or commercial site. In BY2023, the *residential lighting* baseline is a *compact fluorescent lamp*. Commercial customers currently have deferred replacement costs based on baseline *lighting* technologies before replacement with efficient lighting.

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17.3.1.1 Deferred Replacement Cost Equations

Equations below detail the deferred replacement costs for ER and ROB projects. Equation 6 and Equation 7 below relate to deferred replacement costs associated with efficient *lighting* technologies with static baseline technologies.

Equation 6. Deferred Replacement Cost—Replace-on-Burnout—Static Baseline

$$ROB_{Static} = \left\{\frac{1 - [(1 + RDR)^{EUL_{base} - EUL_{eff}}]}{[(1 + RDR)^{EUL_{base}}] - 1}\right\} * Cost_{base}$$

Equation 7. Deferred Replacement Cost—Early Retirement—Static Baseline

$$ER_{Static} = \left\{\frac{[(1 + RDR)^{EUL_{base} - RUL_{base}} - (1 + RDR)^{EUL_{base} - EUL_{eff}}]}{[(1 + RDR)^{EUL_{base}}] - 1}\right\} * Cost_{base}$$

Inputs contained in the above equations correspond with the following:

$RDR = real\ discount\ rate$, corresponding with Equation 4.

$$EUL_{base} = \frac{BaselineLifeHours}{AOH * PAF}$$

$$EUL_{eff} = \frac{EfficientLifeHours}{AOH * PAF}$$

Where:

$BaselineLifeHours$	corresponds with the rated life in hours associated with the baseline lighting technology.
$EfficientLifeHours$	corresponds with the rated life in hours associated with efficient lighting technology.
$AOH = Annual\ Operating\ Hours$	the annual operating hours of the site receiving efficient lighting technology.
$PAF = Power\ Adjustment\ Factor$	adjustments to lighting power corresponding with the existence of lighting controls—equal to one for all lighting projects in the tracking system

$$RUL_{base} = \frac{EUL_{base}}{3}$$

$Cost_{Base}$	corresponds to the total replacement costs for the baseline lighting technology.

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17.3.1.2 Residential Lighting

EAL's residential programs offer *LED lighting* to residential customers. When computing deferred replacement costs, the EM&V team utilized assumptions about efficient *lighting* measures' lives contained within TRM 9.1. For residential *lighting* projects, deferred replacement cost calculations followed the following logic:

Early Retirement Versus Replace-on-Burnout

Deferred replacement cost calculations will differ based on whether the *lighting* project was an ER or ROB. For the Home Energy Solutions, Energy Solutions for Manufactured Homes, Energy Solutions for Multifamily Homes, and Low-Income Solutions programs, all *lighting* projects in the tracking system file extracts were ER. All ER projects have baseline technology with a remaining useful life. The EM&V team assumed a remaining useful life equal to one-third of the baseline technology's EUL. The EM&V team used Equation 7 determine deferred replacement costs associated with efficient *lighting*.

For the Point of Purchase Solutions program, all *lighting* projects in the tracking system file extracts were ROB. In this case, no remaining useful life exists for the baseline technology. The EM&V team used Equation 6 to determine deferred replacement costs associated with efficient *lighting*.

17.3.1.3 Commercial Lighting

The EM&V team's methodologies used to determine deferred replacement costs for commercial projects are detailed below. The EM&V team worked with CLEAResult to understand the tracking system inputs and how they relate to deferred replacement cost calculations for each commercial project. Table 237 highlights *lighting* assumptions used by CLEAResult and the EM&V team for *commercial lighting* projects. For *commercial lighting* projects, replacement costs are broken into *indoor* or *outdoor* replacement costs within the table. We highlight how these parameters, alongside other parameters and assumptions, enter into the deferred replacement cost calculations below.

Table 237. BY2023 CLEAResult Measure Life and Fixture Cost by Fixture Type

Fixture type	Life (hours)	Material cost	Labor rate	Indoor hours	Outdoor hours	Indoor replacement costs	Outdoor replacement costs
CFL exit sign (self-ballasted pin)	10,000	$2.53	$59.83	0.08	0.08	$7.51	$7.51
CFL pin lamp	11,111	$7.42	$59.83	0.08	0.08	$12.41	$12.41
Integrated-ballast CFL lamp	10,000	$8.07	$59.83	0.08	0.08	$13.06	$13.06
Halogen	1,930	$4.21	$59.83	0.08	0.08	$9.19	$9.19
High-pressure sodium	33,429	$66.16	$70.71	0.25	0.50	$83.84	$101.52
Incandescent (use A-lamp)	2,722	$1.19	$59.83	0.08	0.08	$6.17	$6.17
Induction	100,000	$278.28	$70.71	0.25	0.50	$295.95	$313.63

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Fixture type	Life (hours)	Material cost	Labor rate	Indoor hours	Outdoor hours	Indoor replacement costs	Outdoor replacement costs
LED exit sign	50,000	$15.63	$59.83	0.25	0.25	$30.59	$30.59
LED fixture	50,000	$280.86	$70.71	0.25	0.50	$298.54	$316.21
Integrated-ballast LED lamp	20,000	$12.88	$59.83	0.08	0.08	$17.87	$17.87
LED tube lamp	50,000	$16.09	$59.83	0.08	0.08	$21.08	$21.08
Metal halide	14,000	$71.16	$70.71	0.25	0.50	$88.84	$106.52
Mercury vapor	14,000	$108.33	$70.71	0.25	0.50	$126.00	$143.68
Non-high-output T5 lamp	19,500	$20.04	$59.83	0.08	0.08	$25.02	$25.02
High-output T5 lamp	28,500	$20.42	$70.71	0.25	0.50	$38.09	$55.77
T12 (assume the same as T8)	27,000	$26.92	$59.83	0.08	0.08	$31.90	$31.90
CEE T8	28,500	$14.93	$59.83	0.08	0.08	$19.92	$19.92

Annual Operating Hours

Annual operating hours (AOH) for commercial projects vary depending on whether they had stipulated or deemed savings. Projects with stipulated savings have AOH directly entered in the tracking system. Therefore, these values were used in the equations highlighted above when determining deferred replacement costs associated with efficient *lighting*. Projects with deemed savings required the use of AOH based on building type. AOH was extracted directly from TRM 9.1 Volume 2, Table 418, and matched the building type identifiers in the tracking system. Table 238 provides a mapping of AOH to building type. The EM&V team merged this information onto *lighting* projects with deemed savings. The resulting building-type-specific AOH were used in the equations highlighted above to determine deferred replacement costs associated with efficient lighting.

Table 238. BY2023 Annual Operating Hours by Building Type

Building description	AOH	Coincidence factor
All building types: exit signs*	8,760	1.00
All building types: outdoor*	3,996	0.00
Education: K–12, without summer session	2,777	0.47
Education: college, university, vocational, daycare, and K–12 with summer session	3,577	0.69
Food sales: non-24-hour supermarket/retail	4,706	0.95
Food sales: 24-hour supermarket/retail	6,900	0.95
Food service: fast food	6,188	0.81
Food service: sit-down restaurant	4,368	0.81
Health care: out-patient	3,386	0.77

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Building description	AOH	Coincidence factor
Health care: in-patient	5,730	0.78
Lodging (hotel/motel/dorm): common areas	6,630	0.82
Lodging (hotel/motel/dorm): rooms	3,055	0.25
Manufacturing—1 and 2 shifts	4,547	0.64
Manufacturing—3 shifts	6,631	0.89
Multifamily housing: common areas	4,772	0.87
Nursing and resident care	4,271	0.78
Office	3,227	0.54
Outdoor athletic fields	503	0.00
Parking structure	7,884	1.00
Public assembly	2,638	0.56
Public order and safety	3,472	0.75
Religious	1,824	0.53
Retail: excluding malls and strip centers	3,668	0.69
Retail: enclosed mall	4,813	0.93
Retail: strip shopping and non-enclosed mall	3,965	0.90
Service (excluding food)	3,406	0.90
Warehouse: non-refrigerated	3,501	0.77
Warehouse: refrigerated	3,798	0.84

Baseline

Deferred replacement costs were computed using a static baseline. Depending on whether the project was ROB or ER, the EM&V team used Equation 6 (ROB) or Equation 7 (ER).

Early Retirement Versus Replace-on-Burnout

Deferred replacement cost calculations will differ based on whether the *lighting* project was ER or ROB. All *lighting* projects that are not *new construction* projects are *retrofits*. *Retrofit* projects in the tracking system explicitly assume that the ER of the baseline *lighting* technology took place when EAL conducted each project. The EM&V team presumed a remaining useful life equal to one-third of the baseline technology's EUL. The EM&V team used Equation 7 to determine deferred replacement costs associated with efficient lighting.

For *new construction efficient lighting* projects, these projects had the same assumptions as ROB. The EM&V team adopted CLEAResult's approach to determining the baseline technology that customers would have adopted in the absence of efficient *lighting*. Table 239 highlights the EM&V team's methodology for deciding the baseline *lighting* depending on the *new construction efficient lighting* technology. Equation 6 was used to determine the deferred replacement costs.

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Table 239. BY2023 Baseline Lighting for New Construction Projects

Efficient lighting technology	Efficient wattage	Baseline lighting technology
LED fixture	Less than 26 W	One-lamp T8 fixture
LED fixture	Between 26 W and 59 W	Two-lamp T8 fixture
LED fixture	Greater than 60 W	HID—metal halide fixture
Integrated-ballast LED lamp	Any wattage	Integrated-ballast CFL lamp
LED tube lamp	Less than 26 W	One T8 lamp
LED tube lamp	Greater than 26 W	One T5 high-output lamp
Generic fixture/lamp, exterior, not screw-in	Any wattage	Metal halide fixture/lamp
Generic fixture/lamp, interior or exterior, not LED or induction	Any wattage	No baseline—no deferred replacement savings

17.3.2 Non-Energy Benefits for Water Savings

Some energy efficiency measures reduce water and wastewater consumption. Using TRM 9.1 Volume 2, the EM&V team followed TRM guidance to deem water savings associated with efficient measures for residential and commercial customers. The EM&V team measured water savings in gallons for the first year (BY2023) and the lifetime over which the efficient measure may remain installed. To quantify the monetary value of water NEBs, the EM&V team put first-year water savings in cost savings by multiplying changes in water consumption by their respective prices (contained in Table 234). BY2023 marginal water rates were calculated and set at $0.00957 (residential) and $0.00931 (commercial) per gallon. First-year savings were assumed to be repeated as an annual cash flow over the efficient measure's life. To determine lifetime savings in dollars, the EM&V team discounted this cash flow using a real discount rate of 4.15 percent (contained in Table 234).

17.3.3 Non-Energy Benefits for Other Fuels

Efficient measures occasionally generate savings for multiple fuel types. Conversely, efficient measures such as *lighting* can create a penalty for various fuel types, as heat output from efficient *lighting* is lower than that of baseline *lighting* technologies typically in place. This lower heat output requires more fuel consumption to maintain the same temperature at gas-heated sites.

NEBs for other fuels—including natural gas and propane—were computed for residential and commercial projects with fuel savings or penalties. The EM&V team followed TRM guidance to deem other fuel savings or penalties associated with efficiency measures. Other fuel savings or penalties were quantified only for the projects with fuel savings or penalties that gas utilities had not claimed.

The EM&V team measured other fuel savings (or penalties) in therms or gallons for the first year (BY2023) and the lifetime over which the efficient measure may remain installed. To quantify the monetary value of other fuel NEBs, first-year savings (or penalties) were calculated in terms of cost savings (or penalties) by multiplying changes in consumption of other fuels by their respective prices (contained in Table 234). First-year savings were assumed to be repeated as

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an annual cash flow over the efficient measure's life. To determine lifetime savings in dollars, the EM&V team discounted this cash flow using a real discount rate of 4.15 percent (contained in Table 234).

17.4 ESTIMATES OF NON-ENERGY BENEFITS IN THE BY2023 PORTFOLIO

Below we highlight the EM&V team's NEBs findings for BY2023 using the methodologies described above.

17.4.1 Home Energy Solutions

The Home Energy Solutions program offered 13 unique types of measures for BY2023. The EM&V team calculated water NEBs for *faucet aerators* and *low-flow showerheads*. Gas NEBs were calculated for all *lighting* measures, *air infiltration*, *ceiling insulation*, *duct sealing (with electric cooling)*, and *smart thermostat* measures. Finally, ADRCs were calculated for *lighting* measures, and NEBs were categorized for all measures in this program as ER. Potential gas savings resulting from projects jointly delivered with a gas utility were excluded from EAL's NEBs estimates (see Table 240 through Table 244).

Table 240. Home Energy Solutions Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced power strips			
Air conditioner tune-up			
Air infiltration		✓	
Ceiling insulation		✓	
Duct sealing—AC with resistance heat			
Duct sealing—electric cooling		✓	
Duct sealing—heat pump			
ENERGY STAR directional LEDs		✓	✓
ENERGY STAR omnidirectional LEDs		✓	✓
Faucet aerators	✓		
Heat pump tune-up			
Low-flow showerheads	✓		
Smart thermostats		✓	

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Table 241. Gas Savings—Home Energy Solutions

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (net present value (NPV))
1,095,293	19,260,118	$668,128	$8,185,529

Table 242. Propane Savings—Home Energy Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
4,252	73,455	$10,546	$127,486

Table 243. Water Savings—Home Energy Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
940,628	9,406,284	$9,002	$72,471

Table 244. Avoided and Deferred Replacement Costs—Home Energy Solutions

Avoided and deferred replacement costs (NPV)
$60,283

17.4.2 Energy Solutions for Multifamily Homes

The Energy Solutions for Multifamily Homes program offered 14 unique types of measures in BY2023. The EM&V team calculated water NEBs for *faucet aerators* and *low-flow showerheads*. We calculated gas NEBs for all *lighting* measures, *air infiltration*, *ceiling insulation*, *smart thermostats,* and *duct sealing with electric cooling* measures. Finally, we calculated ADRCs for *lighting* measures. NEBs for all measures in this program are categorized as ER (see Table 245 to Table 249).

Table 245. Multifamily Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced power strips			
Air conditioner tune-up			
Air infiltration		✓	
Ceiling insulation		✓	
Duct sealing—AC with resistance heat			
Duct sealing—electric cooling		✓	
Duct sealing—heat pump			

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Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
ENERGY STAR directional LEDs		✓	✓
ENERGY STAR omnidirectional LEDs		✓	✓
Exit signs			
Faucet aerators	✓		
Heat pump tune-up			
Low-flow showerheads	✓		
Smart thermostats		✓	

Table 246. Gas Savings—Energy Solutions for Multifamily Homes

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
67,917	1,181,557	$41,429	$502,882

Table 247. Propane Savings—Energy Solutions for Multifamily Homes

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
0	0	$0	$0

Table 248. Water Savings—Energy Solutions for Multifamily Homes

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
3,485,621	34,856,208	$33,357	$268,549

Table 249. Avoided and Deferred Replacement Costs—Energy Solutions for Multifamily Homes

Avoided and deferred replacement costs (NPV)
$25,269

17.4.3 Energy Solutions for Manufactured Homes

The Energy Solutions for Manufactured Homes program offered 13 unique types of measures in BY2023. The EM&V team calculated water NEBs for *faucet aerators* and *low-flow showerheads*. We calculated gas NEBs for all *lighting* measures, *air infiltration*, *duct sealing with electric cooling*, and *smart thermostat* measures. Finally, we calculated ADRCs for *lighting* measures and categorized NEBs for all measures in this program as ER (see Table 250 to Table 254).

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Table 250. Energy Solutions for Manufactured Homes Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced strips			
Air conditioner tune-up			
Air infiltration		✓	
Duct sealing—AC with resistance heat			
Duct sealing—electric cooling		✓	
Duct sealing—heat pump			
Duct sealing electric resistance no cooling			
ENERGY STAR directional LEDs		✓	✓
ENERGY STAR omnidirectional LEDs		✓	✓
Faucet aerators	✓		
Heat pump tune-up			
Low-flow showerheads	✓		
Smart thermostats		✓	

Table 251. Gas Savings—Energy Solutions for Manufactured Homes

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
40,952	701,735	$24,981	$300,641

Table 252. Propane Savings—Energy Solutions for Manufactured Homes

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
1,230	20,766	$3,051	$36,293

Table 253. Water Savings—Energy Solutions for Manufactured Homes

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
453,507	4,535,068	$4,340	$34,940

Table 254. Avoided and Deferred Replacement Costs—Energy Solutions for Manufactured Homes

Avoided and deferred replacement costs (NPV)
$4,823

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17.4.4 Low-Income Solutions

The Low-Income Solutions program offered 14 unique types of measures in BY2023. The EM&V team calculated water NEBs for *faucet aerators* and *low-flow showerheads*; and calculated gas NEBs for all *lighting* measures, *air infiltration*, *ceiling insulation*, *duct sealing with electric cooling*, and *smart thermostat* measures. Finally, we calculated ADRCs for *lighting* measures, and we defined all measures in this program as ER (see Table 255 to Table 259).

Table 255. Low-Income Solutions Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced power strips			
Air conditioner tune-up			
Air infiltration		✓	
Ceiling insulation		✓	
Duct sealing—AC with resistance heat			
Duct sealing—electric cooling		✓	
Duct sealing—heat pump			
Duct sealing—electric resistance no cooling			
ENERGY STAR directional LEDs		✓	✓
ENERGY STAR omnidirectional LEDs		✓	✓
Faucet aerators	✓		
Heat pump tune-up			
Low-flow showerheads	✓		
Smart thermostats		✓	

Table 256. Gas Savings—Low-Income Solutions

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
242,662	4,195,411	$148,024	$1,790,588

Table 257. Propane Savings—Low-Income Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
906	12,462	$2,246	$22,899

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Table 258. Water Savings—Low-Income Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
1,552,475	15,524,753	$14,857	$119,610

Table 259. Avoided and Deferred Replacement Costs—Low-Income Solutions

Avoided and deferred replacement costs (NPV)
$21,599

17.4.5 Point of Purchase Solutions

The Point of Purchase Solutions program offered 16 unique types of measures (nine residential, three commercial) in BY2023. The EM&V team calculated gas NEBs for all *indoor lighting* measures, *air infiltration*, *duct sealing with electric cooling*, *weatherization*, and *smart thermostat* measures. We also calculated ADRCs for all *lighting* purchases, and we defined all purchases as ROB (see Table 260 to Table 264).

Table 260. Point of Purchase Solutions Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced power strips			
Appliance recycling			
Efficient hot water heaters			
ENERGY STAR dehumidifiers			
ENERGY STAR directional LEDs		✓	✓
ENERGY STAR freezers			
ENERGY STAR omnidirectional LEDs		✓	✓
ENERGY STAR pool pumps			
ENERGY STAR room air-cleaners			
ENERGY STAR window AC replacement			
Hard-wired LED fixtures		✓	✓
Midstream: exterior fixtures			✓
Midstream: interior fixtures		✓	✓
Midstream: interior lamps		✓	✓
Smart thermostats		✓	
Weatherization		✓	

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Table 261. Gas Savings—Point of Purchase Solutions

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
-334,482	-4,327,920	-$204,034	-$2,005,936

Table 262. Propane Savings—Point of Purchase Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
319	3,512	$792	$6,881

Table 263. Water Savings—Point of Purchase Solutions

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
0	0	$0	$0

Table 264. Avoided and Deferred Replacement Costs—Point of Purchase Solutions

Avoided and deferred replacement costs (NPV)
$7,934,409

17.4.6 Large Commercial and Industrial Solutions

The Large Commercial and Industrial Solutions program offered 34 types of measures in BY2023. The EM&V team calculated water NEBs for *commercial showerheads*, *faucet aerators*, and *low-flow pre-rinse spray valves*. We also calculated gas NEBs for all *interior lighting* projects, *advance RTU controls, CEI, smart thermostat, custom measures*, and *commercial door air infiltration* for gas heating sites. Finally, we calculated ADRCs for all *lighting* measures, and we defined all *lighting* measures as ER (see Table 265 to Table 269).

Table 265. Large Commercial and Industrial Solutions Program—Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Advanced RTU controls		✓	
Chiller tune -up			
Commercial AC/HP tune-up			
Commercial door air infiltration		✓	
Commercial showerheads	✓		
Commercial Wi-Fi thermostats		✓	

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Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Continuous energy improvement		✓	
Custom—heating and cooling		✓	
Custom—non-heating and cooling		✓	
Custom controls		✓	
Electronically commutated motors for refrigeration			
Engineering nozzles (compressed air)			
Evaporator fan controls			
Faucet aerators	✓		
Halogens		✓	✓
High-efficiency battery chargers			
High-intensity discharge (HID) lamps		✓	✓
Integrated-ballast CFL lamps		✓	✓
Integrated-ballast LED lamps		✓	✓
LEDs		✓	✓
Lighting controls		✓	
Low-flow pre-rinse spray valves	✓		
Magnetic ballast T5 or premium T8 retrofit of T12		✓	✓
Modular CFLs And CCFLs		✓	✓
Occupancy-based PTHP/PTAC controls			
Other linear fluorescents		✓	✓
Refrigeration door gaskets			
Refrigeration strip curtains			
Unitary and split system AC/HP equipment			
Variable frequency drives			
Water-chilling equipment—air-cooled			
Water chilling equipment—water-cooled centrifugal			
Water-chilling equipment—water-cooled			
Zero energy doors			

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Table 266. Gas Savings—Large Commercial and Industrial Solutions Program

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
-116,978	-1,738,972	-$71,357	-$810,664

Table 267. Propane Savings—Large Commercial and Industrial Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
0	0	$0	$0

Table 268. Water Savings—Large Commercial and Industrial Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
56,686	566,856	$528	$4,249

Table 269. Avoided and Deferred Replacement Costs—Large Commercial and Industrial Solutions Program

Avoided and deferred replacement costs (NPV)
$2,404,266

17.4.7 Small Business Solutions

The Small Business Solutions program offered 18 unique types of measures in BY2023. The EM&V team calculated water NEBs for *commercial showerheads*, *faucet aerators*, and *low-flow pre-rinse spray valves*. We calculated gas NEBs for all *interior lighting* projects, *commercial Wi-Fi thermostats*, and *commercial door air infiltration* sites with *gas* heating. Finally, we calculated ADRCs for *lighting* measures, and we defined all *lighting* measures as ER (see Table 270 to Table 274).

Table 270. Small Business Solutions Program—Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Commercial AC/HP tune-up			
Commercial door air infiltration		✓	
Commercial showerheads	✓		
Commercial Wi-Fi thermostats		✓	
Faucet aerators	✓		
Halogens		✓	✓
High-intensity discharge lamps		✓	✓

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Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Integrated-ballast CFL lamps		✓	✓
Integrated-ballast LED lamps		✓	✓
LEDs		✓	✓
Lighting controls		✓	
Low-flow pre-rinse spray valves	✓		
Magnetic ballast T5 or premium T8 retrofit of T12		✓	✓
Modular CFLs and CCFLs		✓	✓
Other linear fluorescents		✓	✓
Refrigeration door gaskets			
Refrigeration strip curtains			
Unitary and split system AC/HP equipment			

Table 271. Gas Savings—Small Business Solutions Program

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
-44,100	-656,700	-$26,901	-$306,034

Table 272. Propane Savings—Small Business Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
0	0	$0	$0

Table 273. Water Savings—Small Business Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
265,768	2,350,560	$2,474	$17,851

Table 274. Avoided and Deferred Replacement Costs—Small Business Solutions Program

Avoided and deferred replacement costs (NPV)
$1,156,671

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17.4.8 Public Institutions Solutions

The Public Institutions Solutions program offered 21 unique types of measures in BY2023. The EM&V team calculated water NEBs for *faucet aerators* and gas NEBs for all *lighting* projects and *commercial door air infiltration, Wi-Fi thermostats, and custom* sites with *gas* heating. We also calculated ADRCs for *lighting* measures and defined these projects as ER (see Table 275 to Table 279).

Table 275. Public Institutions Solutions Program—Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Continuous energy improvement			
Commercial AC/HP tune-up			
Commercial door air infiltration		✓	
Commercial Wi-Fi thermostats		✓	
Custom—heating and cooling		✓	
Custom—non-heating and cooling		✓	
Custom controls		✓	
Faucet aerators	✓		
Halogens		✓	✓
HID lamps		✓	✓
Integrated-ballast CFL lamps		✓	✓
Integrated-ballast LED lamps		✓	✓
LEDs		✓	✓
Lighting controls		✓	
Magnetic ballast T5 or premium T8 retrofit of T12		✓	✓
Modular CFLs and CCFLs		✓	✓
Other linear fluorescents		✓	✓
Unitary and split system AC/HP equipment			
Variable frequency drive			
Water-chilling equipment—air-cooled			
Water-chilling equipment—water-cooled			

Table 276. Gas Savings—Public Institutions Solutions Program

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
-45,489	-682,001	-$27,748	-$317,842

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Table 277. Propane Savings—Public Institutions Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
0	0	$0	$0

Table 278. Water Savings—Public Institutions Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
13,075	130,751	$122	$980

Table 279. Avoided and Deferred Replacement Costs—Public Institutions Solutions Program

Avoided and deferred replacement costs (NPV)
$2,166,279

17.4.9 Agricultural Energy Solutions

The Agricultural Energy Solutions program offered three measures in BY2023. The EM&V team calculated ADRCs for *lighting* measures (see Table 280 to Table 284).

Table 280. Agricultural Energy Solutions Program—Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Custom lighting – new construction			✓
Custom lighting - retrofit			✓
Custom non-lighting			

Table 281. Gas Savings—Agricultural Energy Solutions Program

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
N/A	N/A	N/A	N/A

Table 282. Propane Savings—Agricultural Energy Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
N/A	N/A	N/A	N/A

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Table 283. Water Savings—Agricultural Energy Solutions Program

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
N/A	N/A	N/A	N/A

Table 284. Avoided and Deferred Replacement Costs—Agricultural Energy Solutions

Avoided and deferred replacement costs (NPV)
$26,817

17.4.10 Residential Direct Load Control

No NEBs were estimated for the Residential Direct Load Control program.

17.4.11 Smart Direct Load Control Pilot

The Smart Direct Load Control pilot offered two types of measures in BY2023. The EM&V team calculated gas NEBs for all residential and commercial *smart thermostat* projects at sites with *gas* heating (see Table 285 to Table 289).

Table 285. Smart Direct Load Control Pilot—Measures and Potential Non-Energy Benefits

Measure	Water reduction	Other fuel	Avoided/deferred replacement costs
Commercial Wi-Fi thermostats		✓	
Smart thermostats		✓	

Table 286. Gas Savings—Smart Direct Load Control Pilot

First-year savings (therms)	Lifetime savings (therms)	First-year savings	Lifetime savings (NPV)
46,707	513,780	$28,491	$247,591

Table 287. Propane Savings—Smart Direct Load Control Pilot

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
N/A	N/A	N/A	N/A

Table 288. Water Savings—Smart Direct Load Control Pilot

First-year savings (gallons)	Lifetime savings (gallons)	First-year savings	Lifetime savings (NPV)
N/A	N/A	N/A	N/A

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Table 289. Avoided and Deferred Replacement Costs—Smart Direct Load Control Pilot

Avoided and deferred replacement costs (NPV)
N/A

17.4.12 Agricultural Irrigation Load Control

No NEBs were estimated for the Agricultural Irrigation Load Control program.

17.5 TOTAL NON-ENERGY BENEFITS IN THE BY2023 PORTFOLIO

Table 290 summarizes first-year *gas* and *water* NEBs, and Table 291 provides lifetime NEBs for each of EAL's programs, including totals for the EAL portfolio.

Table 290. BY2023 First Year Non-Energy Benefits by Program

Program	Gas savings			Water savings		First-year total savings ($)
	First-year savings (therms)	First-year propane savings (gallons)	First-year savings ($)	First-year savings (gallons)	First-year savings ($)	
Home Energy Solutions	1,095,293	73,455	$678,674	940,628	$9,002	**687,676**
Energy Solutions for Multifamily Homes	67,917	0	$41,429	3,485,621	$33,357	**74,787**
Energy Solutions for Manufactured Homes	40,952	20,767	$28,032	453,507	$4,340	**32,372**
Low-Income Solutions	242,662	12,462	$150,270	1,552,475	$14,857	**165,127**
Point of Purchase Solutions	-334,482	319	-$203,242	0	$0	**-203,242**
Large Commercial and Industrial Solutions	-116,978	0	-$71,357	56,686	$528	**-70,829**
Small Business Solutions	-44,100	0	-$26,901	265,768	$2,474	**-24,427**
Public Institutions Solutions	-45,489	0	-$27,748	13,075	$122	**-27,627**
Agricultural Energy Solutions	0	0	$0	0	$0	**0**
Residential Direct Load Control	0	0	$0	0	$0	**0**
Smart Direct Load Control Pilot	46,707	0	$28,491	0	$0	**28,491**
Agricultural Irrigation Load Control	0	0	$0	0	$0	**0**
Total	**952,482**	**107,004**	**597,649**	**6,767,760**	**64,680**	**662,329**

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Table 291. BY2023 Lifetime Non-Energy Benefits by Program

Program	Gas savings			Water savings		Avoided & deferred replacement cost (NPV)	Total savings (NPV)
	Lifetime savings (therms)	Lifetime propane savings (gallons)	Lifetime savings (NPV)	Lifetime savings (gallons)	Lifetime savings (NPV)		
Home Energy Solutions	19,260,118	73,455	$8,313,015	9,406,284	$72,471	$60,283	**$8,445,769**
Energy Solutions for Multifamily Homes	1,181,557	0	$502,882	34,856,208	$268,549	$25,269	**$796,700**
Energy Solutions for Manufactured Homes	701,735	20,767	$336,936	4,535,068	$34,940	$4,823	**$376,699**
Low-Income Solutions	4,195,411	12,462	$1,813,487	15,524,753	$119,610	$21,599	**$1,954,696**
Point of Purchase Solutions	-4,327,920	3,512	-$1,999,055	0	$0	$7,934,409	**$5,935,355**
Large Commercial and Industrial Solutions	-1,738,972	0	-$810,664	566,856	$4,249	$2,404,266	**$1,597,850**
Small Business Solutions	-656,700	0	-$306,034	2,350,560	$17,851	$1,156,671	**$868,488**
Public Institutions Solutions	-682,001	0	-$317,842	130,751	$980	$2,166,279	**$1,849,417**
Agricultural Energy Solutions	0	0	$0	0	$0	$26,817	**$26,817**
Residential Direct Load Control	0	0	$0	0	$0	$0	**$0**
Smart Direct Load Control Pilot	513,780	0	$247,591	0	$0	$0	**$247,591**
Agricultural Irrigation Load Control	0	0	$0	0	$0	$0	**$0**
Total	**18,447,007**	**110,197**	**7,780,316**	**67,370,481**	**518,650**	**13,800,417**	**$22,099,383**

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ENTERGY ARKANSAS, LLC

Arkansas Energy Efficiency Program Portfolio
Annual Report

Docket No. 07-085-TF

2023 PROGRAM YEAR

May 1, 2024

Appendix D

Collateral for Entergy Arkansas, LLC Annual Report

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1. Cross Programs

1.1 EAL Badge_2023_MASTER TEMPLATE_RELEASE_x01.pdf



1.2 2023 EAL Branded Give Aways





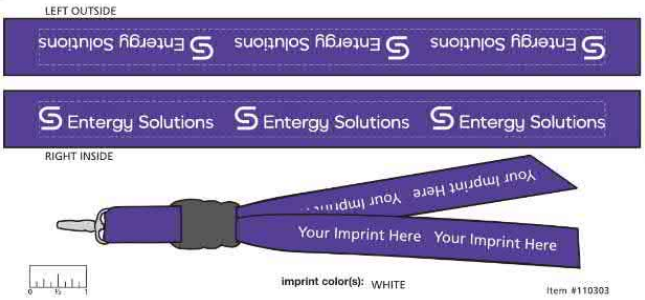
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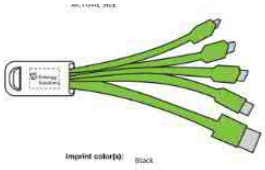


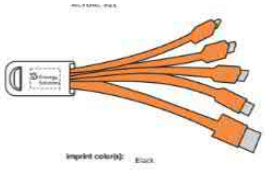


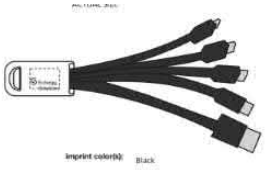




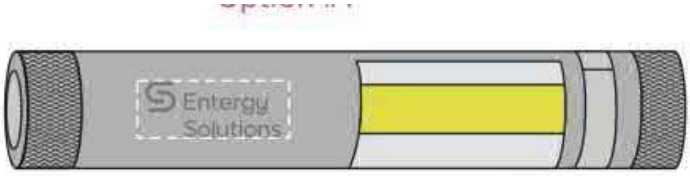
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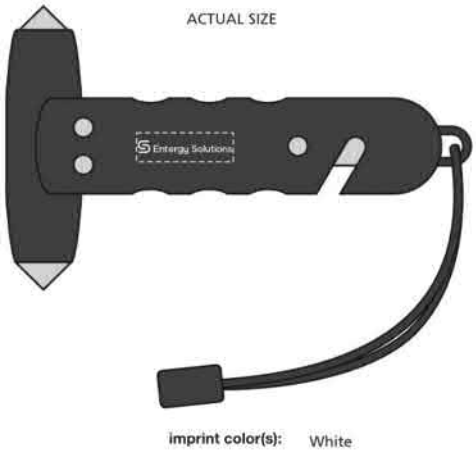












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1.3 Trade Show Booth Display



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1.4 Jeep Compass Wrap







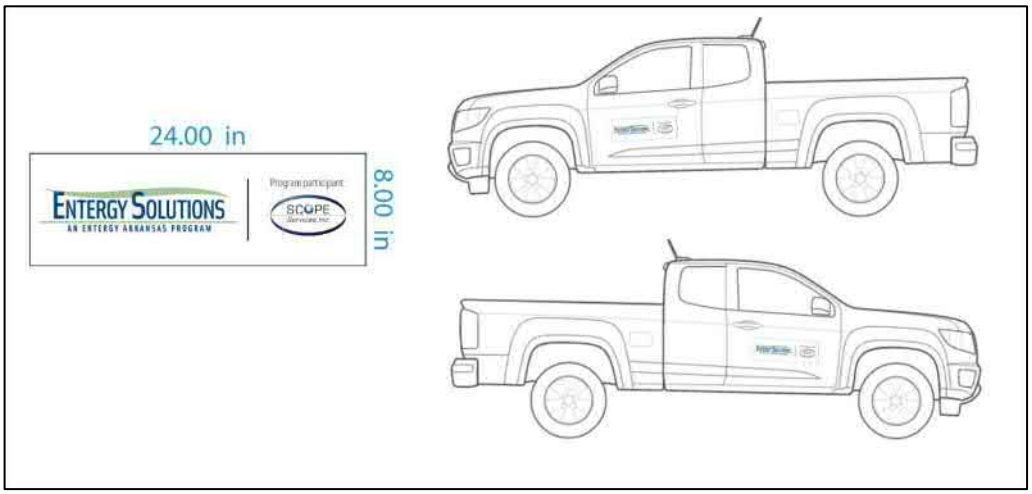






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1.5 Scope Truck Wrap Signage



1.6 2023 EAL Branded Apparel



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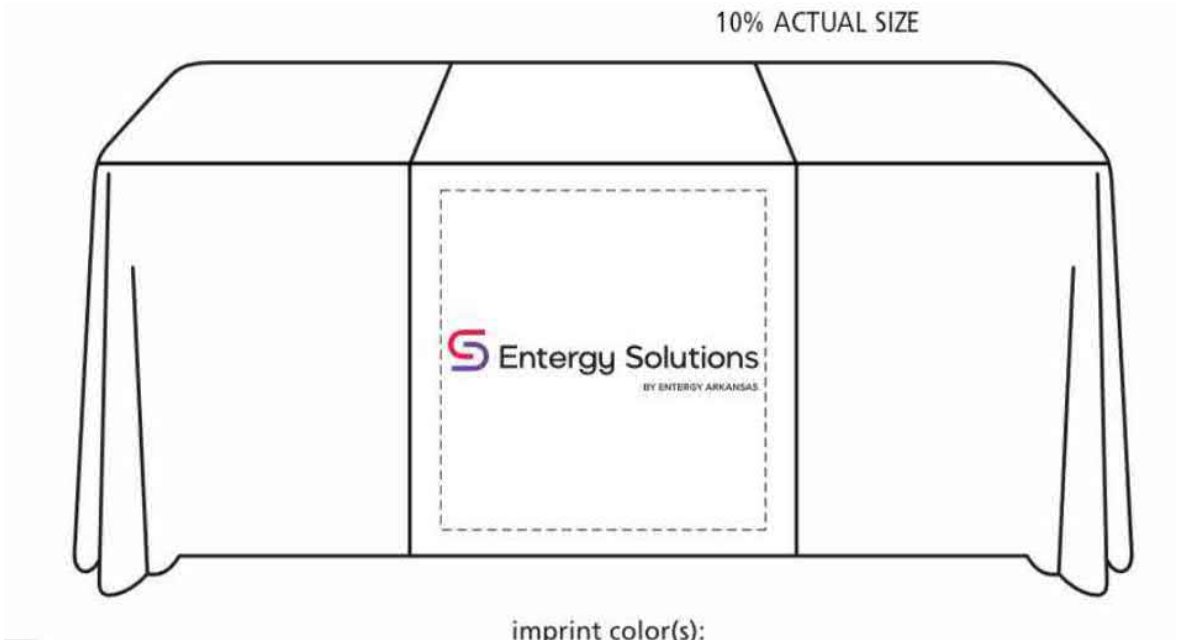




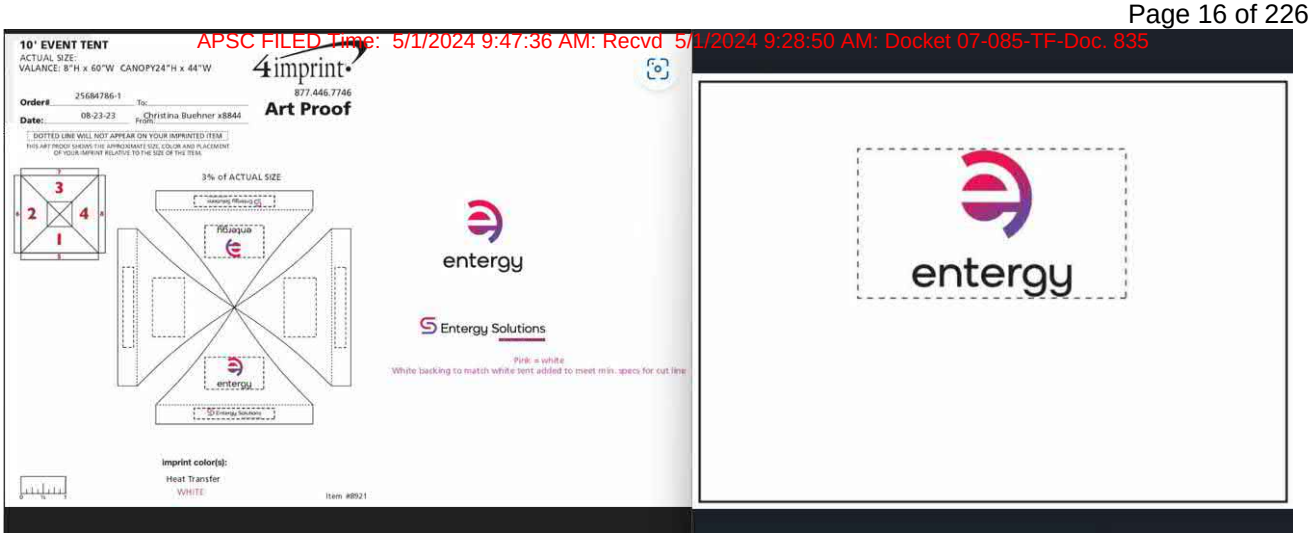
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1.7 Event booth branded items – Tent, Tablecloth and Display Banner





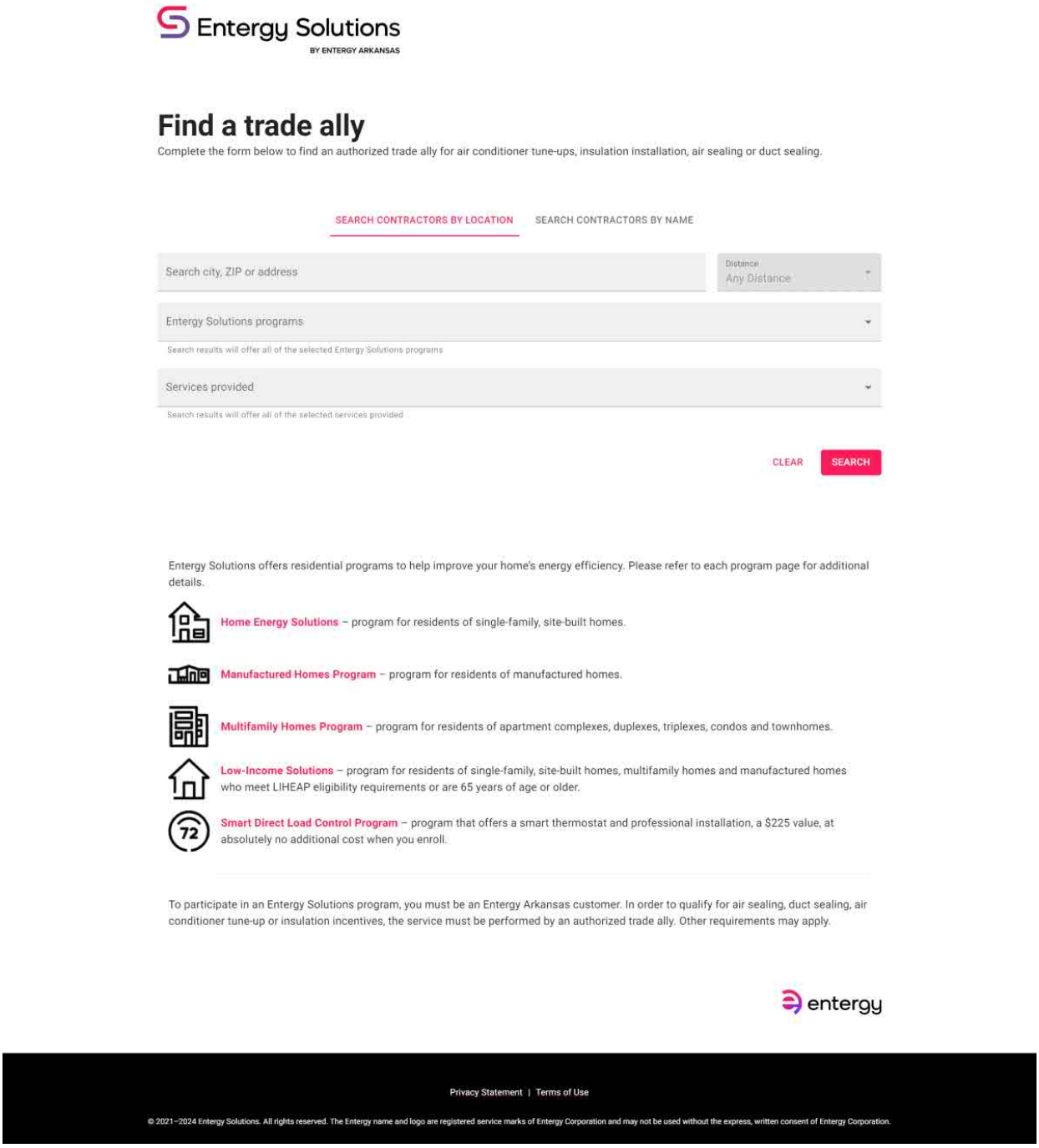
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2. Cross Residential Programs

2.1 Find A Trade Ally Tool



2.2 EAL Weatherization Newsletter Article Jan 2023

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EAL Circuit Newsletter Article – Jan 2023

HES Weatherization

Header: Start Saving Energy in the New Year

5 Ways to Reduce Energy Consumption and Improve Home Energy Efficiency in the New Year

1. Weatherize your home. Sealing leaks and adding insulation can improve your home's energy efficiency, comfort, and durability.
2. Use less energy. Turn off lights and appliances when not in use, use energy-efficient appliances, and take advantage of natural light.
3. Make energy-efficient upgrades. Consider installing a smart thermostat, which allows you to control your home's temperature remotely and adjust it based on your personal preferences.
4. Get the whole family involved. Make energy-saving efforts a fun challenge and track progress as a family.
5. Make energy-saving habits a regular part of your routine. By consistently following these habits, you can see long-term benefits and make a lasting impact on your energy consumption.

By following these tips, you can make a resolution to improve the energy efficiency of your home and save energy all year long. Visit **entergyarkansas.com/efficiency** to learn more about energy-saving programs and resources.



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2.3 EAL Newsletter Article Show Home TLC_ Feb 2023

Entergy Arkansas
Newsletter Article: Give Your Home Some TLC
February 2023



Show your home some love with energy-saving upgrades

Spread the love to your home with energy-saving upgrades. Our Entergy Solutions programs offer multiple ways to increase your home's comfort while decreasing energy use, all at no cost to you.

To give your home the ultimate gift of energy savings, enroll in one of our residential programs. During a visit from a program energy efficient expert, they will install energy-saving lighting, water-saving items and an advanced power strip, all at no cost to you. The expert will also perform a thorough on-site inspection of your home's energy systems and recommend additional ways to reduce energy use and improve comfort.

Whether you live in a single-family home, manufactured home, apartment, condo or townhouse you also may be eligible to take advantage of weatherization upgrades like air sealing, duct sealing or attic insulation installation also available through the Entergy Solutions programs. These improvements can help keep you comfortable and save energy in the long run.

Below are a few reasons to see if you are eligible for weatherization upgrades to your home:

1. **Energy efficiency.** Sealing and insulating increases the efficiency of your home, which helps save energy.
2. **Home comfort.** Sealing and insulating can help with common comfort problems, such as rooms that are too cold in the winter or too hot in the summer.
3. **Air quality.** A well-sealed, well-insulated home keeps out more humidity, dust, pollen and pests.
4. **Safety.** Leaky ducts can allow gases from furnaces, stoves and water heaters to enter rooms throughout your home. Sealing leaks reduces this risk.

Give your home some TLC with energy-saving upgrades from Entergy Solutions by Entergy Arkansas. For more information and to see what other ways we can help you save energy, visit us at entergysolutionsar.com or call **866-627-9177**.

2.4 EAL_ACTU Newsletter June 2023

Entergy Arkansas
A/C Tune-Up Newsletter Article
June 2023



Keep Your Home Comfortable This Summer with an A/C Tune-Up

Get ready for the hot summer days ahead and keep your home cool and comfortable with a high-performance air conditioning tune-up through our **Entergy Solutions** programs. Don't let rising temperatures compromise your comfort - make smart decisions about your heating and cooling system to improve your home's efficiency and comfort levels.

Did you know that up to half of the energy used in your home goes to heating and cooling? That's why we're offering air conditioning tune-ups at no additional cost through our Entergy Solutions energy efficiency programs. Our network of qualified trade allies will evaluate your equipment's energy performance and make necessary adjustments to ensure that your system is running as efficiently as possible. This will help you save energy and stay cool all summer long.

Air conditioning tune-ups offer several benefits, including:

- **Improved energy efficiency:** by making necessary adjustments to your system, we can help it run more efficiently.
- **Comprehensive diagnostic check:** our trade allies will perform a thorough check of your system to ensure that it's running smoothly and identify any potential issues.
- **Longer lifespan for your system:** a properly maintained air conditioner lasts longer, is more reliable, and is safer for your family.
- **Greater comfort:** an energy-efficient air conditioner can keep you and your family cool and comfortable even during the hottest summer days.

If you're interested in scheduling an air conditioning tune-up, contact one of our **participating trade allies**. Tune-ups are available to qualifying Entergy Arkansas customers at **no additional**

2.5 EAL Newsletter Article July 2023 ACTU

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Entergy Arkansas
Newsletter Article: A/C Tune-up
July 2023



Beat the heat this summer with an A/C tune-up.

Prepare your home for the hot summer days ahead and keep your family comfortable with a high-performance air conditioning tune-up through our Entergy Solutions programs. By making smart decisions about your cooling system, you can improve your home's efficiency and comfort level. According to EnergyStar.gov, as much as half of the energy used in most homes goes to heating and cooling.

Through our energy efficiency programs, no matter the type of home you live in, you may qualify for an air conditioning tune-up at **no extra cost**. In addition to a typical seasonal service check, your equipment will be evaluated, and necessary adjustments will be made to ensure it is operating at maximum efficiency, saving you energy while keeping you comfortable.

Benefits of an air conditioner tune-up:

- **Get more from your tune-up.** A participating trade ally will evaluate your equipment's energy performance and make necessary adjustments to ensure it is operating as efficiently as possible. Typical adjustments include cleaning the evaporator coil, outdoor condenser and blower, and correcting the refrigerant charge.
- **Save money and energy.** Get a tune-up at no additional cost. Plus, your system will run more efficiently, so you will save on energy costs all summer long.
- **Worry less.** A properly maintained air conditioner lasts longer, is more reliable, and is safer for your family.
- **Stay cool.** An energy-efficient air conditioner keeps you cool and comfortable during even the hottest summer days.

Don't wait any longer. Contact one of our participating trade allies to schedule your no-cost A/C tune-up. To learn more about Entergy Solutions and other ways to save energy, visit entergysolutionsar.com.

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Entergy Solutions

Professional A/C tune-ups

Stay comfortable and keep your A/C running at its best with a tune-up at no additional cost.



Keep it cool. Keep it efficient.

A well-maintained A/C provides better comfort and runs more efficiently, which can help lower your energy use and costs. A tune-up can also extend the life of your A/C and potentially prevent costly repairs or replacement.

Make an appointment, and a certified technician will perform a thorough evaluation of your equipment and make adjustments so it operates closer to the performance level of a new unit—all at no additional cost.



During your tune-up, a technician will:

- Clean the condenser, evaporator coils, blower and condensate drain.
- Check the refrigerant level and adjust to manufacturer specifications (additional costs may apply).
- Measure the airflow across the cooling coil and adjust to manufacturer specifications.
- Check air filters.
- Check system controls to ensure proper and safe operation.
- Check the running cycle of the equipment to make sure it starts, operates and shuts off properly.
- Give you the tune-up results, showing the efficiency level before and after maintenance.

Home Energy Assessment

Looking for more ways to save? Schedule a Home Energy Assessment to have an energy efficiency consultant visit your home to identify opportunities for future improvements and incentives.

Want more ways to save energy?*

As an Entergy customer, you may also be eligible for the following energy-saving upgrades, installed in your home at no additional cost:

- Duct sealing.
- Air sealing.
- Insulation.
- High-efficiency showerheads and bath aerators.
- Smart thermostats.

Let's get started

Visit: **entergysolutionsar.com**
Call: **866-627-9177**
Email: **entergysolutions@icf.com**

*By participating in Entergy Solutions programs, eligible Entergy Arkansas customers may receive an A/C tune-up, smart thermostat and installation at no additional cost to what they pay for their Entergy electric services.

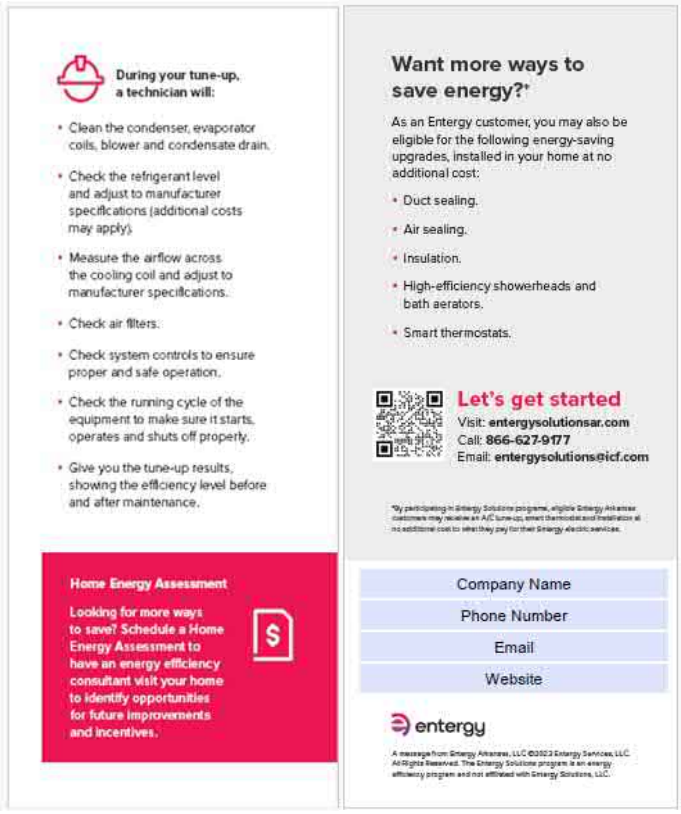
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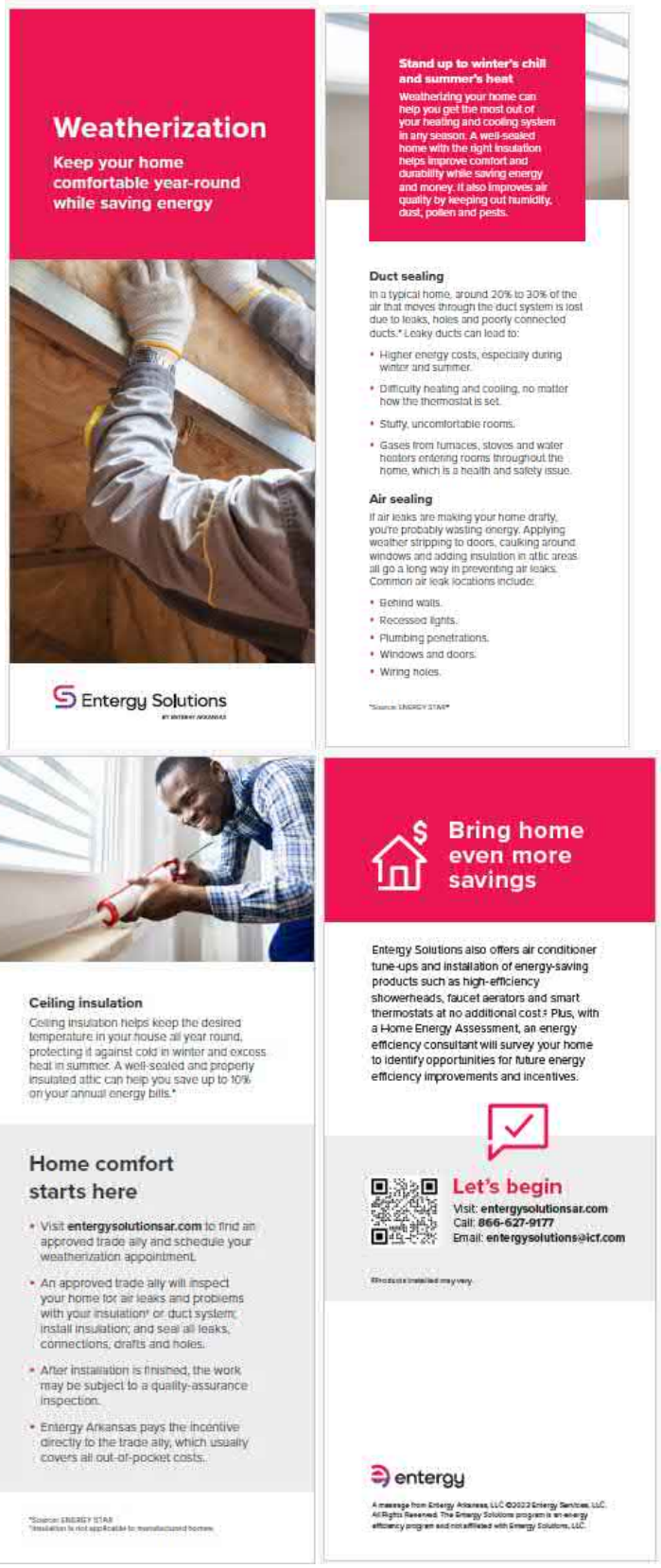
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2.8 42269_EAL_Weatherization_Brochure_3.5x8.5_v08_Web_RELEASE.pdf



Weatherization

Keep your home comfortable year-round while saving energy

Entergy Solutions

Stand up to winter's chill and summer's heat

Weatherizing your home can help you get the most out of your heating and cooling system in any season. A well-sealed home with the right insulation helps improve comfort and durability while saving energy and money. It also improves air quality by keeping out humidity, dust, pollen and pests.

Duct sealing

In a typical home, around 20% to 30% of the air that moves through the duct system is lost due to leaks, holes and poorly connected ducts.* Leaky ducts can lead to:

- Higher energy costs, especially during winter and summer.
- Difficulty heating and cooling, no matter how the thermostat is set.
- Stuffy, uncomfortable rooms.
- Gases from furnaces, stoves and water heaters entering rooms throughout the home, which is a health and safety issue.

Air sealing

If air leaks are making your home drafty, you're probably wasting energy. Applying weather stripping to doors, caulking around windows and adding insulation in attic areas all go a long way in preventing air leaks. Common air leak locations include:

- Behind walls.
- Recessed lights.
- Plumbing penetrations.
- Windows and doors.
- Wiring holes.

*Source: ENERGY STAR®

Ceiling insulation

Ceiling insulation helps keep the desired temperature in your house all year round, protecting it against cold in winter and excess heat in summer. A well-sealed and properly insulated attic can help you save up to 10% on your annual energy bills.*

Home comfort starts here

- Visit **entergysolutionsar.com** to find an approved trade ally and schedule your weatherization appointment.
- An approved trade ally will inspect your home for air leaks and problems with your insulation† or duct system; install insulation; and seal all leaks, connections, drafts and holes.
- After installation is finished, the work may be subject to a quality-assurance inspection.
- Entergy Arkansas pays the incentive directly to the trade ally, which usually covers all out-of-pocket costs.

*Source: ENERGY STAR
†Insulation is not applicable to manufactured homes.

Bring home even more savings

Entergy Solutions also offers air conditioner tune-ups and installation of energy-saving products such as high-efficiency showerheads, faucet aerators and smart thermostats at no additional cost‡ Plus, with a Home Energy Assessment, an energy efficiency consultant will survey your home to identify opportunities for future energy efficiency improvements and incentives.

Let's begin

Visit: **entergysolutionsar.com**
Call: **866-627-9177**
Email: **entergysolutions@icf.com**

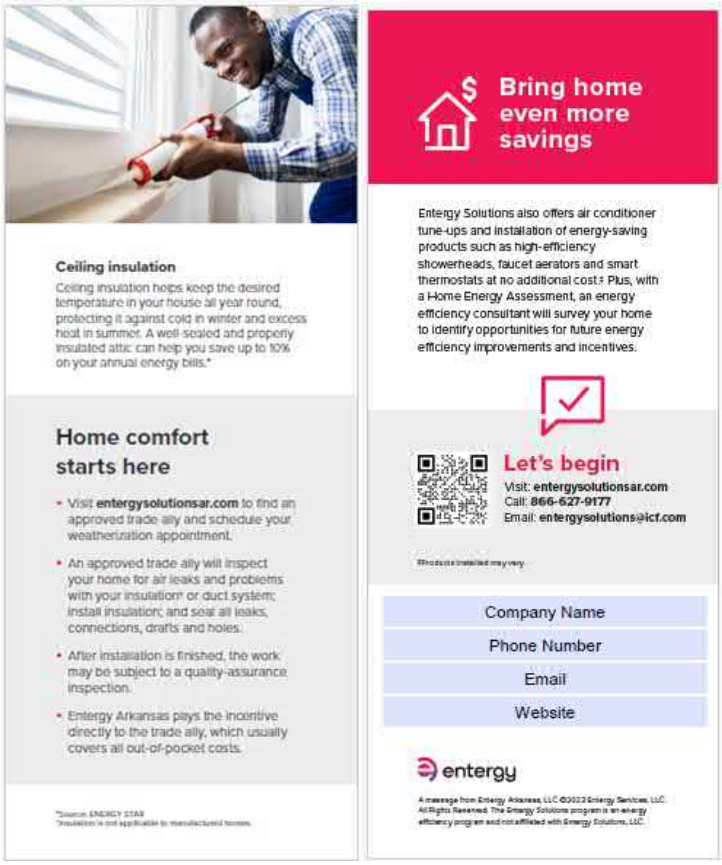
‡Products installed may vary.

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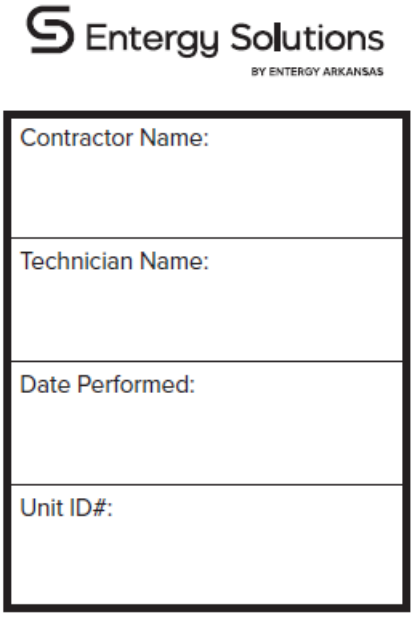


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2.10 EAL Business Card Implementor



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2.13 Weatherization Homepage Banner Jan 2023

Entergy Arkansas EE Homepage Banner
Jan 2023 - Weatherization



Jump-start your energy savings in 2023

Embrace the new year with weatherization measures offered through our residential Entergy Solutions programs to help increase your homes' comfort and improve energy efficiency.

FIND A TRADE ALLY

Link button to the Find a Trade Ally Tool at https://entergyartradeally.com/

2.14 EAL Homepage Banner_ACTU_Sep 2023



Increase your home's comfort

Stay cool with an A/C tune-up

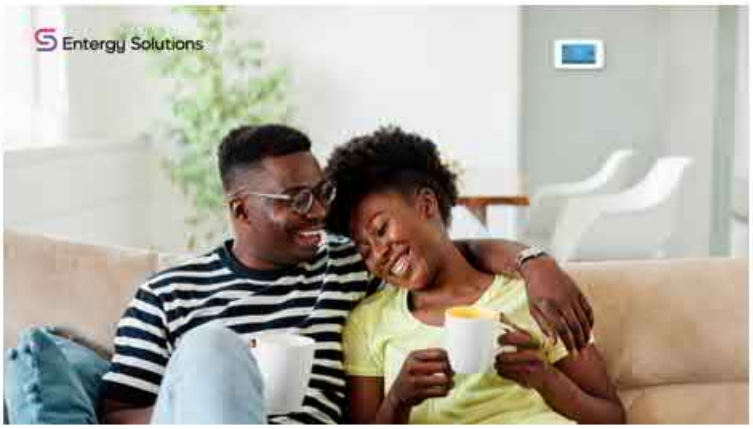
Get a high efficiency tune-up through one of our Entergy Solutions programs to increas
your home's comfort and save on energy costs.

LEARN MORE

Link:
https://www.entergy-arkansas.com/your_home/save_money/ee/residential-solutions/

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2.15 EAL Homepage Banner_DLC_Aug 2023



Summer is for savings

Put a smart thermostat to work for you

Keep your home comfortable for less with our Smart Direct Load Control Program. Get a smart thermostat, with professional installation, at no additional cost.

Learn more

2.16 EAL Homepage Banner_DLC_May 2023



Stay cool and save energy this summer.

Join our Smart Direct Load Control Program now and get a smart thermostat at no additional cost.

Learn More

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2.17 2023 Arkansas Flavor Ad_Ramey



Entergy Solutions
BY ENTERGY ARKANSAS

Combate el calor del verano. Ahorra energía. Ahorra dinero.

En Entergy Arkansas, hacemos todo lo posible para que nuestros clientes se sientan cómodos. Eso significa mantener sus luces encendidas y ayudarlo a ahorrar dinero con consejos y programas de Entergy Solutions.

- Ajuste su termostato a 78 grados.
- Cambie sus filtros de aire una vez al mes.
- Use bombillas y electrodomésticos con certificación ENERGY STAR®.

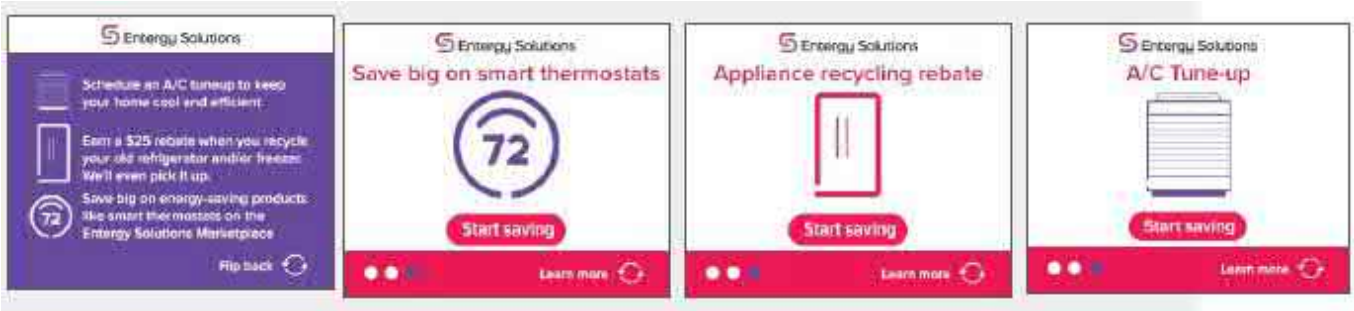
Encuentre más formas de ahorrar en **entergysolutionsar.com**.

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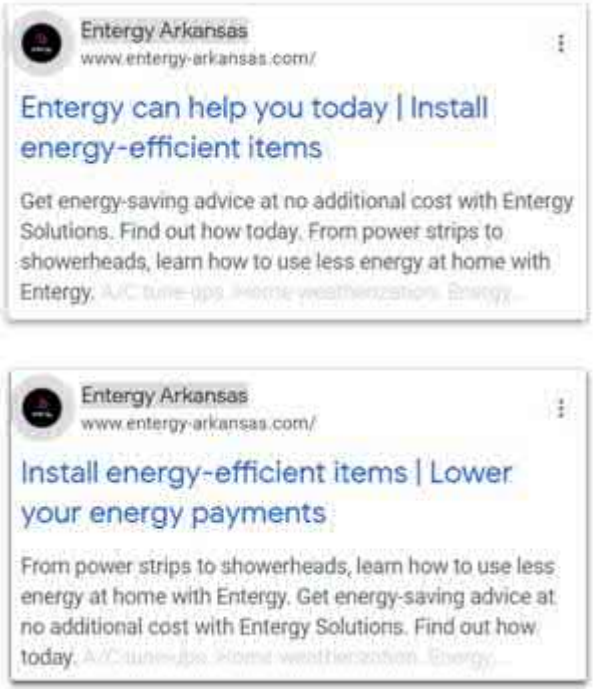


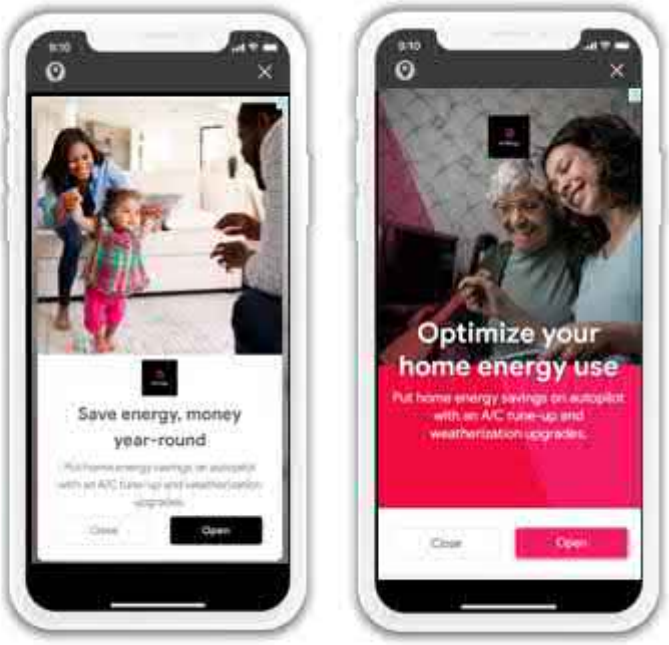




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2.19 Res Display Search Ads 2023





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3. Portfolio Programs
3.1 Home Energy Solutions

3.1.1 EAL_HES_Circuit Newsletter Article_March 2023

Entergy Arkansas
HES Program Newsletter Article
March 2023



Enhance Your Home's Comfort and Efficiency with Entergy Arkansas' Home Energy Solutions Program

Looking to reduce your energy usage and save money? Here are four easy tips to help you set achievable goals and start using less energy all year long:

- **Weatherize your home:** Don't let air leaks waste energy and money. As part of our Home Energy Solutions program, weatherization upgrades can help improve your home's energy efficiency, making it more comfortable and durable in the long run.
- **Use less energy:** Small changes can add up. Turn off lights and appliances when not in use and be mindful of water consumption by turning off the tap when brushing your teeth.
- **Get your family involved:** Encourage your family to participate in your energy-saving efforts. Make it fun by keeping track of progress and creating a chart of small changes each family member can make.
- **Make it a habit:** Stick with your new energy-saving routine and watch your energy usage decrease. Visit entergyarkansas.com/efficiency to learn more about energy efficiency programs and find a participating trade ally.

By following these easy tips, you can reduce your energy consumption and improve the energy efficiency and comfort of your home for years to come. If you want more information or want to explore other Entergy Solutions programs, visit entergysolutionsar.com, call 866-627-9177, or email us.

Improving your home's comfort and efficiency is easy with Entergy Arkansas' Home Energy Solutions Program. Don't wait - take advantage of this offer today and start enjoying a more comfortable and energy-efficient home.

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3.1.2 EAL Newsletter Article Nov 2023 HES

Entergy Arkansas
Weatherization Newsletter Article
November 2023



Enhance the comfort of your home by weatherizing it effectively. Did you know that one of the key areas to focus on for improved energy efficiency is your home's attic? Many homes in the United States lack adequate insulation and have significant air leakage issues. By sealing air leaks and adding insulation, you can not only increase your comfort but also save up to 11%* on your energy costs.

With our Entergy Solutions Programs, you may qualify for air sealing, duct sealing, and attic insulation installation measures. By taking advantage of these upgrades, you can ensure year-round comfort in your home while conserving energy.

Weatherization upgrades offer several benefits for your home:

1. Energy Efficiency: Sealing leaks and adding insulation boosts your home's efficiency, resulting in energy savings.
2. Comfort: Say goodbye to common comfort problems like excessively cold rooms in winter or overly hot spaces in summer by properly sealing and insulating your home.
3. Air Quality: A well-sealed and well-insulated home keeps out excess humidity, dust, pollen, and pests, improving the overall air quality within your living space.
4. Safety: Leaky ducts can allow harmful gases from furnaces, stoves, and water heaters to permeate various rooms in your home. By sealing these leaks, you reduce the associated safety risks.

Take the necessary steps to weatherize your home today and enjoy the benefits of increased energy efficiency, enhanced comfort, improved air quality, and a safer living environment for you and your family.

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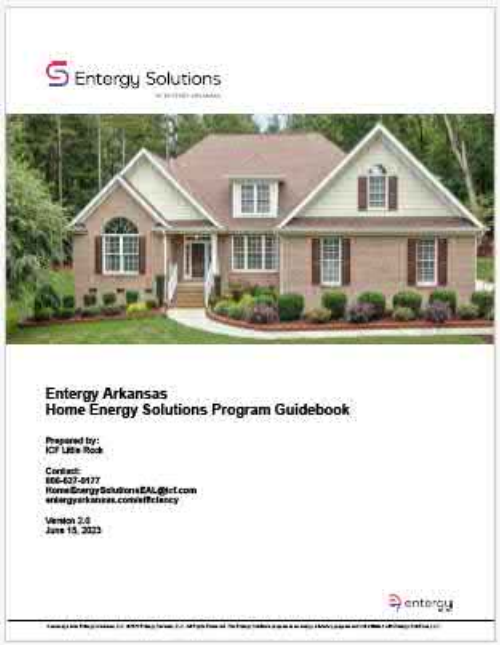




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3.1.5 HES Guidebook_2023_RELEASE.pdf



Entergy Solutions

Entergy Arkansas
Home Energy Solutions Program Guidebook

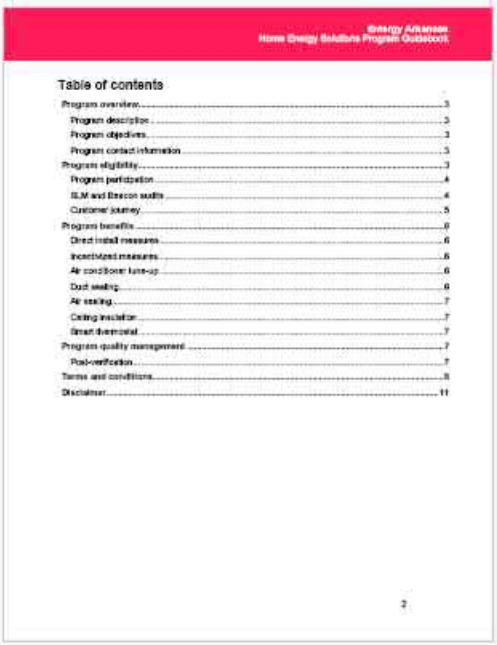
Prepared by:
ICF Little Rock

Contact:
866-627-9177
HomeEnergySolutionsEAL@icf.com
energyarkansas.com/efficiency

Version 2.0
June 15, 2023

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Entergy Arkansas
Home Energy Solutions Program Guidebook

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2



Entergy Arkansas
Home Energy Solutions Program Guidebook

Program overview

Program description

The Entergy Solutions Home Energy Solutions Program provides cost-effective energy efficiency measures to single-family homes throughout the Entergy Arkansas ("Entergy Arkansas") electric service territory. Through the program, participating trade allies will perform energy surveys and energy efficient upgrades at eligible participating single-family homes. Energy-efficient upgrades consist of measures as air conditioner tune-ups, duct sealing, air sealing and ceiling insulation. Additionally, direct install technicians will install energy efficiency measures to the home. Trade allies will also suggest other areas for improvements and opportunities for participation in other Entergy Arkansas energy efficiency programs.

Program objectives

The primary objective of the Home Energy Solutions Program will be to help Entergy homeowners and/or renters reduce their energy usage and possibly save money on their utility bill through installation of no-cost energy efficiency measures and offer incentives for more in-depth energy efficiency measures in both common areas and individual homes. In addition, this program is designed to help Entergy Arkansas homeowners understand their energy consumption and how to use energy wisely.

Program contact information

Phone: 866-627-9177
Email: HomeEnergySolutionsEAL@icf.com
Web: entergyarkansas.com/efficiency

Program eligibility

Owners or renters (certifying required consent) of single-family homes located within the Entergy Arkansas electric service territory are eligible for the Entergy Arkansas Home Energy Solutions Program. Customers with homes that have an energy use of $5.10 per square foot in the summer or are 10 years or older may qualify for the core weatherization measures. Homes for certain measures must have a ducted central heating and air conditioning unit installed prior to participation of the Home Energy Solutions Program.

Funds are limited, and services are available to all Entergy Arkansas service territories on a first-come, first-served basis. For more information about other Entergy Arkansas programs, please visit entergyarkansas.com.

3



Entergy Arkansas
Home Energy Solutions Program Guidebook

Program participation

STEP 1: Enroll in the program by calling a participating trade ally or by emailing us at HomeEnergySolutionsEAL@icf.com. For a list of participating trade allies, please use our Find a Provider Tool at EnergyARTradeAlly.com.

STEP 2: Schedule an appointment to have a trade ally visit your residential home to install the program measures and conduct your energy survey. The technician will determine if the home is a candidate for incentivized measures. An adult representative should plan to be present for the duration of the energy survey and product installation, which will take up to two hours. For weatherization services, a more in-depth energy audit can take up to four hours.

STEP 3: Sign the completed participation document, and please provide any comments or suggestions about the program.

SLM and Beacon audits

Depending on your home's energy usage and size, you may be eligible for either a home energy survey or a more detailed energy-efficient assessment. If either identifies ways to save energy in your home, and you will be eligible to receive qualifying core measures installed at no direct cost by a trade ally.

SLM audit

During the SLM audit walk-through survey, trade allies will install energy-saving measures including advanced power strips, showerheads and kitchen/bath aerators. These measures can instantly save energy and money when properly installed and used. These measures will be installed at no additional cost to the customer. A survey will provide insights into other ways to use energy wisely.

Beacon audit

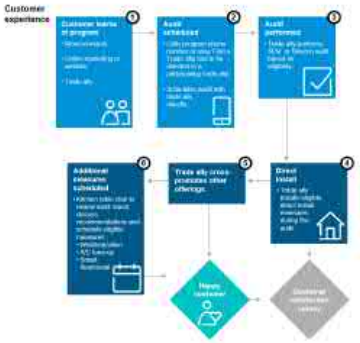
The Beacon audit is a comprehensive evaluation on your home's energy use. This audit will provide recommendations on ways to save energy. During the Beacon audit, customers eligible for weatherization installation will start with a home inspection before work. The energy auditor will complete an interior "walk-through" inspection of the air-conditioned space. A pre-blower door test must be performed to confirm the need for air sealing, and a pre-duct blaster test must be performed to confirm the need for duct sealing. If the pre-testing confirms the need for either air sealing and/or duct sealing, the air sealing and duct sealing may be authorized. Post testing must be performed in the structure and/or the duct to confirm the air-leakage reduction.

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Customer journey

Customer experience



Program benefits

Direct install measures

In this program, energy-efficient products are furnished and installed at no additional cost to Entergy Arkansas Home Energy Solutions Program customers. The measures available for direct installation in eligible properties and locations include:

- 1.5 gallons-per-minute showerheads and faucet aerators (when existing fixtures have flow rates of 2.0 gallons per minute or greater and where the water heater is powered by electricity).
- Advanced power strips for qualifying home entertainment system.
- Entergy customers with qualified air conditioning systems and Wi-Fi may sign up for the Smart Direct Load Control Pilot Program. Smart Thermostat eligibility is based upon the presence of continuous Wi-Fi internet and agreement to participate in summer demand response events. Additionally, the residence cannot be a current participant in the Summer Advantage Program.



Incentivized measures

For all weatherization measures, electricity must be the primary source of heating or cooling. There must be a working central heat pump, working central electric air conditioning system or working central electric resistance furnace in use at the residence.

Air conditioner tune-up

Any Entergy Home Energy Solutions Program customers that have central air conditioning or heat pump systems on-site may qualify for an air conditioning tune-up. Customers who have participated in the previous five years will not be eligible.

The Entergy Arkansas air conditioner tune-up involves a special diagnostic and service procedure that not only ensures the system is operating at peak efficiency (and lowest operational cost) but also identifies shortcomings that are keeping the system from doing so. After the tune-up is complete, it may be subject to a post-installation quality-assurance verification.

Duct sealing

Customers of Entergy who use a central duct system for heating and cooling their home may qualify for duct sealing based on the total system leakage and opportunity for improvement. Duct sealing

will consist of air leaks in the ductwork being reduced with the application of long-lasting materials. After the duct sealing is complete, the home may be subject to a post-installation quality-assurance verification.

Air sealing

Customers of Entergy who have substantial air leakage qualify for air sealing. Sealing may include weatherstripping or caulking around doors or windows. Air sealing may also include using expanding foam in plumbing penetrations and large holes in sheetrock and anywhere air can escape to the exterior. Industry standard materials and methods are used to reduce air infiltration and exfiltration. After the air sealing is complete, it may be subject to a post-installation quality-assurance verification.

Ceiling insulation

Customers with existing insulation of R-14.0 or less may qualify for insulation to bring their home up to the DOE recommendation of R-38. Improvement measure incentive eligibility is based upon existing R-value and square feet of ceiling insulated. Existing insulation is calculated based on its overall depth multiplied by the values listed in the Residential Insulation Guide for R-value of existing Attic Insulation, and not by the perceived condition or density of the insulation. Spaces with distinct different depths or insulation mediums should be billed for separately. Only homes with a functioning central heat and air system are eligible for this service.

Smart thermostat

Entergy customers with qualified air conditioning systems and Wi-Fi may sign up for the Smart Direct Load Control offering. Participating trade allies will assist customers to complete the application during the Home Energy Solutions visit. Smart thermostat eligibility is based upon presence of continuous Wi-Fi internet. Customers can also choose to participate in summer demand response events.

Program quality management

Post-verification

Completed projects are subject to a post-installation verification, selected on a random basis. Typically, 10% of all homes that participated in the program will be selected for the verification.

If it is determined that an on-site post-verification is going to be performed, a program representative will contact the customer to schedule the property site verification.

By receiving a program service, the customer agrees to allow an on-site post-verification after work is completed.

Terms and conditions

These terms and conditions are only valid for service completed on or after Jan. 1, 2023. Only trade allies may submit applications for incentive consideration for the Home Energy Solutions program.

ENERGY AUDIT REPORT: The energy audit report provides the customer with a compiled review of energy-saving measures installed throughout the property, as well as recommendations related to energy efficiency programs available. Entergy Arkansas is not responsible for lost documentation.

ELIGIBILITY: Participants must be Entergy Arkansas electric utility customers with a working central air conditioner or heat pump. For homes without working central air conditioning, the home must have an electric heating. The residence must be at least 10 years old or have energy costs of 10 cents or more of the conditioned square footage on the highest summer cooling bill. Funds are limited, and services are available in select geographic areas on a first-come, first-served basis. In order for participants to qualify for measures such as Air Sealing, Duct Sealing and Air Conditioning Tune-up incentives, the service must be performed by an Entergy Arkansas trade ally. For other Entergy Arkansas programs, please visit entergyarkansas.com.

APPROVAL AND VERIFICATION: Entergy Arkansas reserves the right to verify the delivery of services and to have reasonable access to the participant's residence to verify the performance of energy efficiency direct install measures and/or energy efficiency work. Prior to any payment of incentives, Entergy Arkansas reserves the right to verify sales transactions. The customer's trade ally will verify that the installed energy-saving measures meet all applicable building codes, zoning laws, local, state and federal requirements, and other relevant requirements. The customer's trade ally is responsible for any applicable permits as required by law. Outdoor temperatures and other weather conditions may affect this verification process. The participant acknowledges and agrees to participate if their home is selected for a quality-control post-installation verification by Entergy Arkansas or it's program implementer ICF. No warranty is expressed or implied by this verification.

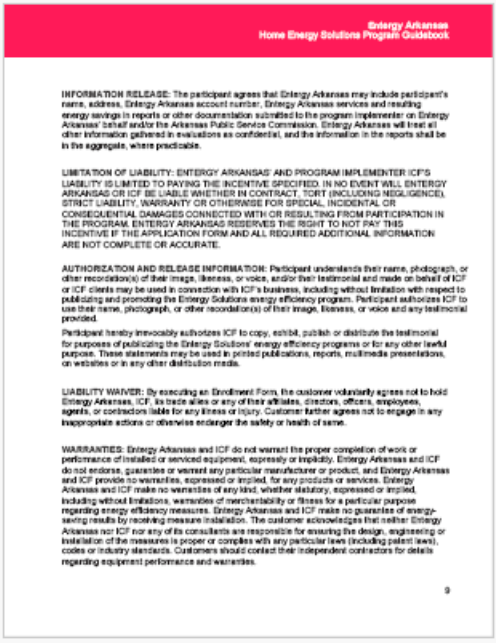
PAYMENT: Each measure may only receive one full incentive payment from Entergy Solutions within the life of the measure.

TAX LIABILITY: The customer is responsible for declaring and paying any and all applicable federal, state and local taxes that may be owed on any incentive. Entergy Arkansas will not be responsible for any tax liability that may be imposed on the customer as a result of the delivery of the energy efficiency measures. Please contact your tax professional for more information.

REMOVAL OF EQUIPMENT: The customer agrees, as a condition of participation in the program, to allow removal and disposal of the equipment being replaced by energy efficiency measures in accordance with all laws, rules and regulations. The customer agrees not to reinstall any newly installed equipment anywhere in Arkansas or transfer it to any other party for installation in Arkansas.

ENDORSEMENT: Entergy Arkansas does not endorse any particular manufacturer, product, system design, claim, trade ally or service in promoting this program.

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INFORMATION RELEASE: The participant agrees that Entergy Arkansas may include participant's name, address, Entergy Arkansas account number, Entergy Arkansas services and resulting energy savings in reports or other documentation submitted to the program implementer on Entergy Arkansas' behalf and/or the Arkansas Public Service Commission. Entergy Arkansas will treat all other information gathered in evaluations as confidential, and the information in the reports shall be in the aggregate, where practicable.

LIMITATION OF LIABILITY: ENTERGY ARKANSAS' AND PROGRAM IMPLEMENTER ICF'S LIABILITY IS LIMITED TO PAYING THE INCENTIVE SPECIFIED. IN NO EVENT WILL ENTERGY ARKANSAS OR ICF BE LIABLE WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, WARRANTY OR OTHERWISE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES CONNECTED WITH OR RESULTING FROM PARTICIPATION IN THE PROGRAM. ENTERGY ARKANSAS RESERVES THE RIGHT TO NOT PAY THIS INCENTIVE IF THE APPLICATION FORM AND ALL REQUIRED ADDITIONAL INFORMATION ARE NOT COMPLETE OR ACCURATE.

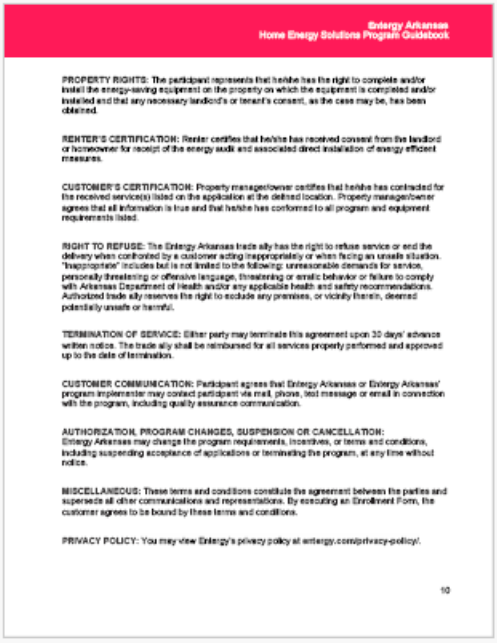
AUTHORIZATION AND RELEASE INFORMATION: Participant understands their name, photograph, or other recordation(s) of their image, likeness, or voice, and/or their testimonial and made on behalf of ICF or ICF clients may be used in connection with ICF's business, including without limitation with respect to publicizing and promoting the Entergy Solutions energy efficiency program. Participant authorizes ICF to use their name, photograph, or other recordation(s) of their image, likeness, or voice and any testimonial provided.

Participant hereby irrevocably authorizes ICF to copy, exhibit, publish or distribute the testimonial for purposes of publicizing the Entergy Solutions' energy efficiency programs or for any other lawful purpose. These statements may be used in printed publications, reports, multimedia presentations, on websites or in any other distribution media.

LIABILITY WAIVER: By executing an Enrollment Form, the customer voluntarily agrees not to hold Entergy Arkansas, ICF, its trade allies or any of their affiliates, directors, officers, employees, agents, or contractors liable for any illness or injury. Customer further agrees not to engage in any inappropriate actions or otherwise endanger the safety or health of same.

WARRANTIES: Entergy Arkansas and ICF do not warrant the proper completion of work or performance of installed or serviced equipment, expressly or implicitly. Entergy Arkansas and ICF do not endorse, guarantee or warrant any particular manufacturer or product, and Entergy Arkansas and ICF provide no warranties, expressed or implied, for any products or services. Entergy Arkansas and ICF make no warranties of any kind, whether statutory, expressed or implied, including without limitations, warranties of merchantability or fitness for a particular purpose regarding energy efficiency measures. Entergy Arkansas and ICF make no guarantee of energy-saving results by receiving measure installation. The customer acknowledges that neither Entergy Arkansas nor ICF nor any of its consultants are responsible for ensuring the design, engineering or installation of the measures is proper or complies with any particular laws (including patent laws), codes or industry standards. Customers should contact their independent contractors for details regarding equipment performance and warranties.

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PROPERTY RIGHTS: The participant represents that he/she has the right to complete and/or install the energy-saving equipment on the property on which the equipment is completed and/or installed and that any necessary landlord's or tenant's consent, as the case may be, has been obtained.

RENTER'S CERTIFICATION: Renter certifies that he/she has received consent from the landlord or homeowner for receipt of the energy audit and associated direct installation of energy efficient measures.

CUSTOMER'S CERTIFICATION: Property manager/owner certifies that he/she has contracted for the received service(s) listed on the application at the defined location. Property manager/owner agrees that all information is true and that he/she has conformed to all program and equipment requirements listed.

RIGHT TO REFUSE: The Entergy Arkansas trade ally has the right to refuse service or end the delivery when confronted by a customer acting inappropriately or when facing an unsafe situation. "Inappropriate" includes but is not limited to the following: unreasonable demands for service, personally threatening or offensive language, threatening or erratic behavior or failure to comply with Arkansas Department of Health and/or any applicable health and safety recommendations. Authorized trade ally reserves the right to exclude any premises, or vicinity therein, deemed potentially unsafe or harmful.

TERMINATION OF SERVICE: Either party may terminate this agreement upon 30 days' advance written notice. The trade ally shall be reimbursed for all services properly performed and approved up to the date of termination.

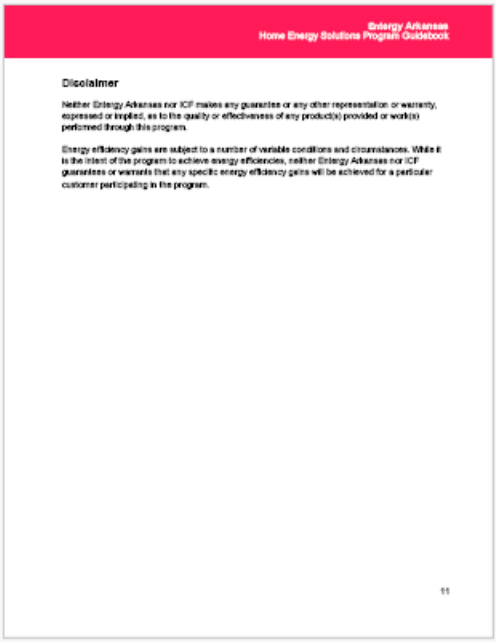
CUSTOMER COMMUNICATION: Participant agrees that Entergy Arkansas or Entergy Arkansas' program implementer may contact participant via mail, phone, text message or email in connection with the program, including quality assurance communication.

AUTHORIZATION, PROGRAM CHANGES, SUSPENSION OR CANCELLATION: Entergy Arkansas may change the program requirements, incentives, or terms and conditions, including suspending acceptance of applications or terminating the program, at any time without notice.

MISCELLANEOUS: These terms and conditions constitute the agreement between the parties and supersede all other communications and representations. By executing an Enrollment Form, the customer agrees to be bound by these terms and conditions.

PRIVACY POLICY: You may view Entergy's privacy policy at entergy.com/privacy-policy/.

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Disclaimer

Neither Entergy Arkansas nor ICF makes any guarantee or any other representation or warranty, expressed or implied, as to the quality or effectiveness of any product(s) provided or work(s) performed through this program.

Energy efficiency gains are subject to a number of variable conditions and circumstances. While it is the intent of the program to achieve energy efficiencies, neither Entergy Arkansas nor ICF guarantees or warrants that any specific energy efficiency gains will be achieved for a particular customer participating in the program.

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3.1.6 HES Customer Satisfaction Survey Emal 2023



Entergy Solutions
BY ENTERGY ARKANSAS

Dear JBE INC JBE INC,

Thank you for participating in the Entergy Arkansas Home Energy Solutions Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.?

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Click here to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit our website for more information.

If you need additional assistance or have any questions, feel free to call 866-627-9177 or email HomeEnergySolutionsEAL@icf.com.

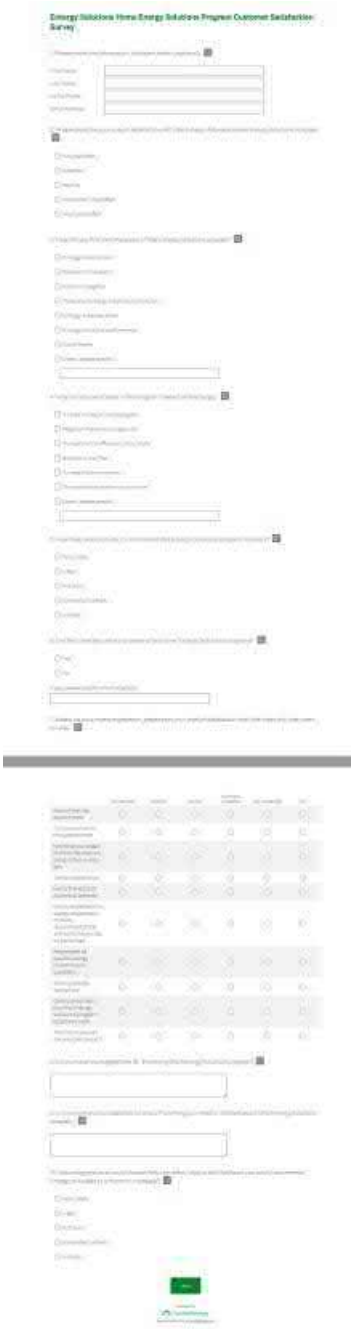
Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

Privacy Policy

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3.1.7 HES Customer Satisfaction Survey



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3.1.8 HES Customer Satisfaction Survey Letter

Entergy Solutions
BY ENTERGY ARKANSAS

STEVE TAYLOR
100 SUNSHINE VALLEY TER
PEARCY, AR 71964

Dear STEVE TAYLOR,

Thank you for participating in the Entergy Arkansas Home Energy Solutions Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Please go to **surveymonkey.com/r/3TKBL78** or use your smartphone to scan the QR code below to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit **entergysolutionsar.com** for more information.

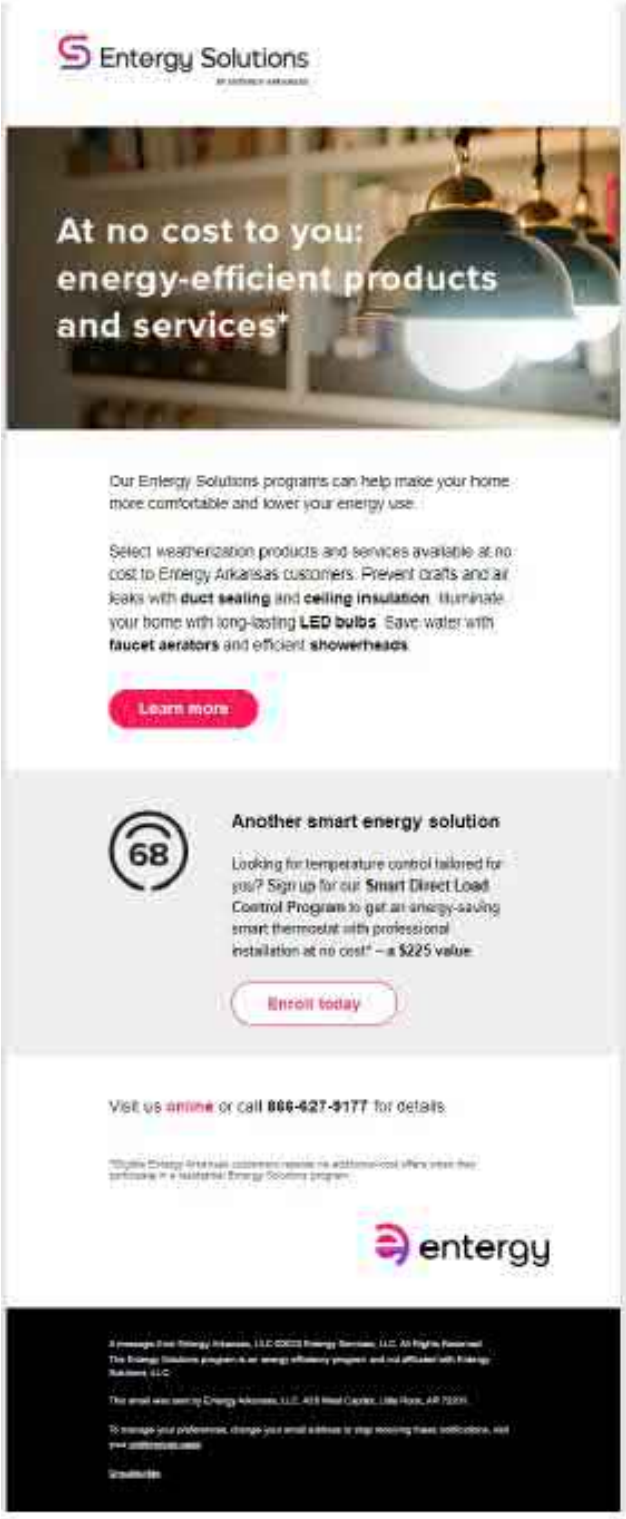
If you need additional assistance or have any questions, feel free to call **866-627-9177** or email **HomeEnergySolutionsEAL@icf.com**.

Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

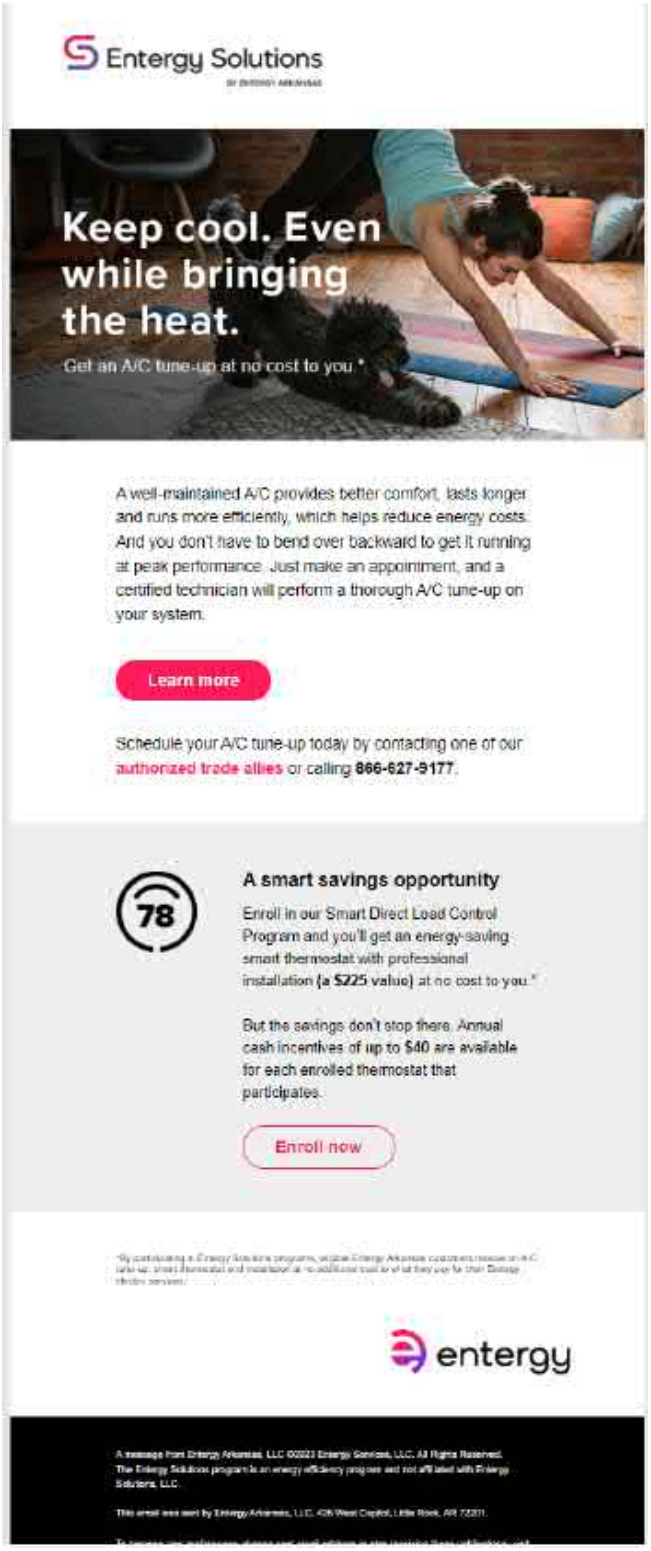
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3.1.9 February_EAL_Weatherization_email.pdf



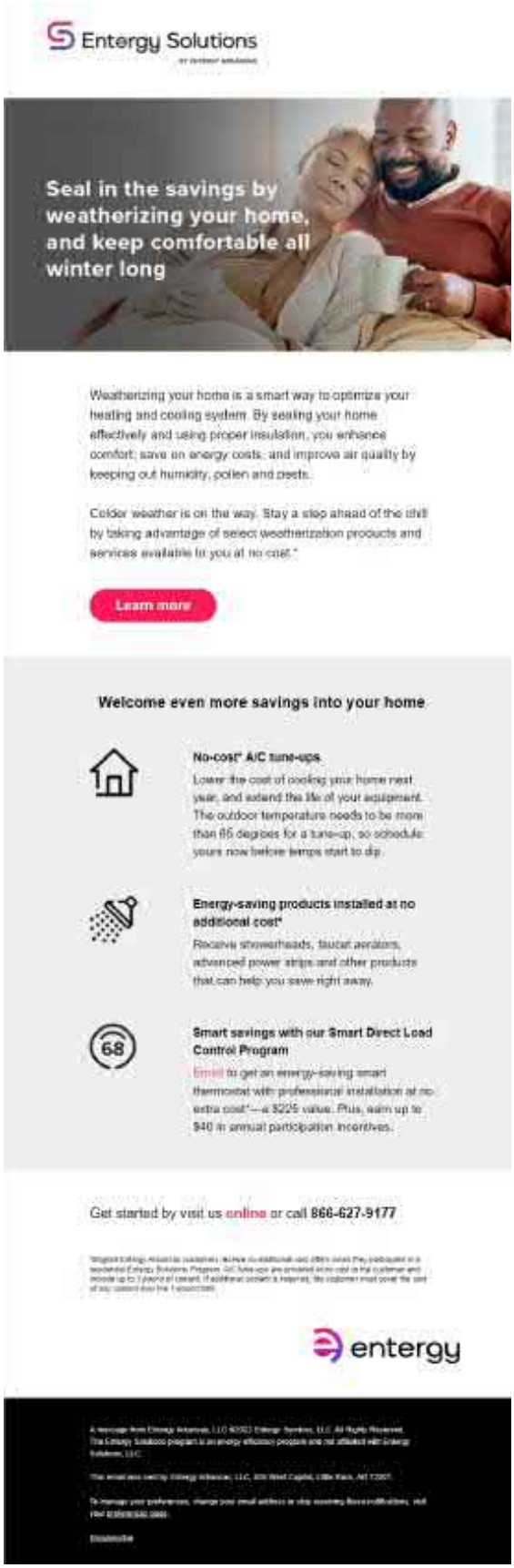
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3.1.10 EAL August_ACTU email.pdf



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3.1.11 EAL October_HES_email.pdf



APSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835

3.1.12 December_EAL_HES email.pdf

Entergy Solutions



No-cost weatherization is knocking at your door*

Welcome Entergy Solutions programs into your home. We offer **weatherization products and services** to Entergy Arkansas customers at no cost. They can make your place cozier while trimming down energy expenses. So say good riddance to pesky drafts and air leaks with duct sealing and ceiling insulation, and save water with faucet aerators and efficient showerheads.

Find a trade ally

68

Get a smart thermostat for $0*

Enroll in the Smart Direct Load Control Program and you'll get an energy-saving smart thermostat valued at $225. Professional installation is included as well.

Sign up

*Eligible Entergy Arkansas customers receive no additional cost offers when they participate in a residential Entergy Solutions program.

entergy

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The Entergy Solutions program is an energy efficiency program and not affiliated with Entergy Solutions, LLC.

This email was sent by Entergy Arkansas, LLC, 425 West Capitol, Little Rock, AR 72201

To manage your preferences, change your email address or stop receiving these notifications, visit your preferences page.

Unsubscribe

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3.1.13 HES Social Media 2023





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Entergy Arkansas
October 4, 2023 ·

Join us today (October 4) as we celebrate Energy Efficiency Day! #EEDay2023

For Energy Efficiency Day, let's work together to cut energy waste. Join the thousands of people who have already pledged to save energy and money: energyefficiencyday.org

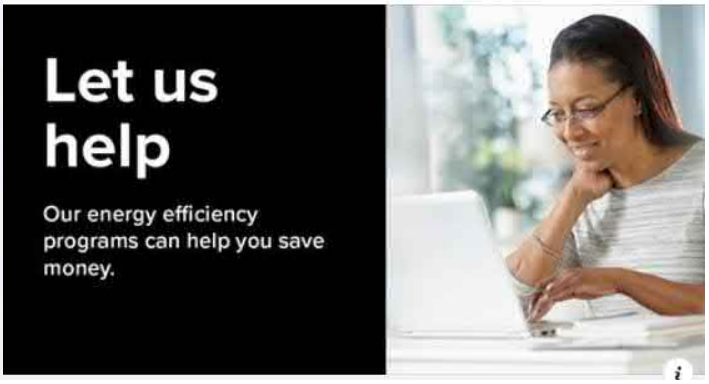
Learn more about Entergy Arkansas Entergy Solutions programs at entergysolutionsar.com



Entergy Arkansas
June 1, 2023 ·

Entergy Arkansas is conducting an energy conservation equipment and systems test today only for residential customers who have volunteered to participate in Entergy Arkansas energy conservation programs with a smart thermostat or through the Summer Advantage or Agriculture Irrigation Load Control programs. Thank you, participants, for volunteering to work with us to conserve energy.

Learn more http://enter.gy/6183Otexz

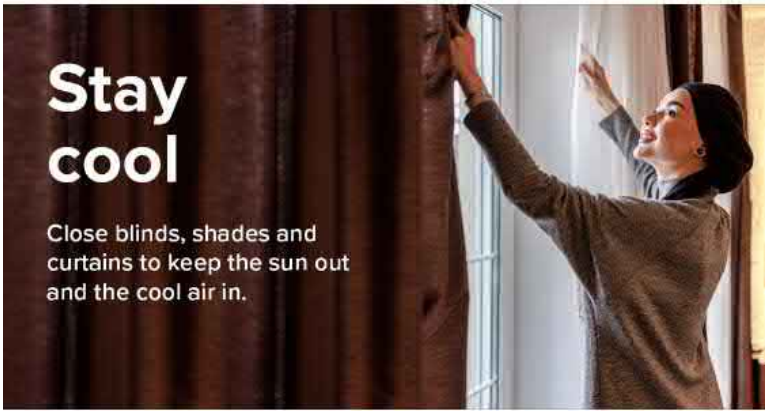


Entergy Arkansas
May 16, 2023 ·

When it's warm outside, stay cool.

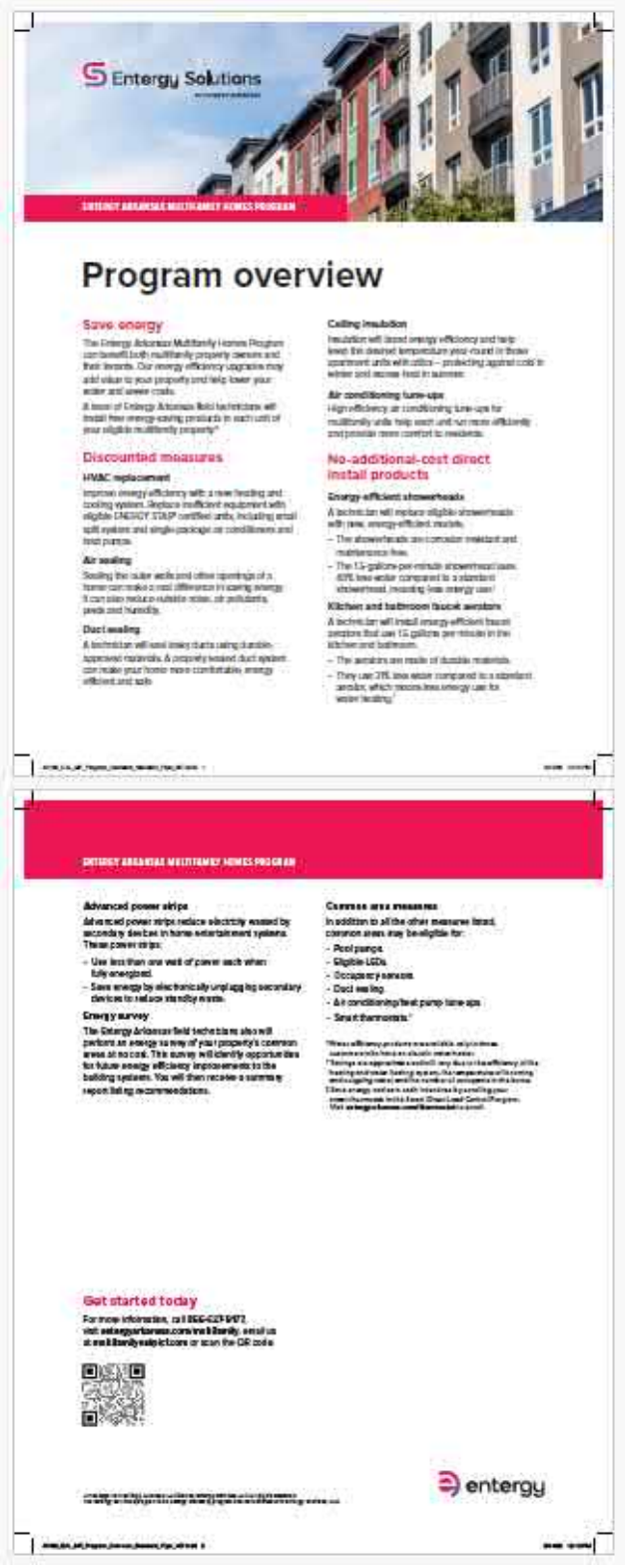
Close blinds, shades and curtains to save energy, keep the sun out, and keep the cool air in.

More energy-saving tips and #EnergyEfficiency resources for the hot weather here http://enter.gy/6183O9MLt



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3.2 Entergy Solutions for Multi-family
3.2.1 40160_EAL_MF_Program_Overview_Standard_Flyer_v07_RELEASE_print.pdf



Entergy Solutions

ENTERGY ARKANSAS MULTIFAMILY HOMES PROGRAM

Program overview

Save energy

The Entergy Arkansas Multifamily Homes Program can benefit both multifamily property owners and their tenants. Our energy efficiency upgrades may add value to your property and help lower your water and sewer costs.

A team of Entergy Arkansas field technicians will install free energy-saving products in each unit of your eligible multifamily property.*

Discounted measures

HVAC replacement

Improve energy efficiency with a new heating and cooling system. Replace inefficient equipment with eligible ENERGY STAR certified units, including small split systems and single-package air conditioners and heat pumps.

Air sealing

Sealing the outer walls and other openings of a home can make a real difference in saving energy. It can also reduce outside noise, air pollutants, pests and humidity.

Duct sealing

A technician will seal leaky ducts using durable, approved materials. A properly sealed duct system can make your home more comfortable, energy efficient and safe.

Ceiling insulation

Insulation will boost energy efficiency and help keep the desired temperature year-round in those apartment units with attics – protecting against cold in winter and excess heat in summer.

Air conditioning tune-ups

High-efficiency air conditioning tune-ups for multifamily units help each unit run more efficiently and provide more comfort to residents.

No-additional-cost direct install products

Energy-efficient showerheads

A technician will replace eligible showerheads with new, energy-efficient models.

- The showerheads are corrosion resistant and maintenance free.
- The 1.5-gallons-per-minute showerhead uses 40% less water compared to a standard showerhead, meaning less energy use.†

Kitchen and bathroom faucet aerators

A technician will install energy-efficient faucet aerators that use 1.5 gallons per minute in the kitchen and bathroom.

- The aerators are made of durable materials.
- They use 25% less water compared to a standard aerator, which means less energy use for water heating.†

ENTERGY ARKANSAS MULTIFAMILY HOMES PROGRAM

Advanced power strips

Advanced power strips reduce electricity wasted by secondary devices in home entertainment systems. These power strips:

- Use less than one watt of power each when fully energized.
- Save energy by electronically unplugging secondary devices to reduce standby waste.

Energy survey

The Entergy Arkansas field technicians also will perform an energy survey of your property's common areas at no cost. This survey will identify opportunities for future energy efficiency improvements to the building systems. You will then receive a summary report listing recommendations.

Common area measures

In addition to all the other measures listed, common areas may be eligible for:

- Pool pumps
- Eligible LEDs
- Occupancy sensors
- Duct sealing
- Air conditioning/heat pump tune-ups
- Smart thermostats.*

Get started today

For more information, call 866-623-9972, visit entergyarkansas.com/multifamily, email us at multifamily@aeiclt.com or scan the QR code.

entergy

APSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835

3.2.2 40160_EAL_MF_Program_Overview_Co-branded_Flyer_v07_RELEASE_print.pdf



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3.2.3 40373_EAL_MF_Commercial_Standard_Flyer_v04_RELEASE_print.pdf



Incentives for common area and exterior upgrades

Benefits of upgrading

Lighting upgrades

Commercial air conditioner tune-ups

Pool pump upgrade

Duct sealing

Get started today

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3.2.4 40373_EAL_MF_Commercial_Co-branded_Flyer_v04_RELEASE_print.pdf



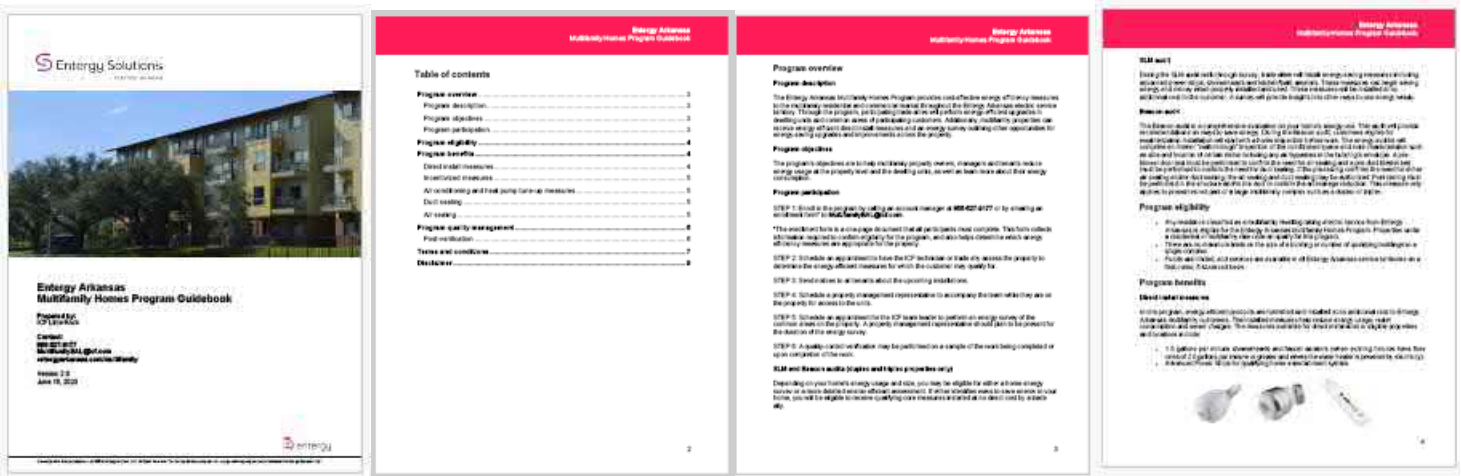
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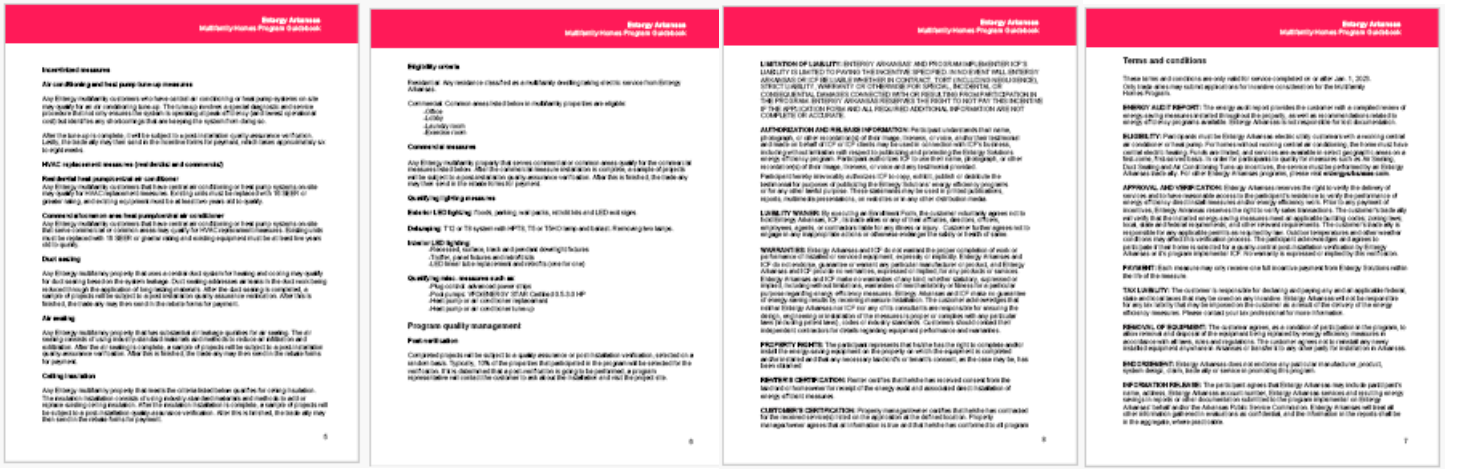
3.2.5 EAL_MF_Participation Certificate_2023_TEMPLATE_RELEASE.pdf



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3.2.6 MF Guidebook 2023 RELEASE

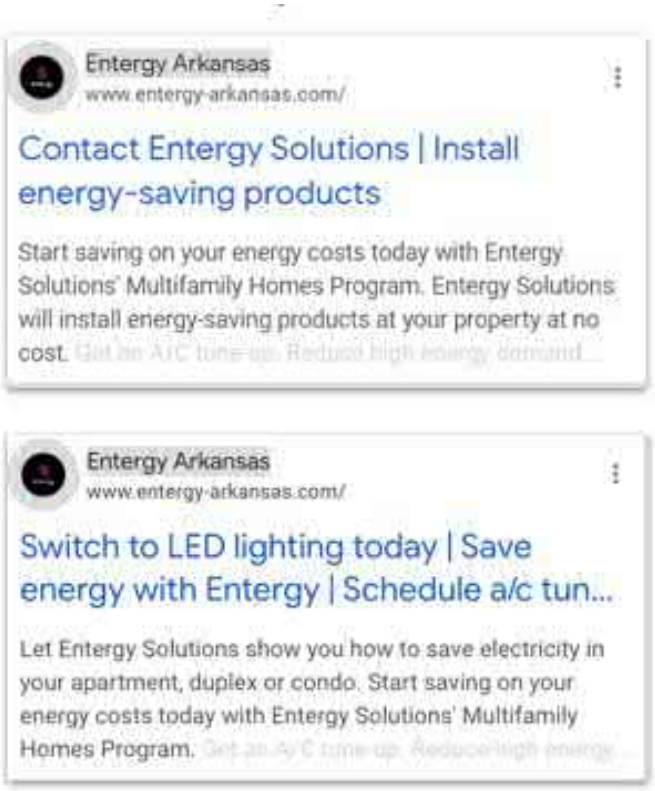


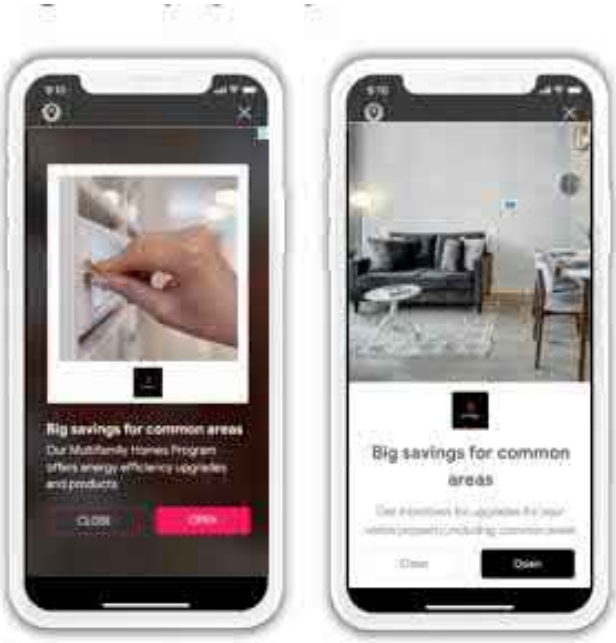




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3.2.7 Multifamily Paid Search Display Advertising 2023

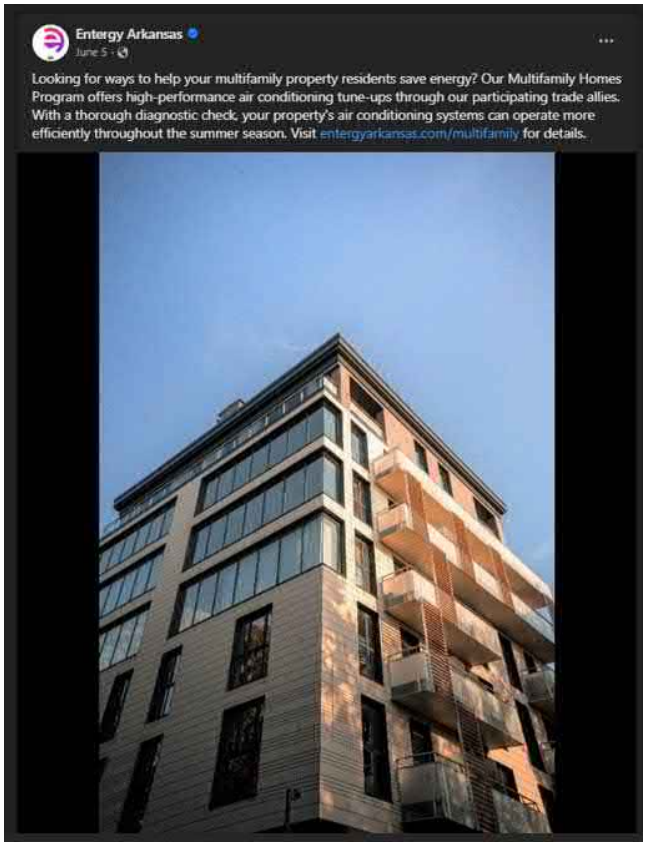




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3.2.8 Multifamily Social Media 2023







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3.3 Entergy Solutions for Manufactured Homes

3.3.1 EAL MA Newsletter Article _Sept 2023



Upgrade Your Manufactured Home with Energy-Saving Solutions

The Entergy Arkansas Manufactured Homes Program offers a range of energy-saving products to owners or residents, from LED bulbs to advanced power strips. This program provides cost-effective energy efficiency solutions through direct installation of these products in manufactured homes.

By enrolling in this program, you may be eligible to receive energy-saving measures such as air sealing and duct sealing, which can help keep your home comfortable and save energy in the long run. In addition, you can have high-efficiency showerheads and kitchen and bath aerators.

Weatherization upgrades to your home provide a variety of benefits, including:

- Energy efficiency. Sealing air that is leaking from your home increases the efficiency of your home, which may help save energy.
- Home comfort. Sealing air leaks can help with common comfort problems, such as rooms that are too cold in the winter or too hot in the summer.
- Air quality. A well-sealed home keeps out more humidity, dust, pollen and pests.
- Safety. Leaky ducts can allow gases from furnaces, stoves and water heaters to enter rooms throughout your home. Sealing leaks reduces this risk.

Start saving on energy costs today by improving the energy efficiency of your home. Visit entergyarkansas.com/manufactured to learn more about this program and find a participating trade ally.

3.3.2 EAL Newsletter Dec 2023

Entergy Arkansas
Newsletter Article: Manufactured Homes Program
December 2023



Ensure Winter Comfort in Your Manufactured Home with Energy-Saving Upgrades

Achieve energy savings this winter and beyond with our Manufactured Homes Program. Did you know that air leakage from your home can result in substantial energy waste? Our Entergy Solutions Manufactured Homes Program offers weatherization measures to improve your home's energy efficiency and alleviate concerns. By sealing your home effectively, you can save energy, reduce costs, and enhance comfort and durability.

Enrolling in the Manufactured Homes Program grants you eligibility for energy-saving measures such as air sealing, duct sealing, and more. These upgrades not only contribute to your long-term energy savings but also ensure your comfort. Additionally, as part of this program, energy-saving products high-efficiency showerheads and high-efficiency kitchen and bath aerators can be installed in your home at no extra cost.

Weatherization upgrades to your home deliver the following benefits:

1. Energy efficiency: Sealing air leaks enhances your home's overall efficiency, leading to potential energy savings.
2. Home comfort: By addressing air leaks, common comfort issues like excessively cold or hot rooms can be mitigated.
3. Air quality: A well-sealed home acts as a barrier against humidity, dust, pollen, and pests, improving indoor air quality.
4. Safety: Leaky ducts can permit gases from furnaces, stoves, and water heaters to enter various areas of your home. Sealing these leaks reduces the associated risks.

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Reduce energy usage and save money

Community managers and residents of eligible manufactured homes can get an energy audit, installation of energy-saving products and recommendations for additional energy efficiency upgrades—all at no cost.

Start with a Home Energy Assessment

It begins with an assessment of the home's energy use. Depending on the results, the following products may be installed at no cost.

Showerheads

A technician will replace eligible showerheads with new energy-efficient models that are corrosion-resistant and maintenance-free. The 1.5-gallons-per-minute showerhead uses 40% less water than a standard model, which helps save energy on water heating.

Kitchen and bathroom faucet aerators

Durable faucet aerators that use just 1.5 gallons per minute may be installed. They use 31% less water than a standard model, meaning less energy is used for water heating.

Advanced power strips

Advanced power strips reduce energy use by cutting power to electronics while they're in standby mode. This prevents them from using energy when not in use. Perfect for home office setups and entertainment centers.

Get incentives for upgrades

As part of the energy assessment, recommendations will be made for additional ways to improve energy efficiency. Some are eligible for incentives that typically cover the full cost.

Duct sealing

A properly sealed duct system can make homes more comfortable, energy efficient and safe.

Air sealing

Sealing gaps where air can pass through can lower energy costs and reduce outside noise, air pollutants, pests and humidity.

High efficiency air conditioning tune-ups

A well-tuned system runs more efficiently and effectively, providing improved comfort during warm weather.

Smart thermostat

Controlling home temperature settings with a smart thermostat can help save energy and keep everyone comfortable.

Enroll your smart thermostat in the Smart Direct Load Control program and earn even more incentives. Sign up at entergyarkansas.com/thermostat.

Schedule an audit today

For more information, call **866-827-9477**, visit **entergyarkansas.com/manufactured**, email **manufacturedhomes@ict.com** or scan the QR code.

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3.3.4 40126_EAL_MA_Program_Overview_Co-Branded_Flyer_EN-SP_v09_Release_Print.pdf



Reduce energy usage and save money

Community managers and residents of eligible manufactured homes can get an energy audit, installation of energy-saving products and recommendations for additional energy efficiency upgrades—all at no cost.

Start with a Home Energy Assessment

It begins with an assessment of the home's energy use. Depending on the results, the following products may be installed at no cost.

Showerheads

A technician will replace eligible showerheads with new energy-efficient models that are corrosion-resistant and maintenance-free. The 1.5-gallons-per-minute showerhead uses 40% less water than a standard model, which helps save energy on water heating.

Kitchen and bathroom faucet aerators

Durable faucet aerators that use just 1.5 gallons per minute may be installed. They use 30% less water than a standard model, meaning less energy is used for water heating.

Advanced power strips

Advanced power strips reduce energy use by cutting power to electronics while they're in standby mode. This prevents them from using energy when not in use. Perfect for home office setups and entertainment centers.

Get incentives for upgrades

As part of the energy assessment, recommendations will be made for additional ways to improve energy efficiency. Some are eligible for incentives that typically cover the full cost.

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Air sealing

Sealing gaps where air can pass through can lower energy costs and reduce outside noise, air pollutants, pests and humidity.

High efficiency air conditioning tune-ups

A well-tuned system runs more efficiently and effectively, providing improved comfort during warm weather.

Smart thermostat

Controlling home temperature settings with a smart thermostat can help save energy and keep everyone comfortable.

Enroll your smart thermostat in the Smart Direct Load Control program and earn even more incentives. Sign up at entergyarkansas.com/thermostat.

Schedule an audit today

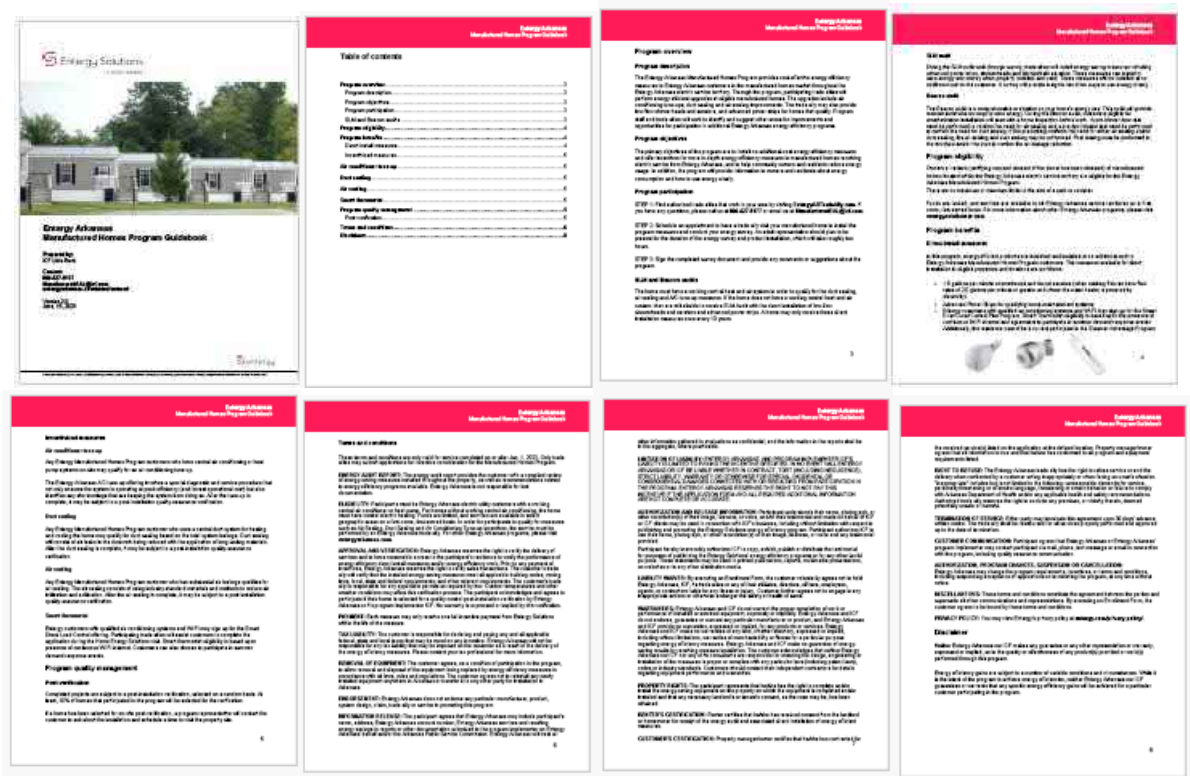
For more information, call 866-527-9477, visit entergyarkansas.com/manufactured, email manufacturedadd@ict.com or scan the QR code.

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3.3.5 MA Guidebook 2023 RELEASE



3.3.6 Manufactured Homes Survey Email 2023

Entergy Solutions
BY ENTERGY ARKANSAS

Dear KATHY KING,

Thank you for participating in the Entergy Arkansas Manufactured Homes Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Click here to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit our website for more information.

If you need additional assistance or have any questions, feel free to call 866-627-9177 or email ManufacturedEAL@icf.com.

Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

Privacy Policy

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3.3.7 Entergy Solutions Manufactured Homes Program Customer Satisfaction Survey 2023



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3.3.8 Manufactured Homes Survey Letter

Entergy Solutions
BY ENTERGY ARKANSAS

Customer Sample
123 Main St.
HOMETOWN, AR 12345

Dear Customer,

Thank you for participating in the Entergy Arkansas Manufactured Homes Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Please go to **surveymonkey.com/r/3TW65S6** or use your smartphone to scan the QR code below to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit **entergysolutionsar.com** for more information.

If you need additional assistance or have any questions, feel free to call **866-627-9177** or email **ManufacturedEAL@icf.com**.

Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

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3.3.9 Manufactured Homes Social Media 2023





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ARSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835

3.4 Low-Income Solutions
3.4.1 2023 LIS June Bill Insert

Entergy Solutions
BY ENTERGY ARKANSAS

Make sure comfort is always in season

At no additional cost, you can save energy and improve home comfort all year long with the Low-Income Solutions program.

Start with scheduling a home energy assessment by emailing lowincomesolutionseal@icf.com or calling 866-627-9177.



Save every season with energy upgrades at no additional cost

The Low-Income Solutions program offers qualifying customers a suite of home upgrades, services and products, including:

- Home energy assessment
- Duct sealing
- Air sealing
- Ceiling insulation
- A/C tune-up
- Energy-saving products:
  - Advanced power strip
  - Low-flow showerheads and aerators

Start with scheduling a home energy assessment by emailing lowincomesolutionseal@icf.com or calling 866-627-9177. Visit entergyarkansas.com/lowincome or scan the QR code to learn more.

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3.4.2 40123_EAL_LIS_Program_Overview_English _Flyer_v09_Release_Print.pdf



More comfort, more savings

The Low-Income Solutions program can help make your home more energy efficient and comfortable year-round, while saving you energy and money—all at no additional cost to you.

Schedule a Home Energy Assessment

Start with a Home Energy Assessment to determine how your home uses energy and how you can use less. During the assessment, you also might receive energy-saving products such as advanced power strips, low-flow showerheads and aerators (for customers with electric water heaters).

Take advantage of upgrades

Based on your Home Energy Assessment, you also might be eligible for a variety of energy efficiency upgrades installed by one of our trade allies. Upgrades can include:

- Air sealing
- Duct sealing
- Ceiling insulation
- Smart thermostat
- High-performance air conditioning tune-up

Save even more with your smart thermostat

Eligible customers can get a smart thermostat with professional installation—a $225 value. If you also enroll in the **Smart Direct Load Control program**, you'll get an annual incentive of up to $40 for participating in conservation periods. If you live in a single-family or manufactured home with central heating and air and have in-home Wi-Fi service, you may be eligible to participate.

You may qualify

If you are an Entergy Arkansas residential customer (renter or owner) who lives in a single-family, multifamily or manufactured home, you may qualify if you are eligible for the Low-Income Home Energy Assistance program (LIHEAP), regardless of age, or if you are 65 years of age or older.

"The Entergy Solutions team fixed the leaks in my ducts. I can't say enough about the program. It's wonderful. It has saved me a lot of money, and I am very comfortable in my home."

— Entergy Arkansas customer

Get started today

Contact the Energy Efficiency Solutions Center at **866-627-9177**, or email **lowincomesolutionseal@icf.com**.

Visit **entergyarkansas.com/lowincome** to learn more, or scan the QR code.

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3.4.3 40123_EAL_LIS_Program_Overview_Spanish Flyer_v09_Release_Print.pdf



Más comodidad, más ahorro

El programa Soluciones para personas de bajos recursos puede ayudarle a que el consumo de energía en su hogar sea más eficiente y más cómodo durante todo el año, y a su vez, ahorra energía y dinero, todo esto sin costo adicional para usted.

Solicite una evaluación de energía de su hogar

Comience con una evaluación de energía donde se determinará cómo se está utilizando la energía en su hogar y maneras para reducir el consumo eléctrico. Durante la evaluación, también podra recibir productos para ahorrar energía, como regletas de enchufes avanzados, cabezales de ducha de bajo caudal y aireadores (para clientes con calentadores de agua eléctricos).

Aproveche las mejorías

Después de la evaluación de energía de su hogar, puede calificar para recibir mejorías de eficiencia energética que son instaladas por uno de nuestros aliados comerciales. Las mejorías pueden incluir:

- Sellado del aire
- Sellado de conductos
- Aislamiento del techo
- Termostato inteligente
- Mantenimiento del aire acondicionado de alto rendimiento

Empiece hoy mismo

Póngase en contacto con el Centro de Soluciones de Eficiencia Energética al **866-627-9177**, o envíe un correo electrónico a **lowincomesolutionseal@icf.com**.

Visite **entergyarkansas.com/lowincome** para obtener más información, o escanee el código QR.

Ahorre aún más con su termostato inteligente

Los clientes que cumplan con los requisitos pueden adquirir un termostato inteligente e instalación profesional; un valor de $225. Además si se inscribe en el **programa Smart Direct Load Control**, recibiría un incentivo anual de hasta $40 por participar en los periodos de conservación. Si vive en una vivienda unifamiliar o prefabricada con calefacción y aire acondicionado central y si su hogar dispone de servicio de internet Wi-Fi , podría ser elegible para participar en el programa.

Podría cumplir con los requisitos

Si usted es un cliente residencial de Entergy Arkansas (inquilino o propietario) que vive en una vivienda unifamiliar, multifamiliar o prefabricada y es elegible para el Programa de Asistencia de Energía para Hogares de Bajos Recursos (LIHEAP), independientemente de su edad.

"El equipo de Entergy Solutions arregló las fugas de mis conductos de aire. Solo puedo mencionar cosas muy buenas del programa. Es maravilloso. Me he ahorrado mucho dinero y estoy muy cómodo en mi hogar".

- Cliente de Entergy Arkansas

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El programa de Entergy Solutions es un programa de eficiencia energética y no está afiliado a Entergy Solutions, LLC.

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3.4.4 40123_EAL_LIS_Program_Overview_Co-branded_Flyer_English



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3.4.5 40123_EAL_LIS_Program_Overview_Co-Branded_Spanish



More comfort, more savings

The Low-Income Solutions program can help make your home more energy efficient and comfortable year-round, while saving you energy and money—all at no additional cost to you.

Schedule a Home Energy Assessment

Start with a Home Energy Assessment to determine how your home uses energy and how you can use less. During the assessment, you also might receive energy-saving products such as advanced power strips, low-flow showerheads and aerators (for customers with electric water heaters).

Take advantage of upgrades

Based on your Home Energy Assessment, you also might be eligible for a variety of energy efficiency upgrades installed by one of our trade allies. Upgrades can include:

- Air sealing
- Duct sealing
- Ceiling insulation
- Smart thermostat
- High-performance air conditioning tune-up

Save even more with your smart thermostat

Eligible customers can get a smart thermostat with professional installation—a $225 value. If you also enroll in the **Smart Direct Load Control program**, you'll get an annual incentive of up to $40 for participating in conservation periods. If you live in a single-family or manufactured home with central heating and air and have in-home Wi-Fi service, you may be eligible to participate.

You may qualify

If you are an Entergy Arkansas residential customer (renter or owner) who lives in a single-family, multifamily or manufactured home, you may qualify if you are eligible for the Low-Income Home Energy Assistance program (LIHEAP), regardless of age, or if you are 65 years of age or older.

"The Entergy Solutions team fixed the leaks in my ducts. I can't say enough about the program. It's wonderful. It has saved me a lot of money, and I am very comfortable in my home."

— Entergy Arkansas customer

Get started today

Contact the Energy Efficiency Solutions Center at **866-627-9177**, or email **lowincomesolutionseal@icf.com**.

Visit **entergyarkansas.com/lowincome** to learn more, or scan the QR code.

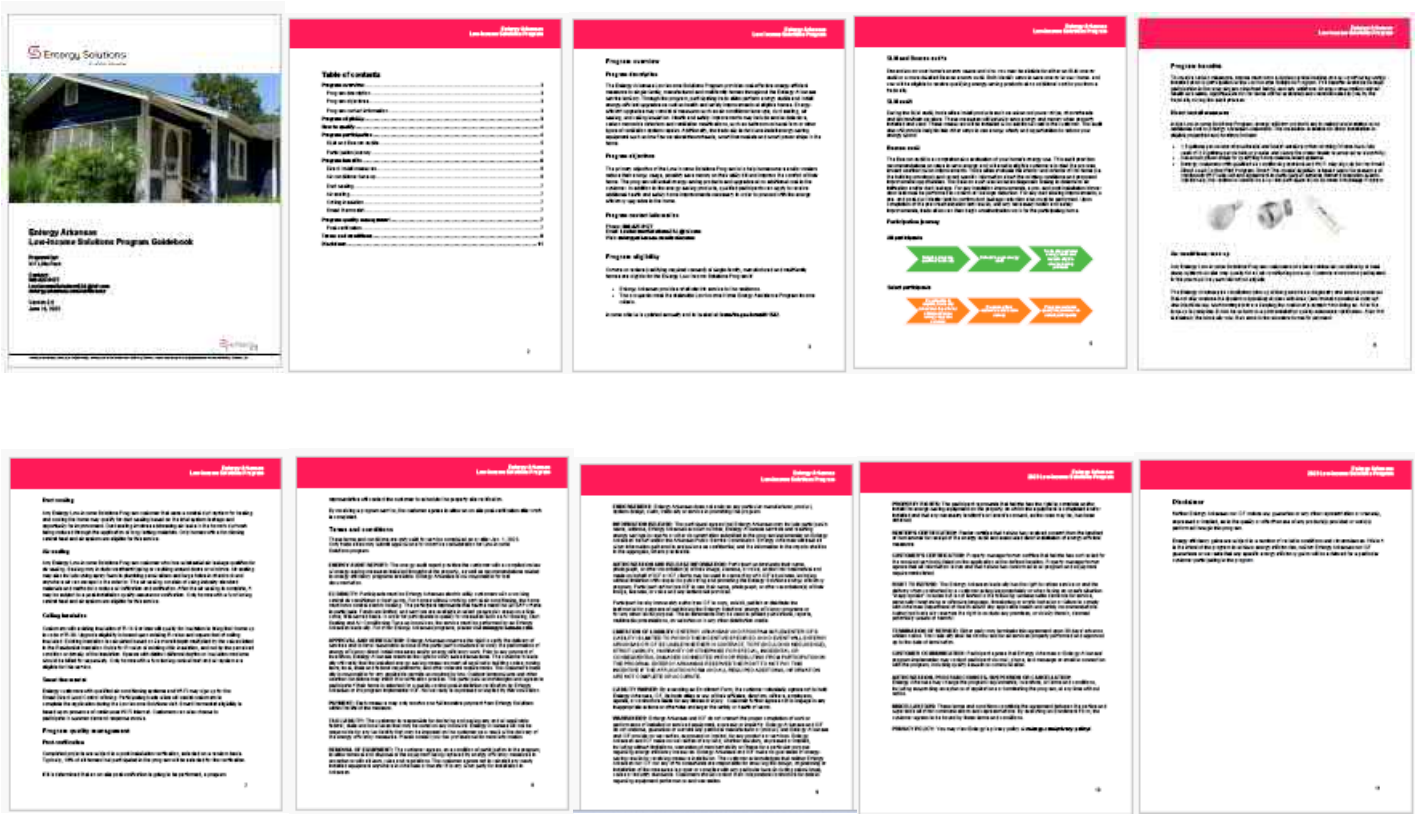
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3.4.6 LIS Guidebook 2023 RELEASE



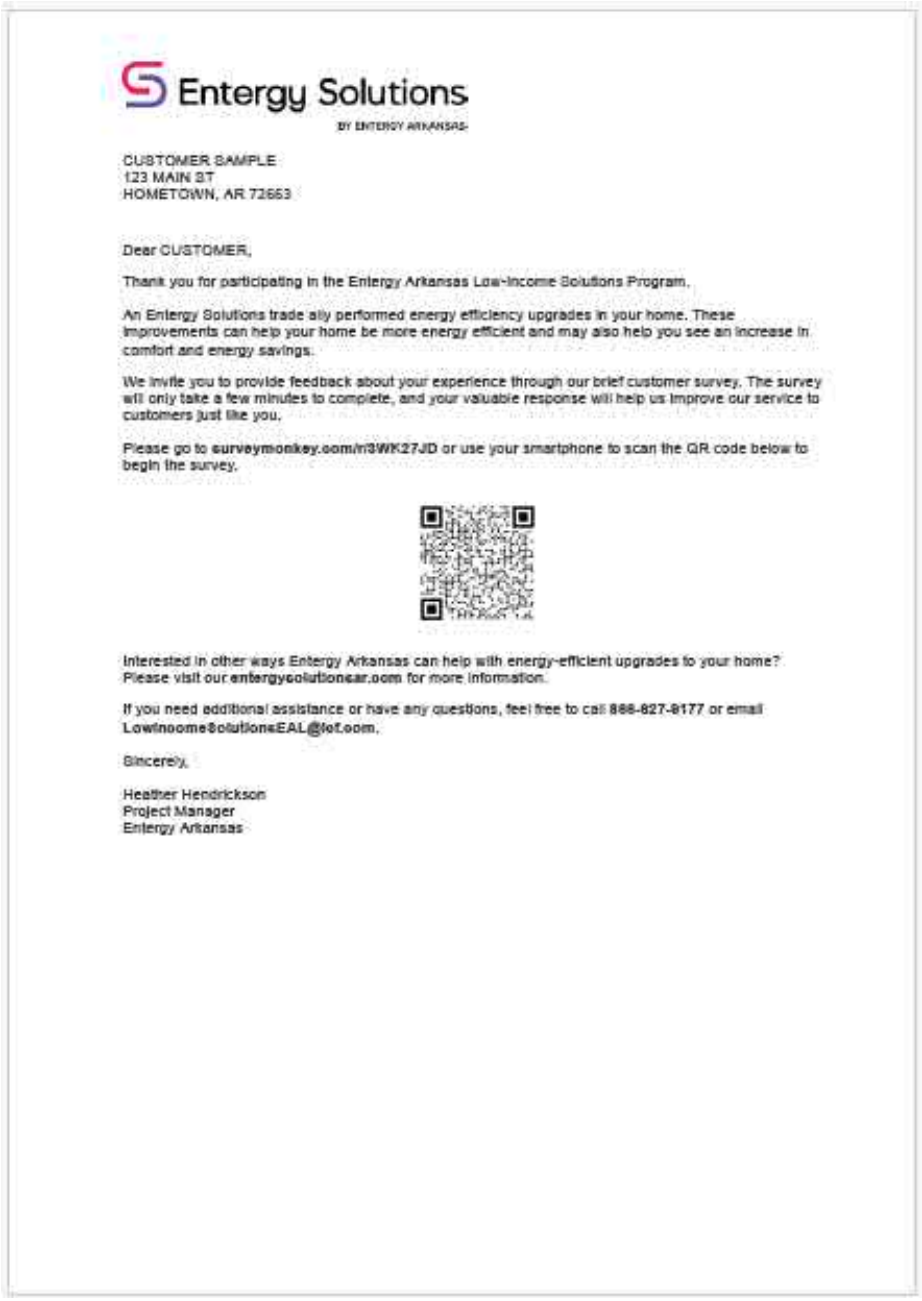
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3.4.7 Low Income Solutions Customer Satisfaction Survey 2023



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3.4.8 LIS Customer Satisfaction Survey Letter



Entergy Solutions
BY ENTERGY ARKANSAS

CUSTOMER SAMPLE
123 MAIN ST
HOMETOWN, AR 72663

Dear CUSTOMER,

Thank you for participating in the Entergy Arkansas Low-Income Solutions Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Please go to **surveymonkey.com/r/3WK27JD** or use your smartphone to scan the QR code below to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit our **entergysolutionsar.com** for more information.

If you need additional assistance or have any questions, feel free to call **888-827-9177** or email **LowIncomeSolutionsEAL@lot.com**.

Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

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3.4.9 LIS Customer Satisfaction Survey Email

Entergy Solutions
BY ENTERGY ARKANSAS

Dear CUSTOMER,

Thank you for participating in the Entergy Arkansas Low-Income Solutions Program.

An Entergy Solutions trade ally performed energy efficiency upgrades in your home. These improvements can help your home be more energy efficient and may also help you see an increase in comfort and energy savings.

We invite you to provide feedback about your experience through our brief customer survey. The survey will only take a few minutes to complete, and your valuable response will help us improve our service to customers just like you.

Click here to begin the survey.

Interested in other ways Entergy Arkansas can help with energy-efficient upgrades to your home? Please visit our website for more information.

If you need additional assistance or have any questions, feel free to call 866-627-9177 or email LowIncomeSolutionsEAL@icf.com.

Sincerely,

Heather Hendrickson
Project Manager
Entergy Arkansas

Privacy Policy

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3.4.10 LIS Social Media 2023







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3.5 Point of Purchase Solutions

3.5.1 EAL Newsletter August 2023 POPS



Control Comfort and Save Money with Energy-Efficient Home Products

Improve your home's comfort and freshness level with Room ACs, Air Purifiers, and Dehumidifiers. These ENERGY STAR® certified products not only offer great control over your home's atmosphere but also help save energy and money in the long run.

Here are some facts to consider:

- ENERGY STAR certified room air conditioners consume 10 percent less energy and cost less than $70 annually to run.
- ENERGY STAR certified room air purifiers are over 25% more energy-efficient than standard models, saving around 120 kWh/year and $15 on annual utility bills. This could amount to $120 over the product's lifetime.
- ENERGY STAR certified dehumidifiers use more efficient refrigeration coils, compressors, and fans to remove the same amount of moisture as conventional units but with nearly 15% less energy consumption.

Don't wait any longer to start saving. Visit energyarkansas.com/ or call 833-607-7662 today to learn more about how you can live a comfortable life while saving money.

3.5.2 2023 POPS Thermostat Rebate Form

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Entergy Solutions

Up to $50 rebate

on a new qualifying ENERGY STAR® certified freezer



Step 1:
Purchase and install a new ENERGY STAR certified smart thermostat.

Step 2:
Complete the back of this form and mail, along with a dated receipt, within 60 days.

Step 3:
If all requirements noted on the reverse side are met, we'll send you a $50 rebate.

Smart thermostats make it easy to stay comfortable and save energy all year long. Get the savings started with an Entergy Arkansas rebate.

We power life.®

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Smart thermostat rebate application

Account information

Entergy Arkansas account number (of installation address)

☐☐☐☐☐☐☐☐☐☐☐☐

Installation address: _____ City: _____ State: _____ ZIP code: _____

Purchaser's name: _____ Daytime phone: _____

Product and home information

Does your home have central A/C and Wi-Fi? (required) ☐ Yes ☐ No

Thermostat make and model #: _____

How do you primarily heat your home? (check one) ☐ Electric ☐ Natural Gas ☐ Propane ☐ Other: _____

What type of home do you live in? ☐ Single family ☐ Duplex/Triplex ☐ Multifamily

What is the square footage of your home? ☐ 0–1,500 ☐ 1,501–2,500 ☐ 2,500+

What kind of thermostat are you replacing? ☐ Manual ☐ Programmable ☐ Unknown

By signing below, the purchaser authorizes Entergy Arkansas to perform a phone survey or physical inspection to confirm installation. Rebate checks will be sent to purchaser listed on this form.

Signature: _____

Please send this application, along with a copy of your dated sales receipt, to:

Entergy Arkansas Rebate Program
16350 Felton Road, Lansing, MI 48906

Email: entergyarappliances@clearesult.com **Fax:** 888-668-2907 Or apply online at **entergyarappliances.clearesult.com**

This offer is available to Entergy Arkansas customers beginning on Jan. 1, 2023, and is only applies to ENERGY STAR certified smart thermostats purchased and installed between Jan. 1, 2023, and Dec. 31, 2023. Participation limited to one rebate per customer per calendar year. Customer must be a residential customer of Entergy Arkansas with a valid account number. Rebate will be issued in the form of a check mailed to the customer's billing address. Limit one rebate per household. Rebate is subject to program terms and conditions. Entergy Arkansas reserves the right to modify or cancel this offer at any time without notice. Void where prohibited by law. Other restrictions may apply. Visit entergyarkansas.com/energy_efficiency or call 800-482-4620 for more information.

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3.5.3 POPS Freezer Rebate Form



Entergy Solutions

Up to $50 rebate

on a new qualifying ENERGY STAR® certified freezer

Step 1:
Purchase a new ENERGY STAR certified compact, chest or upright freezer.

Step 2:
Within 60 days, complete and sign the form on the back of this card. Mail, email or fax the form and a dated receipt to the address provided.

Step 3:
If all requirements are met, we will issue a $25 rebate for a freezer up to 775 cubic feet in capacity or a $50 rebate for a freezer above 775 cubic feet in capacity.

Claim your Entergy Arkansas rebate now and save $195 over the next five years on your Entergy bill. This offer is exclusive to Entergy Arkansas residential customers.

We power life.™

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Freezer rebate application

Account information

Entergy Arkansas account number (of installation address):

Installation address: _____ City: _____ State: _____ ZIP code: _____

Purchaser's name: _____ Daytime phone: _____

Product and home information

Freezer capacity (in cubic feet): _____

Freezer model #: _____

Type of freezer (check one): ☐ Compact ☐ Chest ☐ Upright

Water in your home is supplied by (check one): ☐ Municipal water source ☐ Well ☐ Other: _____

Does your home tie into a municipal sewer system? (check one): ☐ Yes ☐ No

By signing below, the purchaser authorizes Entergy Arkansas to perform a phone survey or physical inspection to confirm installation. Rebate checks will be paid to purchaser listed on this form.

Signature: _____

Please send this application, along with a copy of your dated sales receipt, to:

Entergy Arkansas Rebate Program
16350 Felton Road, Lansing, MI 48906

Email: entergyarappliances@cleresult.com
Fax: 888-668-2907
Or apply online at **entergyarappliances.cleresult.com**

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3.5.4 2023 POPS Air Purifier Rebate Form



Entergy Solutions

$35 rebate

on a new qualifying air purifier

Step 1:
Purchase a new ENERGY STAR® certified air purifier.

Step 2:
Within 60 days, complete and mail in the back of this form along with a dated receipt.

Step 3:
If all requirements are met, we'll issue your rebate. See the back side of the form for detailed requirements.

Claim your Entergy Arkansas rebate now and you could expect more than $200 over the lifetime of the unit in energy savings, or $25 annually. This offer is exclusive to Entergy Arkansas residential customers.

We power life.®

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Air purifier rebate application

Account information

Entergy Arkansas Account Number (of installation address):

Installation address: _____ City: _____ State: _____ ZIP code: _____

Purchaser's name: _____ Daytime phone: _____

Product and home information

Air purifier model #: _____

Water in your home is supplied by (check one): ☐ Municipal water source ☐ Well ☐ Other: _____

Does your home tie into a municipal sewer system? (check one): ☐ Yes ☐ No

By signing below, the purchaser authorizes Entergy Arkansas to perform a phone survey or physical inspection to confirm installation. Rebate checks will be sent to purchaser listed on this form.

Signature: _____

Please send this application, along with a copy of your dated sales receipt, to:

Entergy Arkansas Rebate Program
16350 Felton Road, Lansing, MI 48906

Email: entergyarappliances@clearesult.com
Fax: 888-668-2907
Or apply online at **entergyarappliances.clearesult.com**

This offer is available through Dec. 31, 2022, or while supplies last. We will only accept one rebate per household. All rebate forms must be postmarked and purchase must have been made between Jan. 1, 2022, and Dec. 31, 2022. Please allow four to six weeks for processing. For more information about this program, including a full terms and conditions list, visit entergyarkansas.com/energysaving, email energysaving@entergy.com or call 877-372-8300.

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3.5.5 2023 POPS Dehumidifier Rebate Form



Entergy Solutions

$25 rebate

on a new qualifying dehumidifier

Step 1:
Purchase a new ENERGY STAR® certified dehumidifier.

Step 2:
Within 60 days, complete and mail the back of this form along with a dated receipt.

Step 3:
If all requirements are met, we'll issue your rebate. See the back side of the form for detailed requirements.

Claim your Entergy Arkansas rebate now and you could expect more than $200 over the lifetime of the unit in energy savings, or $25 annually. This offer is exclusive to Entergy Arkansas residential customers.

We power life.™

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Dehumidifier rebate application

Account information

Entergy Arkansas Account Number (on installation address)

☐☐☐☐☐☐☐☐☐☐☐☐

Installation address: _____ City: _____ State: _____ ZIP code: _____

Purchaser's name: _____ Daytime phone: _____

Product and home information

Dehumidifier model #: _____

Water in your home is supplied by (check one): ☐ Municipal water source ☐ Well ☐ Other: _____

Does your home tie into a municipal sewer system? (check one): ☐ Yes ☐ No

By signing below, the purchaser authorizes Entergy Arkansas to perform a phone survey or physical inspection to confirm installation. Rebate checks will be paid to purchaser listed on this form.

Signature: _____

Please send this application, along with a copy of your dated sales receipt, to:

Entergy Arkansas Rebate Program
16350 Felton Road, Lansing, MI 48906

Email: entergyarappliances@clearesult.com
Fax: 888-668-2907
Or apply online at **entergyarappliances.clearesult.com**

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3.5.6 2023 POPS Freezer Rebate Form



Entergy Solutions

Up to $50 rebate

on a new qualifying ENERGY STAR® certified freezer

Step 1:
Purchase a new ENERGY STAR certified compact, chest or upright freezer.

Step 2:
Within 60 days, complete and sign the form on the back of this card. Mail, email or fax the form and a dated receipt to the address provided.

Step 3:
If all legal criteria are met, we will issue a $25 rebate for a freezer up to 775 cubic feet in capacity or a $50 rebate for a freezer above 775 cubic feet in capacity.

Claim your Entergy Arkansas rebate now and save **$195** over the next five years on your Entergy bill. This offer is exclusive to Entergy Arkansas residential customers.

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Freezer rebate application

Account information

Entergy Arkansas account number (of installation address):

Installation address: _____ City: _____ State: _____ ZIP code: _____

Purchaser's name: _____ Daytime phone: _____

Product and home information

Freezer capacity (in cubic feet): _____

Freezer model #: _____

Type of freezer (check one): ☐ Compact ☐ Chest ☐ Upright

Water in your home is supplied by (check one): ☐ Municipal water source ☐ Well ☐ Other: _____

Does your home tie into a municipal sewer system? (check one): ☐ Yes ☐ No

By signing below, the purchaser authorizes Entergy Arkansas to perform a phone survey or physical inspection to confirm installation. Rebate checks will be paid to purchaser listed on this form.

Signature: _____

Please send this application, along with a copy of your dated sales receipt, to:

Entergy Arkansas Rebate Program
16350 Felton Road, Lansing, MI 48906

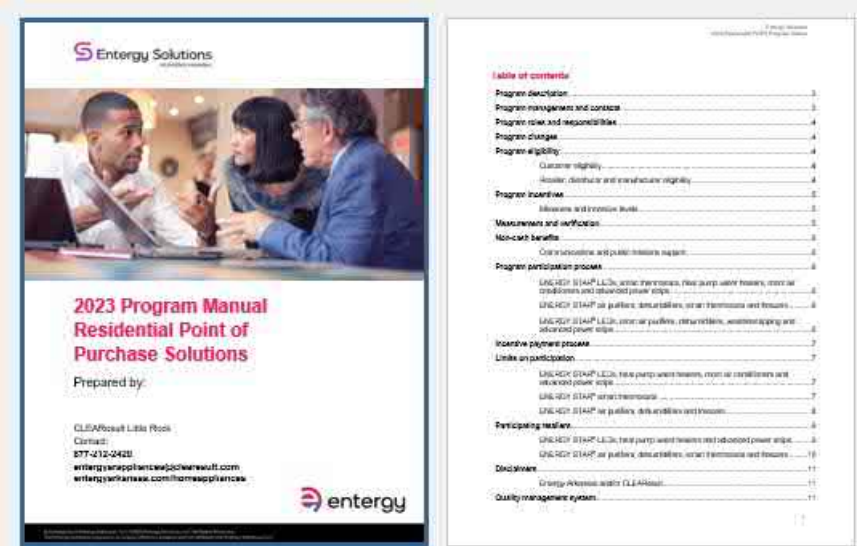
Email: entergyarappliances@cleanresult.com
Fax: 888-668-2907
Or apply online at **entergyarappliances.cleanresult.com**

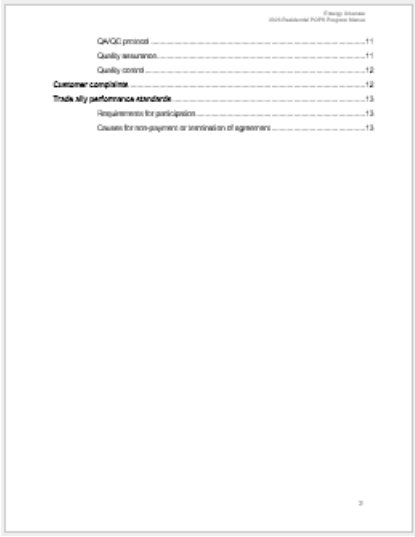
This offer is available through Dec. 31, 2022, unless extended. We reserve the right to end or change this offer at any time without notice. Limit one rebate per household per calendar year. Rebate is limited to one unit per purchase, and per customer each calendar year (Jan. 1 – Dec. 31, 2022). Please allow four to six weeks for processing. For more information about how energy efficiency contributes to Entergy Arkansas' and employees' commitment to the environment, visit entergy-arkansas.com/energy_efficiency.

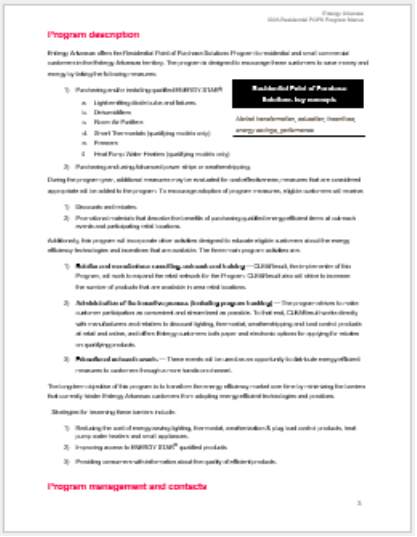
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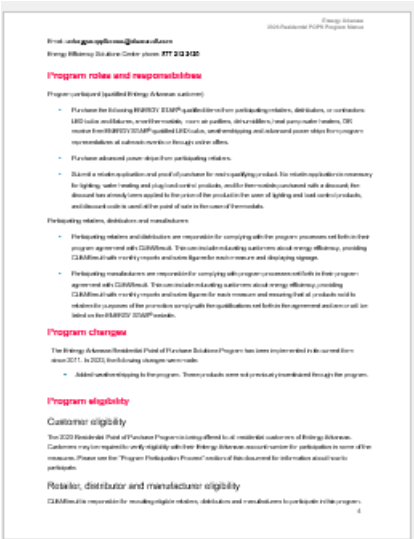
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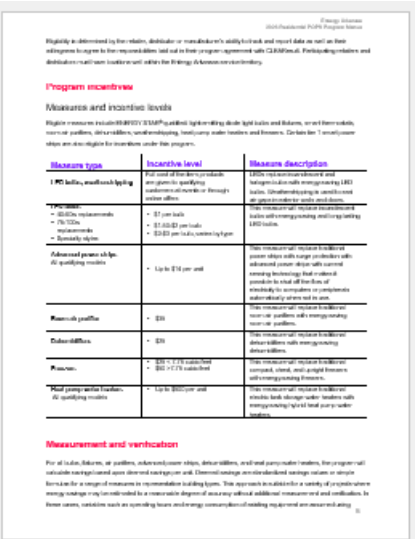
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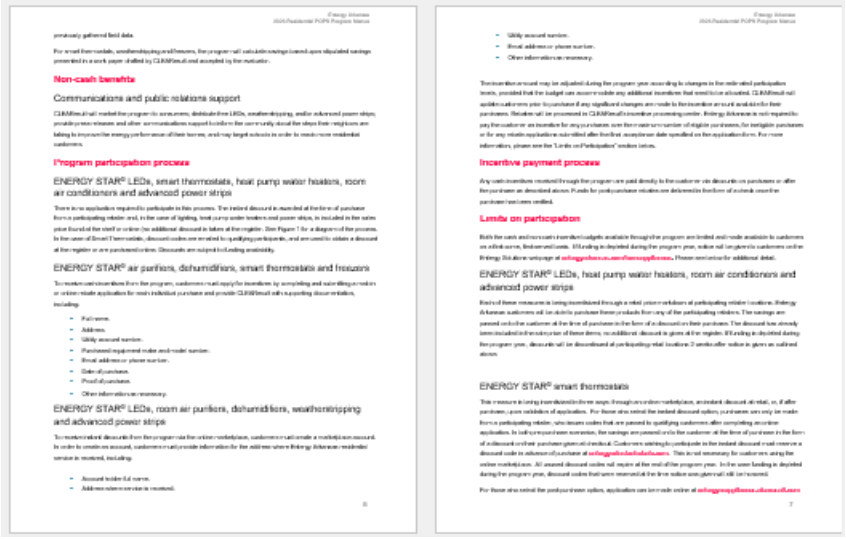


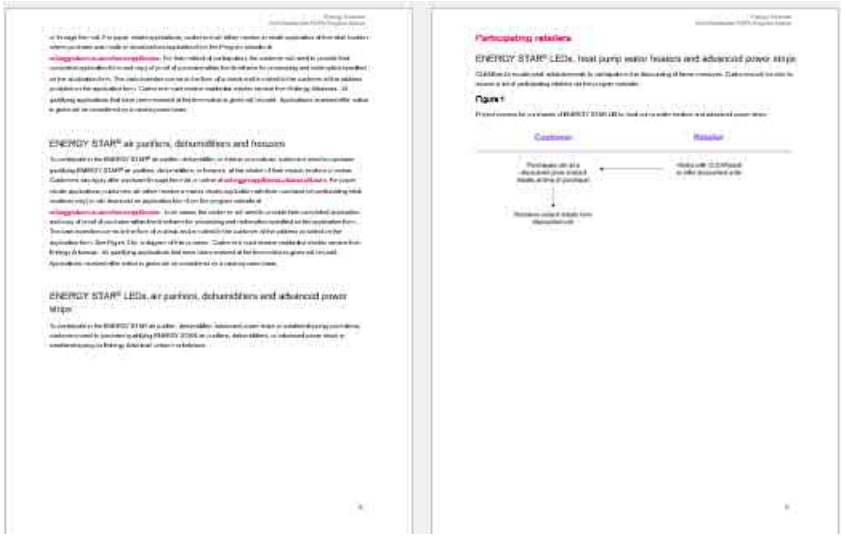


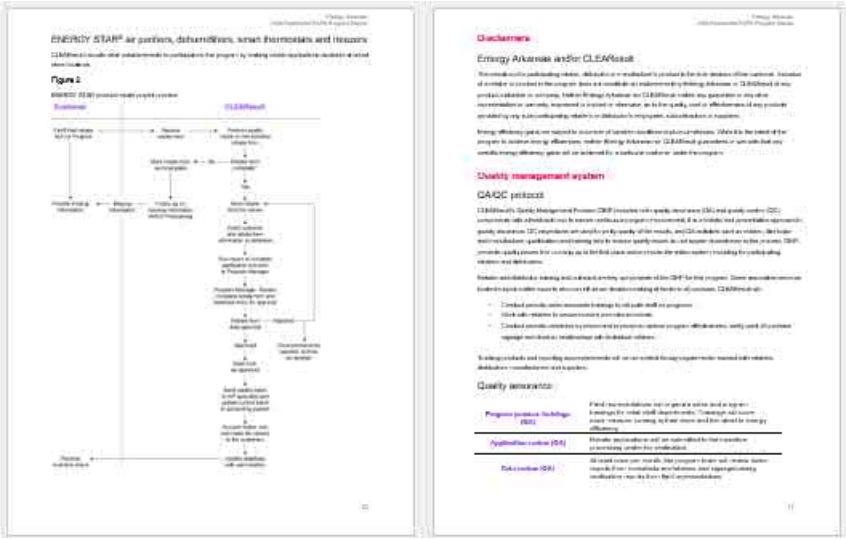




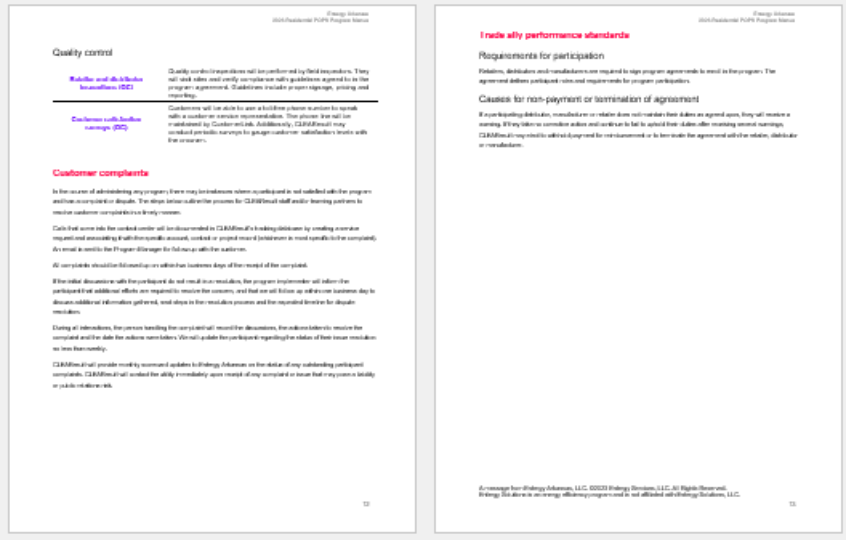
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Quality control

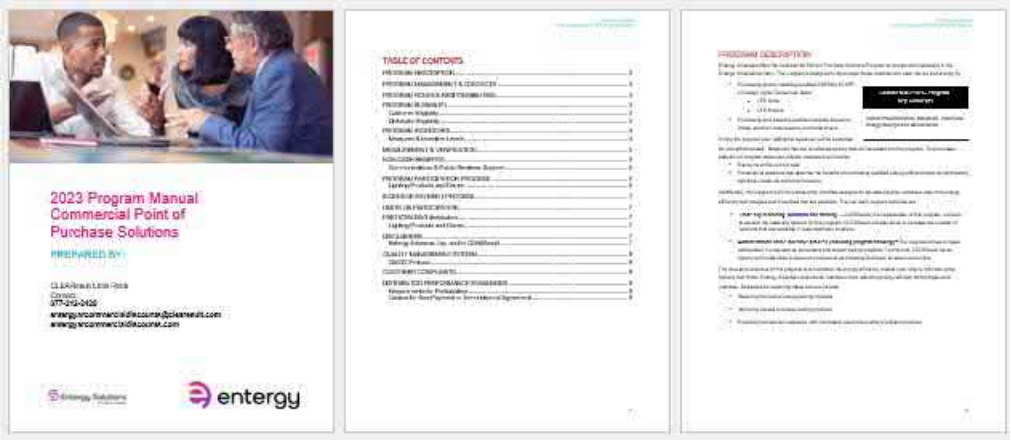
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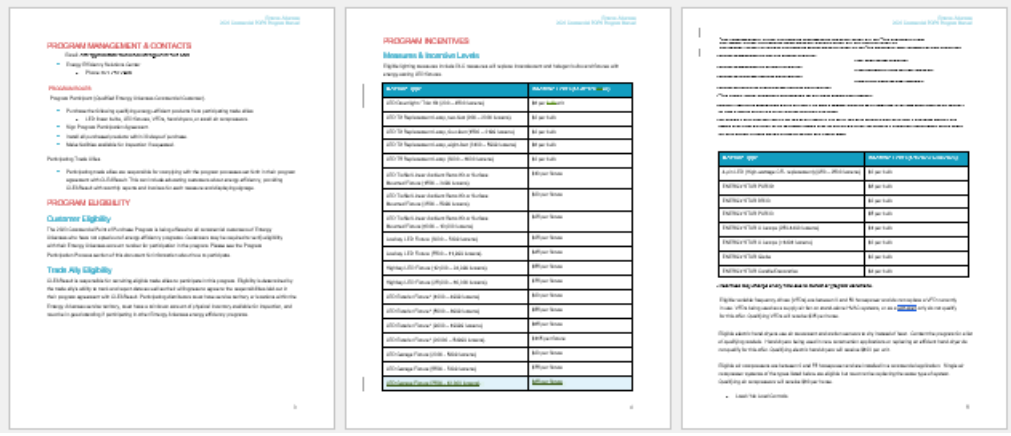
Causes for non-payment or termination of agreement

3.5.8 Commercial POPS Program Manual 2023


2023 Program Manual
Commercial Point of Purchase Solutions

PREPARED BY:

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PROGRAM MANAGEMENT & CONTACTS

PROGRAM ELIGIBILITY

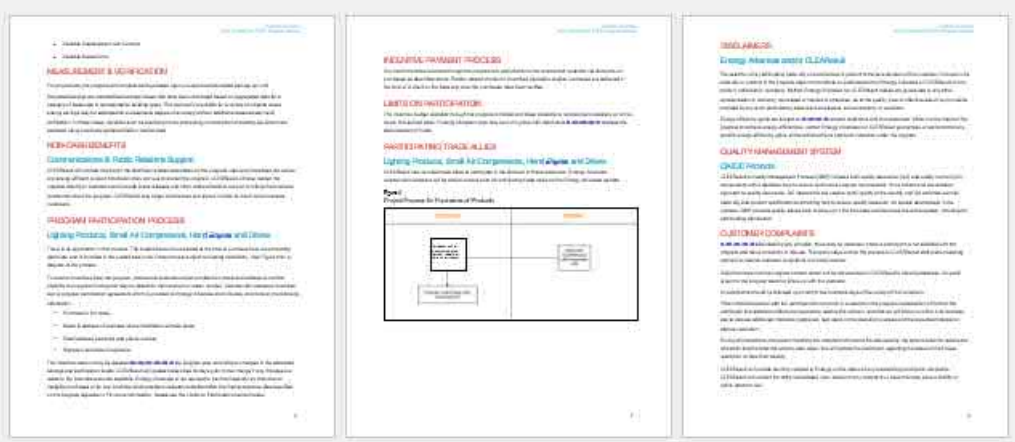
Customer Eligibility

Trade Ally Eligibility

PROGRAM INCENTIVES

Measures & Incentive Levels

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3.5.9 POPS Participation Agreement Commercial

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Entergy Solutions
BY ENTERGY ARKANSAS



Commercial Point of Purchase Solutions Energy Efficiency program participation agreement

Save real money with high-efficiency equipment.

The Entergy Arkansas Commercial Point of Purchase Solutions Energy Efficiency program offers incentives at the time of purchase for specific high-efficiency equipment. Entergy Arkansas commercial customers can obtain the products through their standard purchasing methods, and incentives are processed through the equipment supplier.

How will I benefit?

- Savings, now and later. Equipment upgrades typically pay for themselves in energy savings alone within a few years, and you can also save immediately through incentives for purchasing select high-efficiency products.
- Simplified process. The incentives are processed through your equipment supplier so you get immediate benefits and the supplier handles the paperwork.
- Entergy Arkansas commercial customers can obtain discounted high-efficiency products through standard purchasing methods.

Frequently asked questions

1. **Are there any commercial customers that aren't eligible for participation in the program?**
   Any nonresidential Entergy Arkansas customer is eligible to receive discounts through the program, even if you've completed a commercial project for which you received Entergy Arkansas incentives, though incentives cannot be claimed for the same socket or fixture twice.
2. **Do all efficient products qualify for discounts through the program?**
   No, only certain categories of lighting, hand dryers, small air compressors and variable-frequency drives of a certain size are eligible for discounts through the program.

How to participate:

1. Sign the back of this form and submit it to your product supplier. This enrolls you in the program and authorizes us to process the incentives for your purchase.
2. Purchase qualified products from your supplier. The incentive amount will be automatically deducted from the purchase price.
3. Install your product within 30 days of the purchase date. One of our program representatives may contact you to verify installation.
4. Enjoy the benefits of your completed project.

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Commercial Point of Purchase Solutions Energy Efficiency program Customer Participation Agreement

Entergy Arkansas has contracted with CLEAResult to implement, promote and administer the Commercial Point of Purchase Solutions Energy Efficiency program (herein referred to as "program"). _____ (herein referred to as "participant") recognizes it is a willing participant of this program and is an Entergy Arkansas commercial customer. This participation agreement reflects the voluntary collaboration between your organization and the Entergy Arkansas-sponsored Commercial Point of Purchase Solutions Energy Efficiency program. The terms below list the general commitments of the participant in order to improve the energy efficiency of your organization.

To participate in this program, you will need to understand and agree to these terms:

1. The program will provide incentive funds (in the form of a direct discount from the participating supplier) for eligible energy-saving products to be installed by the participant within facilities served by Entergy Arkansas. Installation address must be provided.
2. Participant will promptly install all energy-saving products purchased for their facilities within 30 days of the purchase date of the energy-saving products. Repayment of incentives received may be requested for any products found not installed upon inspection 30 days following purchase.
   ☐ Please initial.
3. Participant will allow necessary post-inspections to be administered by the program for verification of installation of the energy-saving products and arrange for any necessary inspection/participant surveys to be administered by the program evaluator of record.
4. Participant acknowledges that, as part of its participation in this program, it will maintain eligibility to receive program services and incentives for a period of two years from the date the participant receives the discount for the purchase of energy-saving products installed at its organization.
5. If the individual signing this form is NOT the account holder, the signer acknowledges that he/she is authorized to make purchasing decisions on the account holder's behalf. All terms and conditions in this agreement apply regardless of who signs the agreement.

Disclaimer

The purchasing of eligible energy-saving products from a participating supplier is the sole decision of the participant. The inclusion of a participating supplier for the program does not constitute an endorsement by Entergy Arkansas or CLEAResult of any product, individual or company. Eligible energy-saving products purchased by the participant from a participating supplier are not guaranteed or subject to any representation or warranty, either expressed or implied or otherwise, by either Entergy Arkansas or CLEAResult. Neither Entergy Arkansas nor CLEAResult makes any guarantee or any other representation or warranty, expressed or implied or otherwise, as to the quality, cost or effectiveness of any energy-saving product(s) provided by any participating supplier, by any such participating supplier's employees or subcontractors. Energy efficiency gains are subject to a number of variable conditions and circumstances. While it is the intent of the program to achieve energy efficiencies at the participant's organization, neither Entergy Arkansas nor CLEAResult guarantees or warrants that any specific energy efficiency gains will be achieved for a particular customer under the program.

Customer acknowledgment

I acknowledge that by signing below I understand and agree to the terms listed above. I understand that I will be liable to pay back the participating supplier some (or all) of the discounted amount received for the products purchased if I decide not to proceed with the installation of all purchased products. Incentives will not be paid for products that have also been incentivized through a different program, or if the socket or fixture being replaced was incentivized prior to proposed replacement. I agree to allow my account information and data to be used by the program staff for the purposes of verifying program eligibility and reporting program data to Entergy Arkansas. I acknowledge that I have read and understand the above disclaimer.

By endorsing below, your organization accepts this agreement with Entergy Arkansas. If your organization wishes to end its participation in the program, it may do so at any time by providing the program administrator written notice of its intentions, subject to product installation status and incentives received as outlined above.

Account Holder Point of Contact (First and Last Name): _____
☐ Check if you are NOT the account holder, and see #5 above.

Account Holder Company Name: _____

Installation Location Address, City, State, ZIP: _____

Telephone: _____ Email: _____

SIGNATURE: _____ DATE: _____

Please fill in completely, sign and hand this form to your product supplier.

Questions? Contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarcommercialdiscounts.com**.

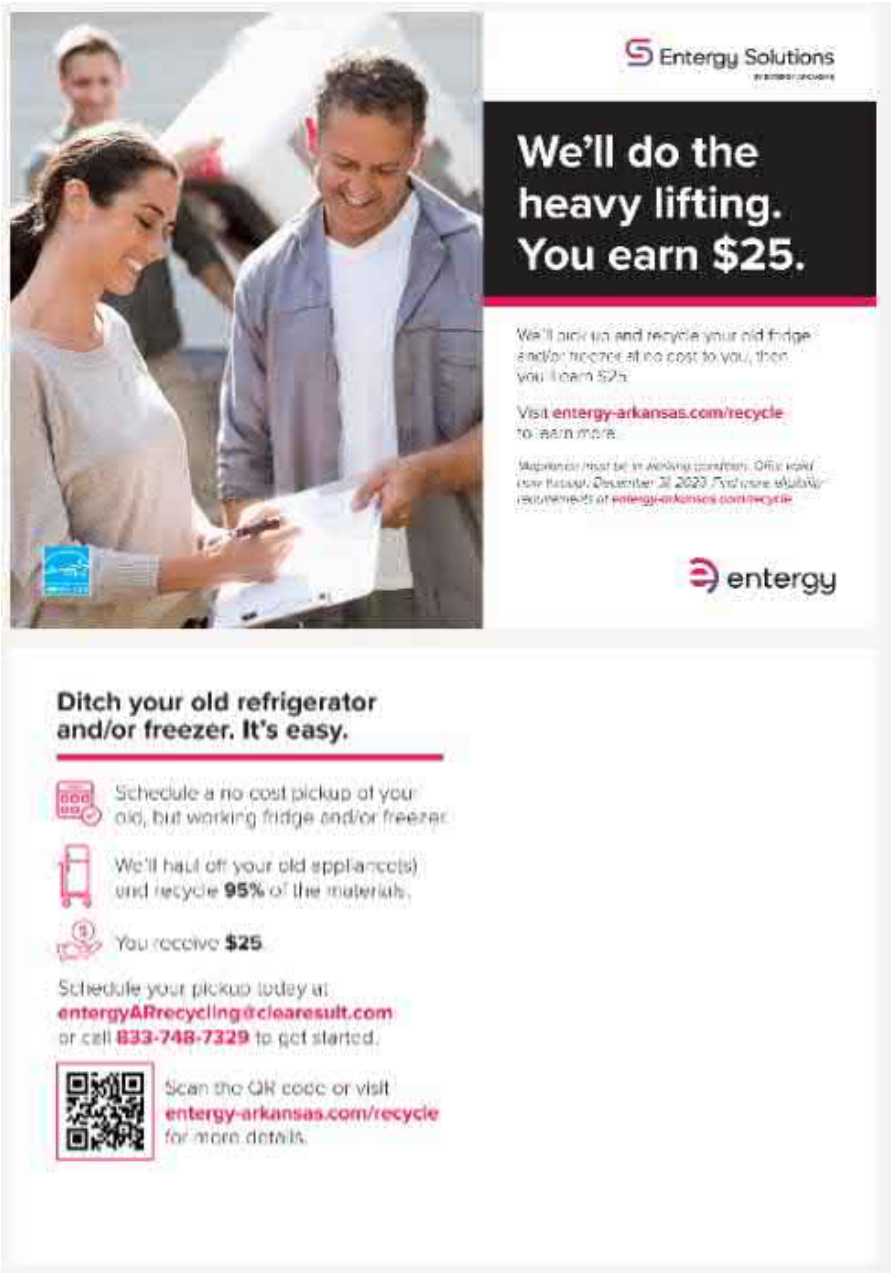
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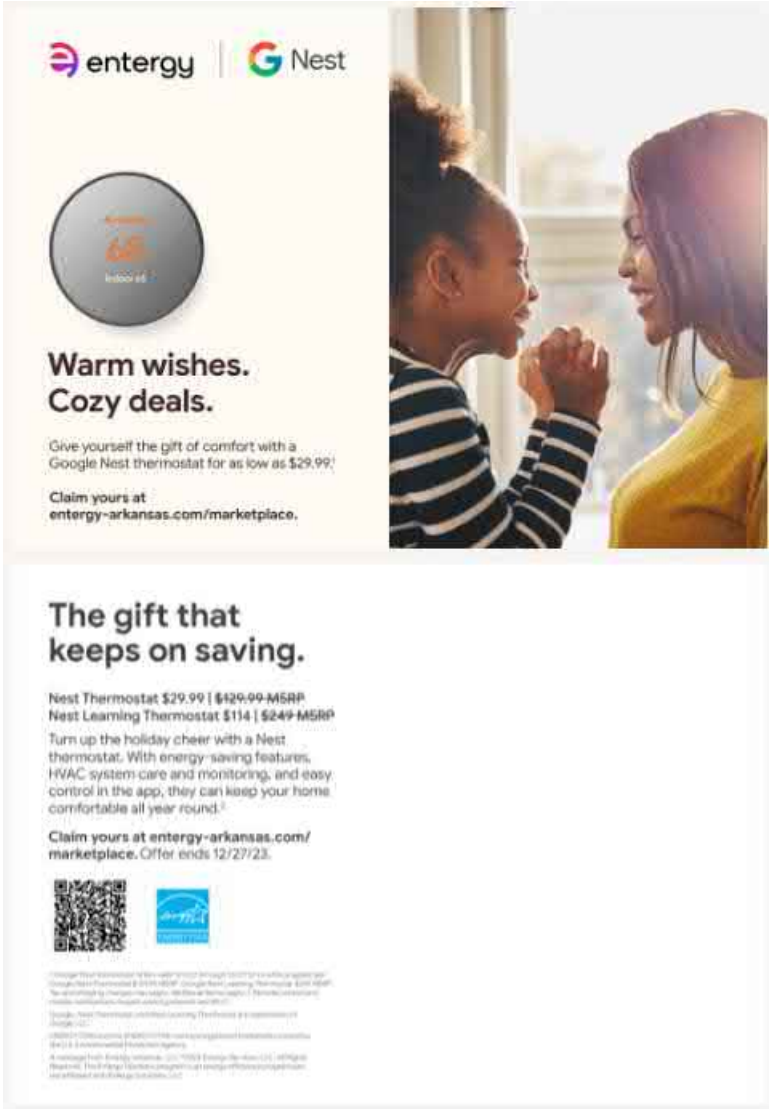
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3.5.10 POPS Recycling Direct Mail 2023



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3.5.11 POPS Holiday Mailer Google Nest promo



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3.5.12 POPS Email Recycling Program

Entergy Solutions



Recycle your old fridge. Receive a $25 rebate.

Have an outdated, working refrigerator or freezer you need taken off your hands? Entergy Arkansas is offering residential customers a new, convenient way to remove and recycle your old, energy-inefficient refrigerator or freezer.

Simply schedule an appointment and we'll pick up your old fridge or freezer and recycle it at no cost to you. Not only will you be doing your part to keep old appliances out of the landfill, you'll also receive a **$25 rebate** *.

Schedule now

Or contact us at
entergyarrecycling@pleaseresult.com
1-833-748-7329

Did you know?

An average older refrigerator contains more than 120 pounds of recyclable steel? Our expert technicians can recycle up to 95% of the old materials, turning things like plastic, metals and glass into new appliances. Your old fridge or freezer may also contain refrigerants, oils, mercury and other toxic compounds that are harmful if not properly removed and recovered.

More savings are in store for you

Get in-store discounts and rebates on ENERGY STAR® certified freezers, room air conditioners, heat pump water heaters and more. Explore all the ways Entergy Arkansas can help you save.

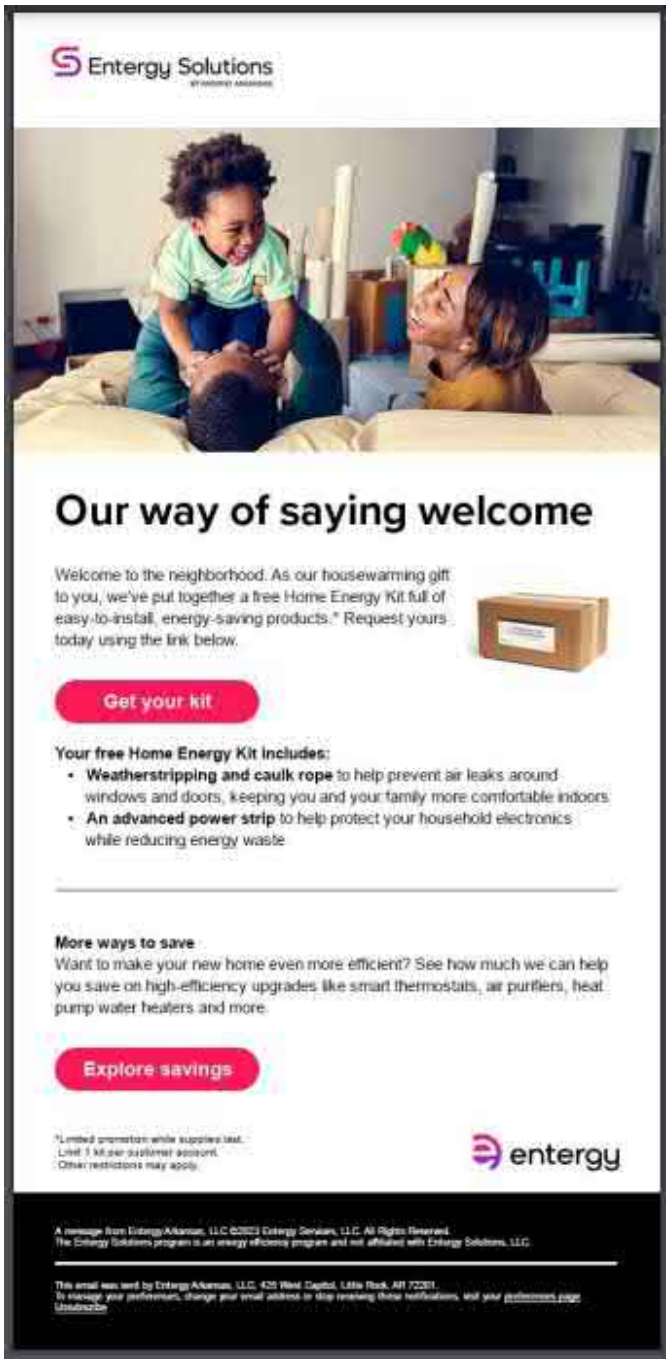
*Appliance must be in working condition. Offer valid now through **December 31, 2023**. Find more eligibility requirements at entergy-arkansas.com/recycle.

We power life.

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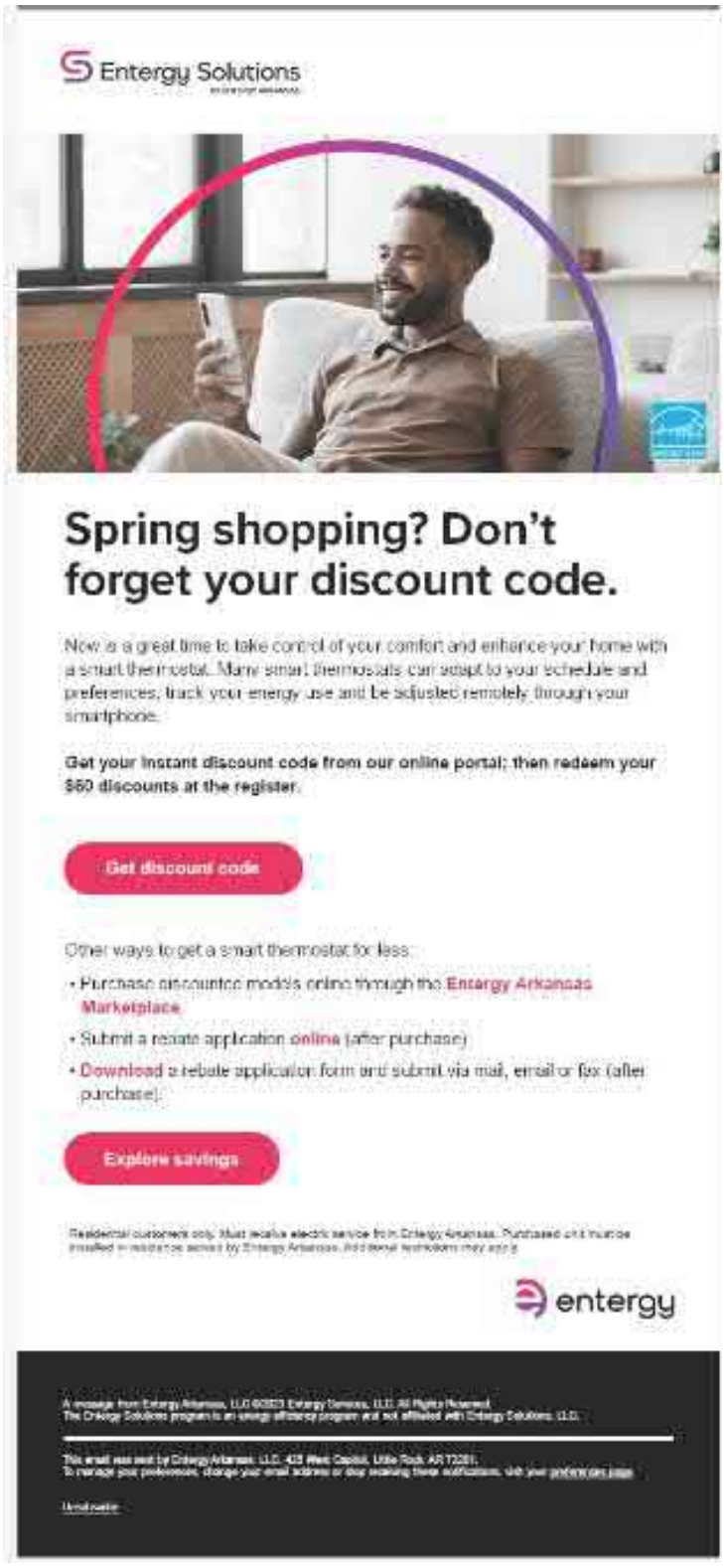
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3.5.13 Home Energy Kit Email POPS 2023



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3.5.13 POPS Earth Day Spring Shopping Email 2023



3.5.14 POPS Earth Day Air Purifier Email

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Entergy Solutions



Fresh spring savings

Celebrate Earth Day with a new ENERGY STAR® certified air purifier that can help reduce allergens and boost your home's year-round indoor air quality. Shop our online marketplace to get one for under $45.

Shop now

Instant discounts are available on:

- **Smart thermostats** for carefree energy savings and comfort. **Get a new ENERGY STAR certified smart thermostat for just $39, now through April 25.**
- **LEDs** for long-lasting quality and efficiency. **Enjoy free shipping on a 12-pack of LED bulbs, now through April 25.**
- **Weatherstripping** for year-long comfort.
- **Advanced power strips** for efficiently protecting electronics.
- **Air purifiers and dehumidifiers** for cleaner, healthier indoor air.

Explore savings

Residential customers only. Must receive electric service from Entergy Arkansas. Purchased unit must be installed in residence served by Entergy Arkansas. Additional restrictions may apply.

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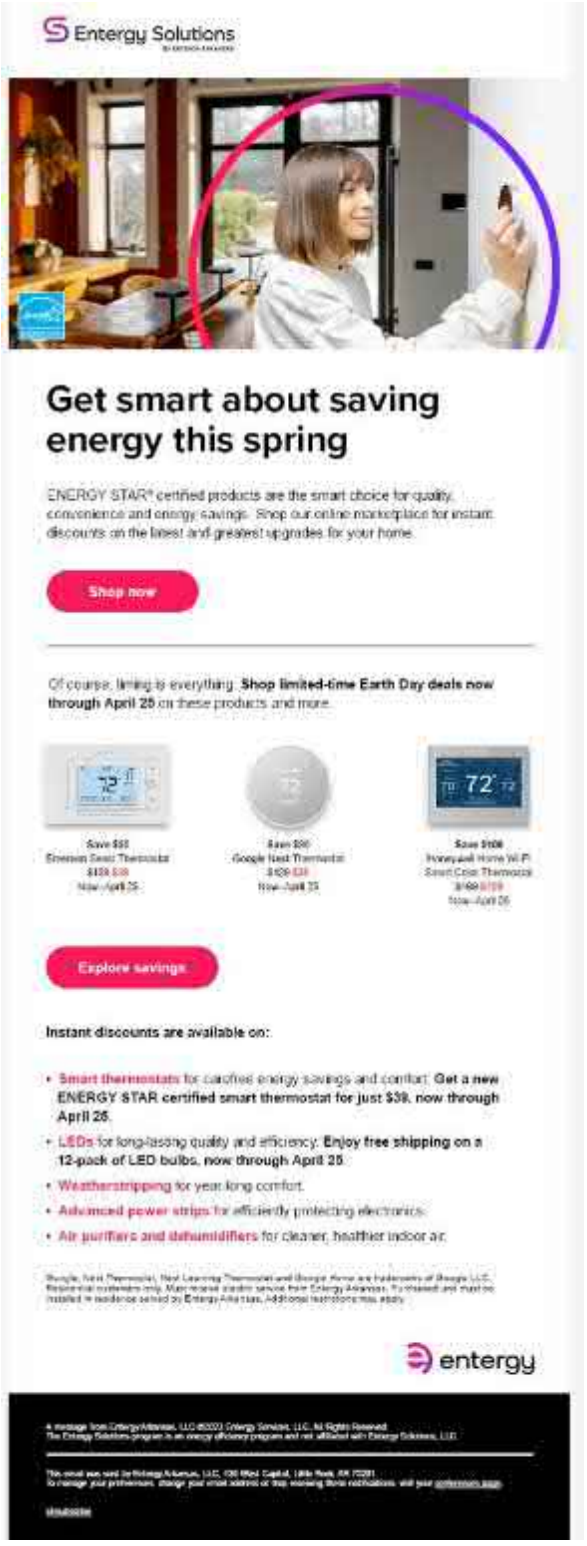
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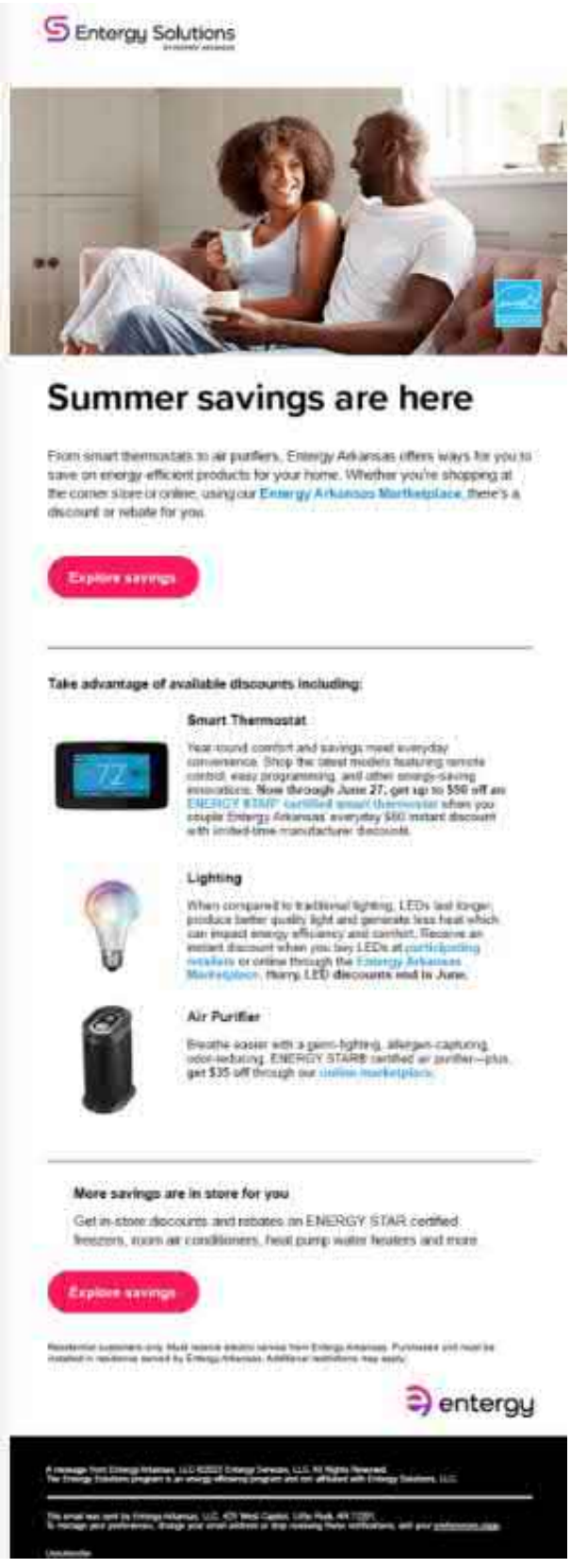
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3.5.15 POPS Earth Day Email Tstat Promo



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3.5.16 POPS Summer Savings Promo Email



Entergy Solutions

Summer savings are here

From smart thermostats to air purifiers, Entergy Arkansas offers ways for you to save on energy-efficient products for your home. Whether you're shopping at the corner store or online, using our Entergy Arkansas Marketplace, there's a discount or rebate for you.

Explore savings

Take advantage of available discounts including:

Smart Thermostat

Year-round comfort and savings meet everyday convenience. Shop the latest models featuring remote control, easy programming, and other energy-saving innovations. **Now through June 27, get up to $50 off an** ENERGY STAR® certified smart thermostat when you couple Entergy Arkansas' everyday $60 instant discount with limited-time manufacturer discounts.

Lighting

When compared to traditional lighting, LEDs last longer, produce better quality light and generate less heat which can impact energy efficiency and comfort. Receive an instant discount when you buy LEDs at participating retailers or online through the Entergy Arkansas Marketplace. Hurry, **LED discounts end in June.**

Air Purifier

Breathe easier with a germ-fighting, allergen-capturing, odor-reducing, ENERGY STAR® certified air purifier—plus, get $35 off through our online marketplace.

More savings are in store for you

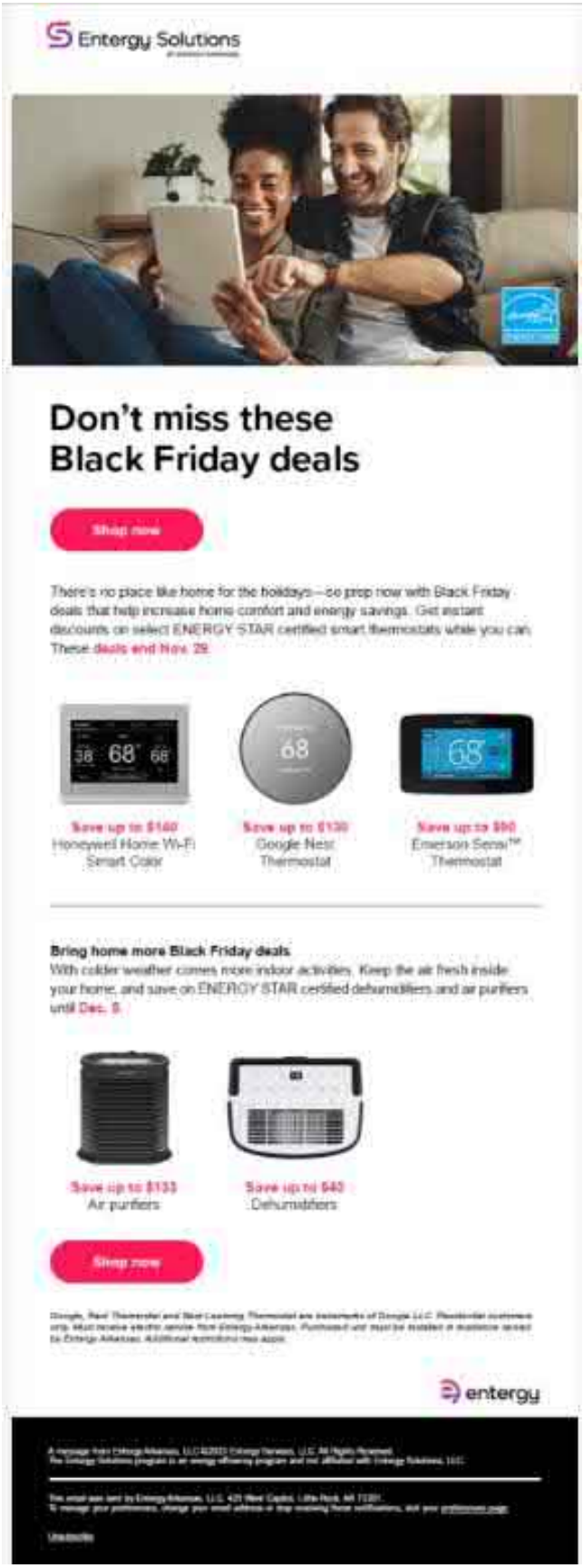
Get in-store discounts and rebates on ENERGY STAR certified freezers, room air conditioners, heat pump water heaters and more.

Explore savings

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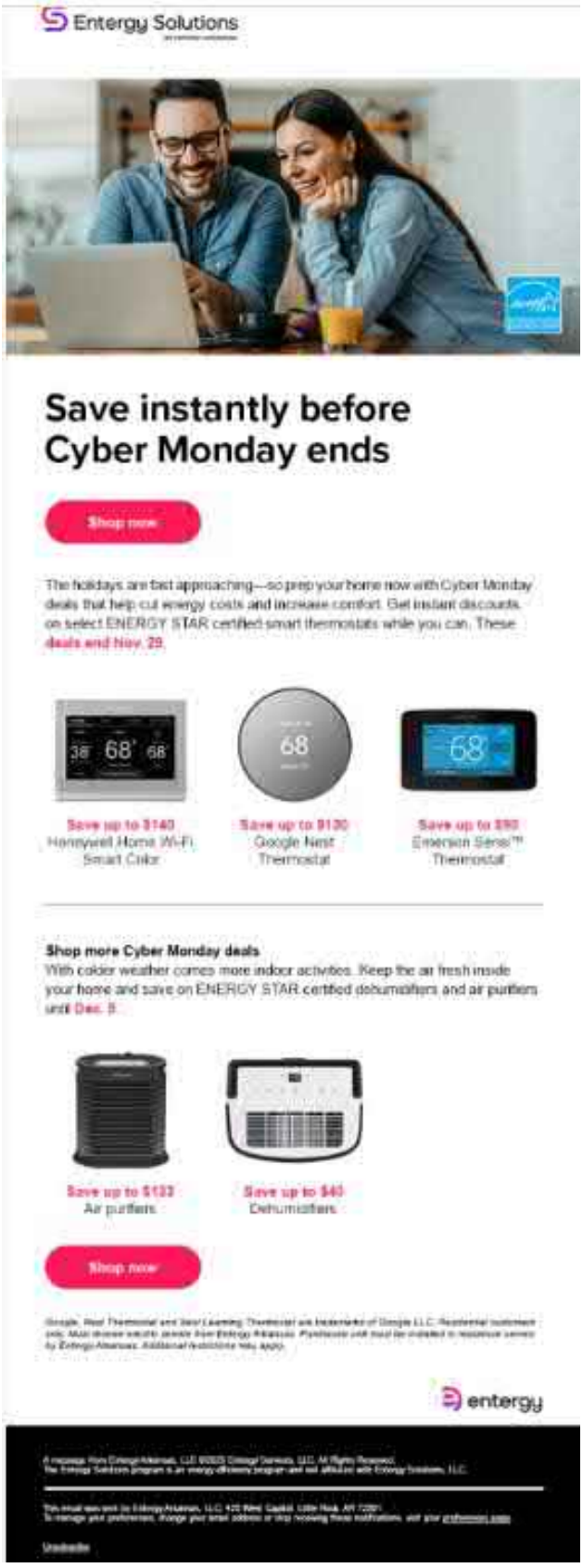
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3.5.17 POPS Black Friday Marketplace_EML_Nov_Q4



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3.5.18 POPS Cyber Monday email Marketplace promo



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3.5.19 POPS December promo email

Entergy Solutions



Get cozy and energy efficient this holiday season

Shop now

As temperatures drop outside, stay comfortable and in control with an ENERGY STAR® certified smart thermostat. For a limited time, save up to $140 with instant discounts from Entergy Arkansas. But hurry. Just like Frosty the Snowman, these deals won't last forever.



Save up to $140
Honeywell Home Wi-Fi Smart Color



Save up to $100
Google Nest Thermostat



Save up to $60
Emerson Sensi™ Thermostat

Give the gift of energy efficiency this holiday season.

Shop now

Google, Nest Thermostat and Nest Learning Thermostat are trademarks of Google LLC. Residential customers only. Must receive electric service from Entergy Arkansas. Purchases and must be installed in residences served by Entergy Arkansas. Additional restrictions may apply.

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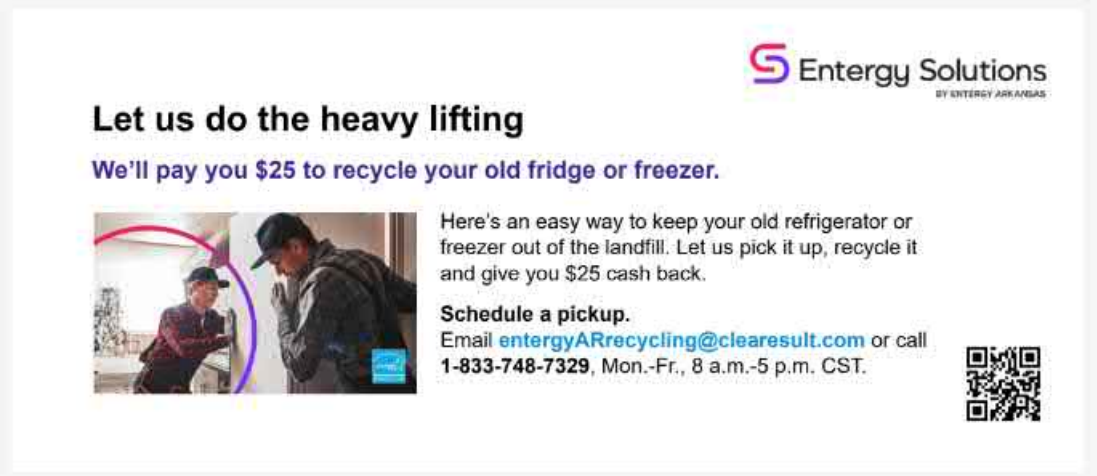
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3.5.20 POPS Recycling flyer 8.5x3.6



3.5.21 Recycling Fact Sheet FLYER_Clean

ARSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835

Entergy Solutions
BY ENTERGY ARKANSAS



Ditch your old refrigerator and/or freezer

Take advantage of our new refrigerator and freezer recycling offer, including pickup at no cost to you, plus a **$25 rebate** per eligible appliance recycled.

Earn recycling rebates

Entergy Arkansas offers a convenient way to remove and recycle your old, energy-inefficient refrigerators and freezers. According to ENERGY STAR®, you can save up to $260 per year on your energy bill by running more efficient ENERGY STAR certified models and receive a $25 cash incentive for pulling the plug on an outdated and inefficient appliance.

Not only will the collected appliances not end up in a landfill, but after they are dismantled by recycling technicians, 95% of the materials (such as plastic, metals and glass) will be recycled.

Signs that it is time to retire and recycle your old refrigerator or freezer:

- Accumulation of ice.
- Signs of moisture.
- Broken seal.
- Heat generation.
- Constantly running motor.

Eligibility requirements

- Applicant must be an Entergy Arkansas residential customer.
- Appliance must be a refrigerator or freezer.
- Appliance must be owned by an Entergy Arkansas residential customer.
- Appliance must be at least 10 years old and in working order.
- Appliance must be between 10–32 cubic feet.
- Appliance must be in working (cooling) order, empty, clean and plugged in at the time of pickup.
- Water line must be disconnected.
- Appropriate physical pickup address must be provided.
- Rebate will be mailed within six weeks of appliance pickup.
- Limit one refrigerator and one freezer per premise within 7-year period.

Miniature and commercially sized refrigerators and freezers do not qualify. **Any freezer must be a standalone unit.** Entergy Arkansas reserves the right to revise requirements and rebate levels at any time. Rebates are subject to availability.

This is not a replacement program. While we will collect the old appliance and issue the rebate, customers must purchase their own replacement appliance.

Schedule a pickup

The process is easy—email **entergyARrecycling@clearesult.com** or call **833-748-7329** to schedule a pickup today.

Information needed to schedule:

- Entergy Arkansas account number.
- Name on account.
- Physical address.
- Appliance information (appliance type, brand/model and cubic feet).
- Email address.
- Phone number.

When it's time to upgrade your household appliances, Entergy Arkansas will help you to responsibly recycle them—and get cash back, too.

Learn more

Reach out to a customer service representative today at **entergyARrecycling@clearesult.com** or call **833-748-7329**, Mon.–Fri., 8 a.m.–5 p.m. CST.

entergy-arkansas.com/recycle

entergy

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3.5.22 RES POPS Overview FLYER Clean 2023

Entergy Solutions



Residential Point of Purchase Solutions Program

Entergy Arkansas offers four convenient ways to save on energy-efficient upgrades for your home.

Online marketplace	**The online marketplace is the easiest way to save. Find instant rebates, special offers and more on a wide range of energy-saving products.**
	Free shipping on orders over $35 Available products include weatherstripping, caulk and advanced power strips, as well as ENERGY STAR® certified smart thermostats, LEDs, dehumidifiers and air purifiers. Shop now at entergyarkansas.com/marketplace
Instant discounts	**Shop and save instantly at participating stores (list available online).**
	LEDs: Up to $3 per bulb Simply put, LEDs last longer, use less energy and emit less heat than any other bulbs.
	Advanced power strips: Up to $15 Unused devices can still consume energy. Use an advanced power strip to prevent this costly "vampire power."
	Window air conditioners: $50 off ENERGY STAR Most Efficient models The latest air conditioners on the market offer more than just added energy savings; many come with connected functionality, offering more convenience and comfort.
	Heat pump water heaters: Up to $500 off select models. Replacing a traditional electric storage water heater with a hybrid unit provides more control and insight into usage, as well as big energy savings.
Discount codes	**Get your instant discount code from our online portal; then redeem at checkout.**
	Smart thermostats: $60 Many smart thermostats can adapt to your schedule and preferences, track your energy use and be adjusted remotely through your smartphone.
Rebates	**Purchase a qualifying ENERGY STAR certified product; then apply for a rebate online or by mail. Rebates are also available for smart thermostats.**
	Freezers: Up to $50 Claim your Entergy Arkansas rebate now, and you could save $195 over the next five years on your Entergy bill. Additionally, take advantage of our NEW refrigerator and freezer recycling offer including pickup and recycling at no cost, plus a $25 rebate per eligible appliance recycled.
	Room air purifiers: $35 Clear the air and save up to $30 each year in energy costs by upgrading to a more energy-efficient air purifier.
	Dehumidifiers: $25 ENERGY STAR certified dehumidifiers are about 30% more efficient than standard models.

For a full list of eligible products and more ways to save, visit entergyarkansas.com/homeappliances.

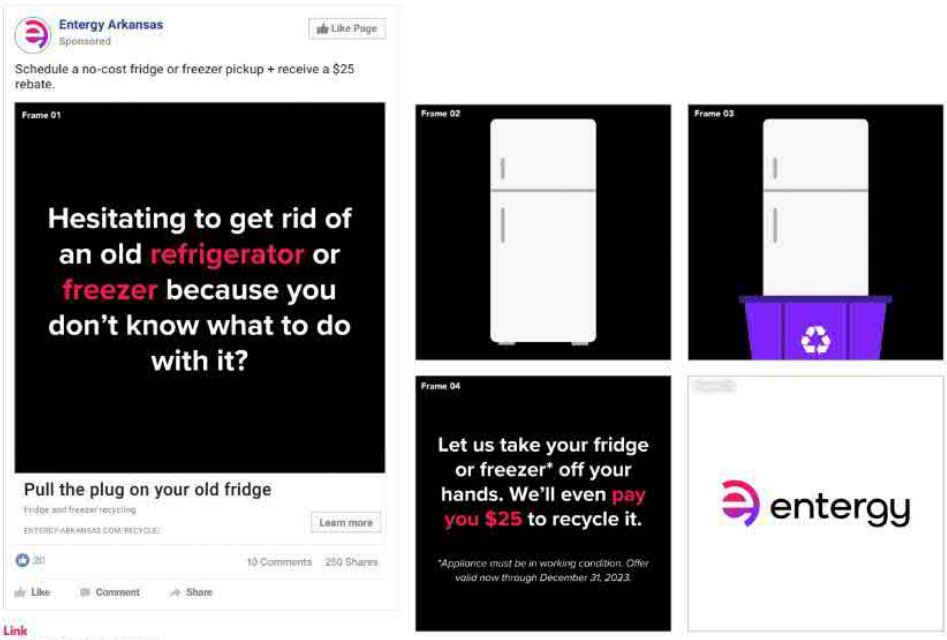
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3.5.23 Recycling Paid Ads_Meta 2023

Ad 01 – Video
Meta – Paid Ad



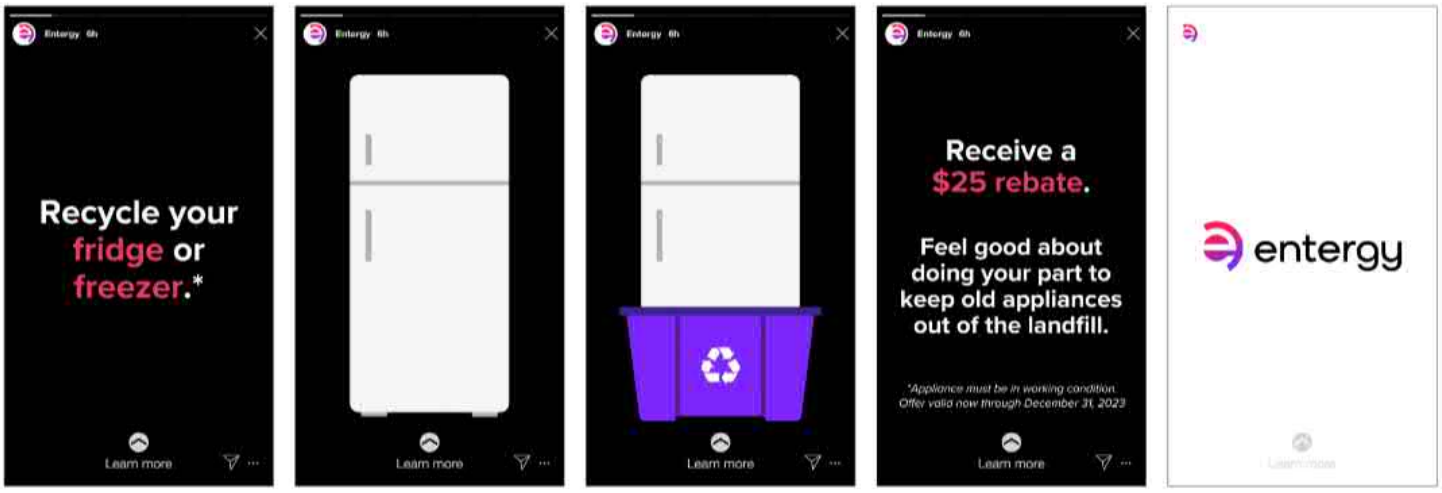
Link
entergy-arkansas.com/recycle/

Ad 02 – Image
Meta – Paid Ad



Link
entergy-arkansas.com/recycle/

Ad 03 – Video
Meta Story – Paid Ad



Frame 1 | Frame 2 | Frame 3 | Frame 4 | Frame 5

Link
entergy-arkansas.com/recycle/

3.5.24 EA-3671389-POP-Sticky Note 06.08.2023
ARSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835



Entergy Solutions

We were in the neighborhood.

Need to recycle an old fridge or freezer? We'll pick yours up at no cost.

Let Entergy Arkansas do the heavy lifting. Simply schedule an appointment, and we'll pick up your old, working refrigerator and recycle it at no cost. Not only will you be doing your part to conserve resources, make room for more energy-efficient appliances and keep appliances out of the landfill, you will also receive a $25 rebate.*

Learn more and schedule a pickup by emailing entergyARrecycling@clearesult.com or calling 833-748-7329.

*Appliance must be in working condition.
Offer valid now through December 31, 2023.
Learn more at entergy-arkansas.com/recycle*

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Entergy Solutions

Sorry we missed you.

An Entergy Arkansas authorized contractor stopped by to remove and recycle your inefficient appliance.

- ☐ Success! Your appliance was picked up as planned. Please watch for a rebate check in the mail within 3–5 weeks. Additionally, complete this survey to let us know how we did at <survey link>.
- ☐ We were unable to complete your appliance pick up because you were not at home and we could not locate the appliance.
- ☐ Other _____

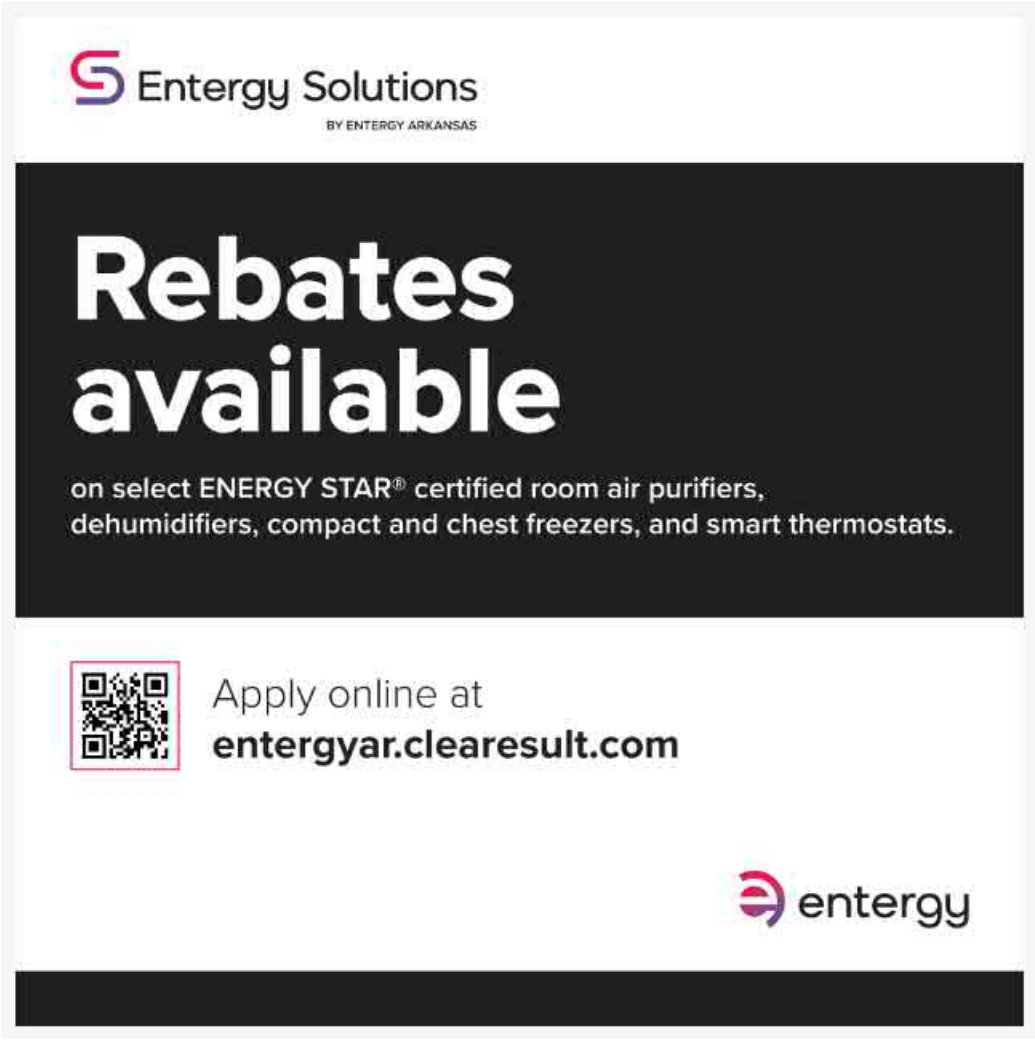
If you have questions or would like to reschedule a pickup, please email entergyarrecycling@clearesult.com or call 833-748-7329. For more information, visit entergy-arkansas.com/recycle.

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3.5.25 EA-POP-3674885-Rebrand-2023-Signage_CLING_CLEAN

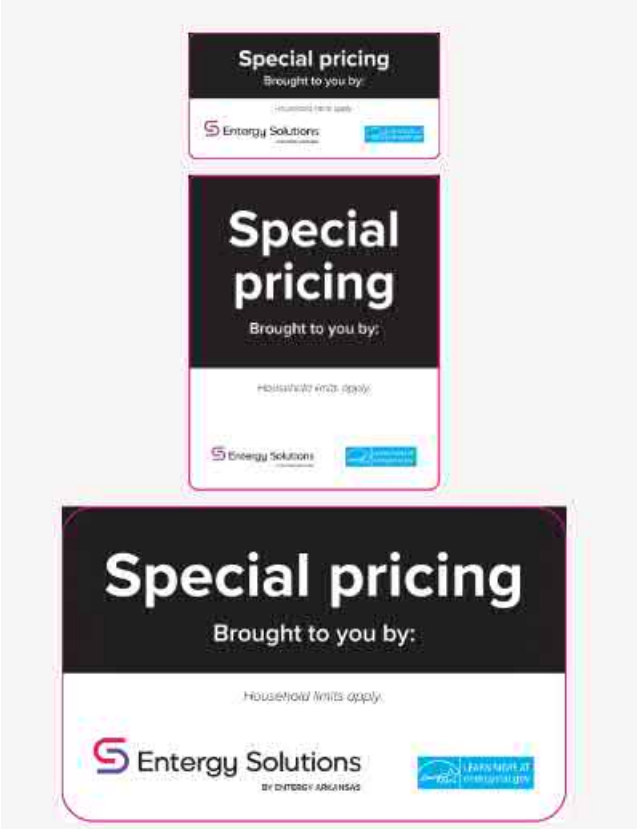


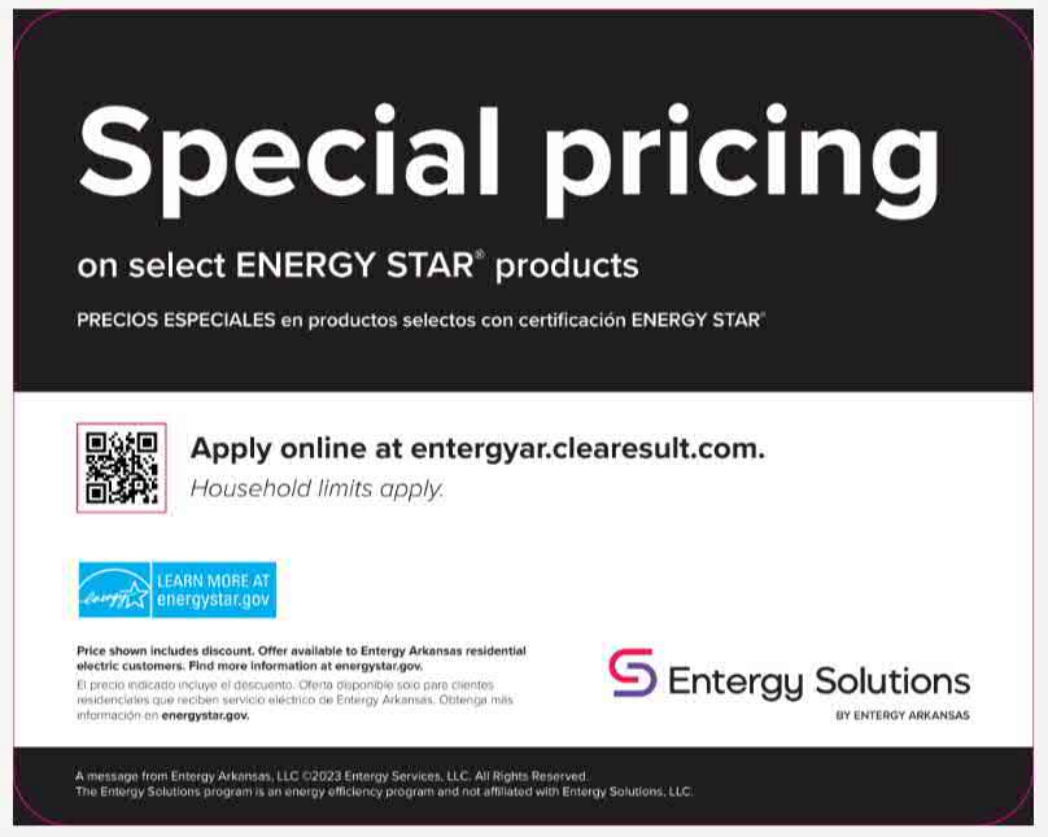
3.5.26 EA-POP-3674885-Rebrand-2023-Signage_HBS_CLEAN



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3.5.26 -EA-POP-3674885-Rebrand-2023-Signage_LABELS_CLEAN



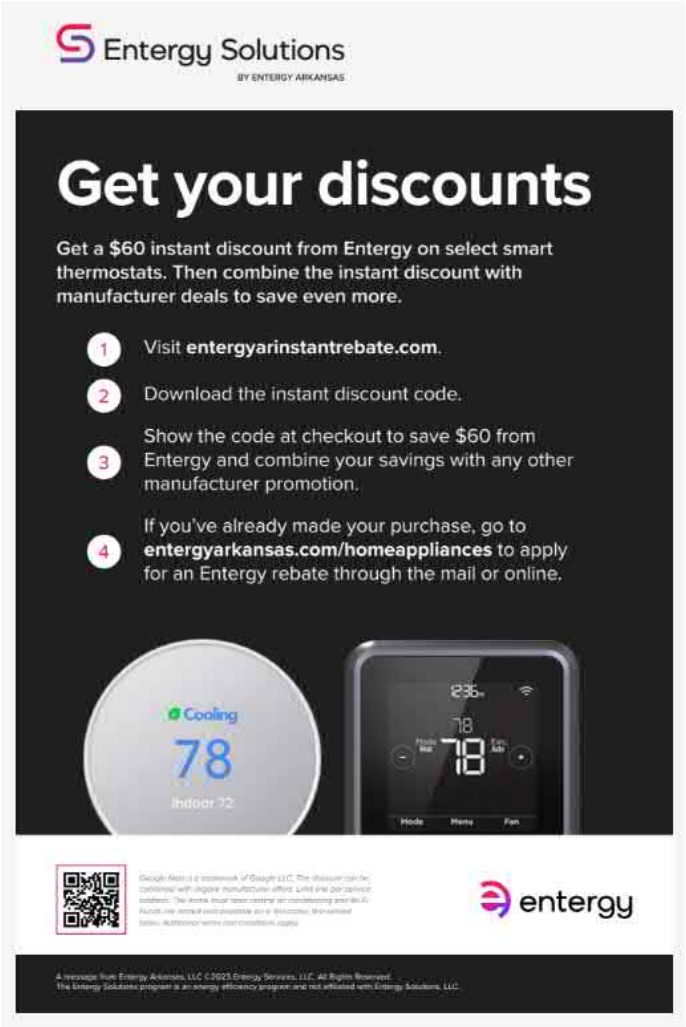


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3.5.27 EA-POP-3674885-Rebrand-2023-Signage_STICKER_CLEAN



3.5.28 EA-POP-3674885-Rebrand-2023-Signage_TSTAT SIGN_CLEAN



APSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835

3.5.29 EA-POP-3674885-Rebrand-2023-Signage_VBS_CLEAN



3.5.30 EA_Res_3719288_Recycling Thank You_Home Energy Kit_Insert

ARSCC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:26:50 AM: Docket 07-085-TF-Doc. 835



Entergy Solutions

A gift that saves you energy

Your Home Energy Kit is a quick and easy way to save money and use less energy. It only takes a few minutes to install. These simple steps will improve your efficiency every day.

Want more?

Entergy Arkansas offers convenient ways to save on all kinds of energy efficient products for your home.

For a full list of eligible products, visit **entergyarkansas.com/homeappliances**.

entergy



What's in your kit?

Weatherstripping and rope caulk

Did you know that weatherstripping and rope caulk can help reduce drafts and energy use? Additionally, they can reduce noise and improve indoor air quality.

Advanced power strip

Electronics make up about 12% of the total electricity used by the average U.S. household. By upgrading to an advanced power strip, you'll be able to use electricity only when you want it and stop wasted energy from your devices in standby mode.

How to use your advanced power strip

1. Plug your primary device, usually a TV or computer, into the MASTER outlet.
2. Plug devices that need power at all times, such as a modem, into the ALWAYS ON outlet.
3. Plug other devices into the MASTER CONTROLLED outlets, which are shut off when the MASTER device is turned off.

Learn about more ways to save by visiting **entergyarkansas.com**.

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3.5.31 EA_Res_3719288_Recycling Thank You_Home Energy Kit_Sticker



3.5.32 EA_RES_4044163_Weatherization Kit Box_FINAL



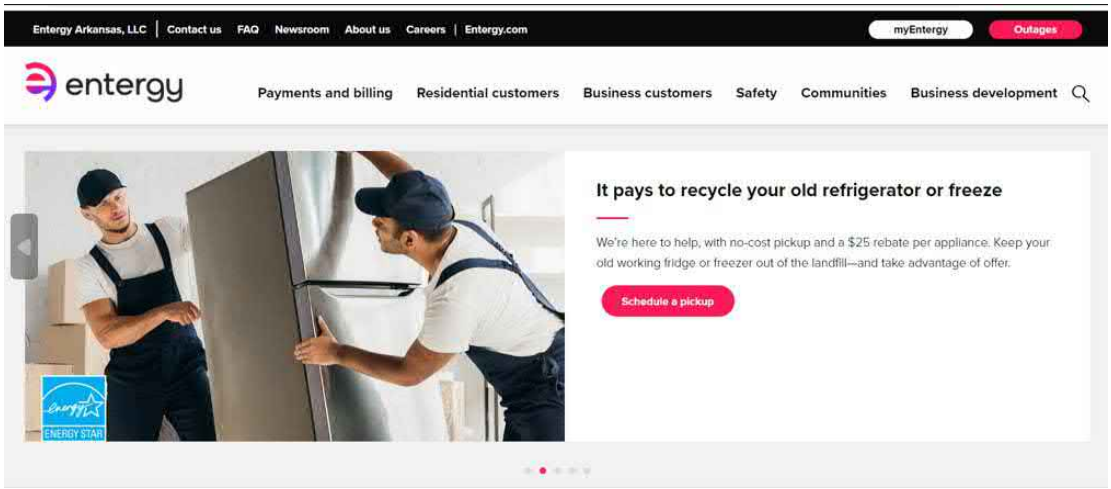
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3.5.33-EA-POP-3674885-Rebrand-2023-Signage_RECTRACTABLE BANNER_CLEAN

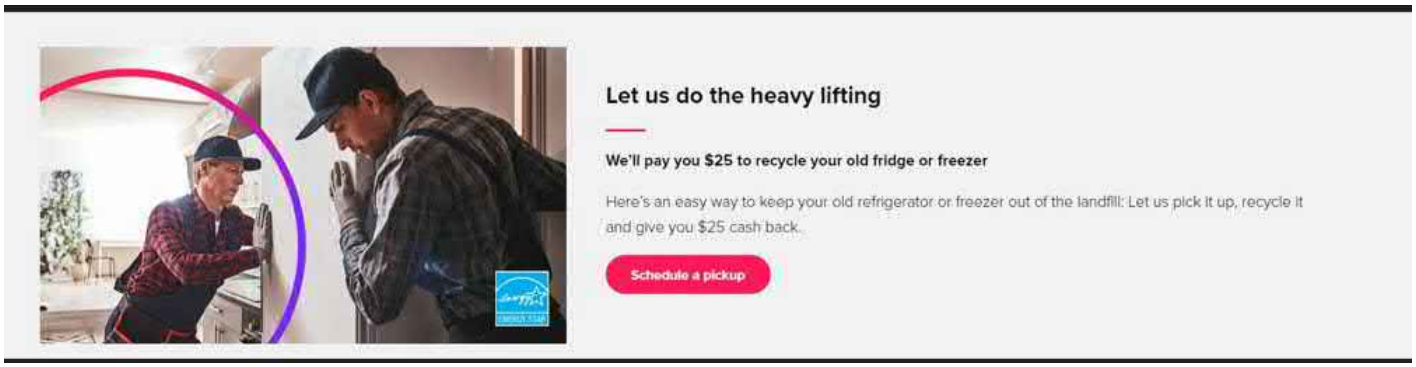


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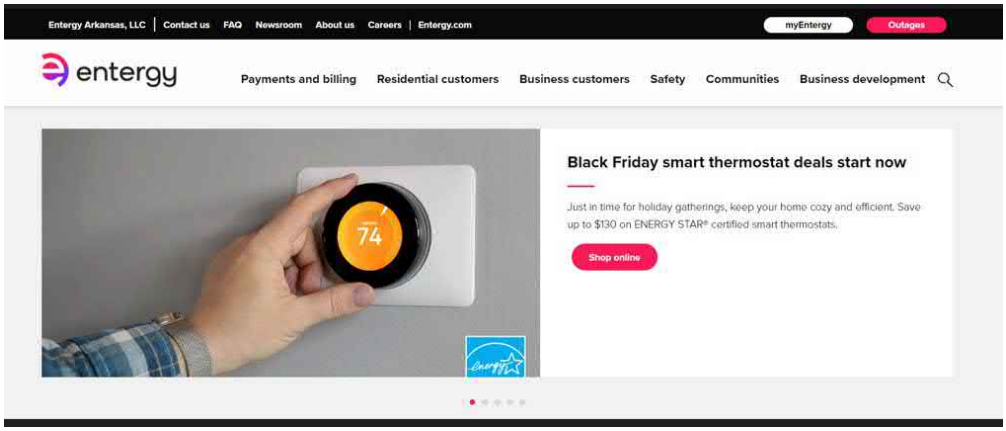
3.5.34 Homepage Banner 2023_ October



3.5.35 Homepage Banner 2023 March_April_ Recycling

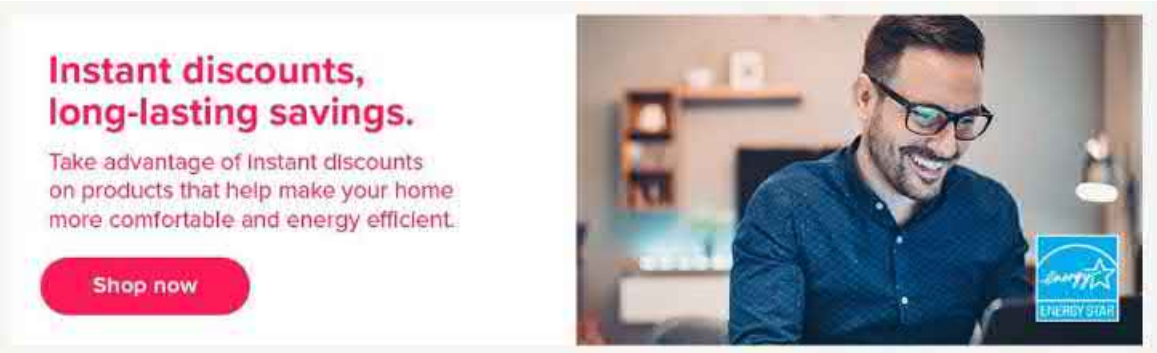


3.5.36 Homepage Banner Nov 2023 Marketplace



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3.5.37 EA POPS 2023 Marketplace Banners



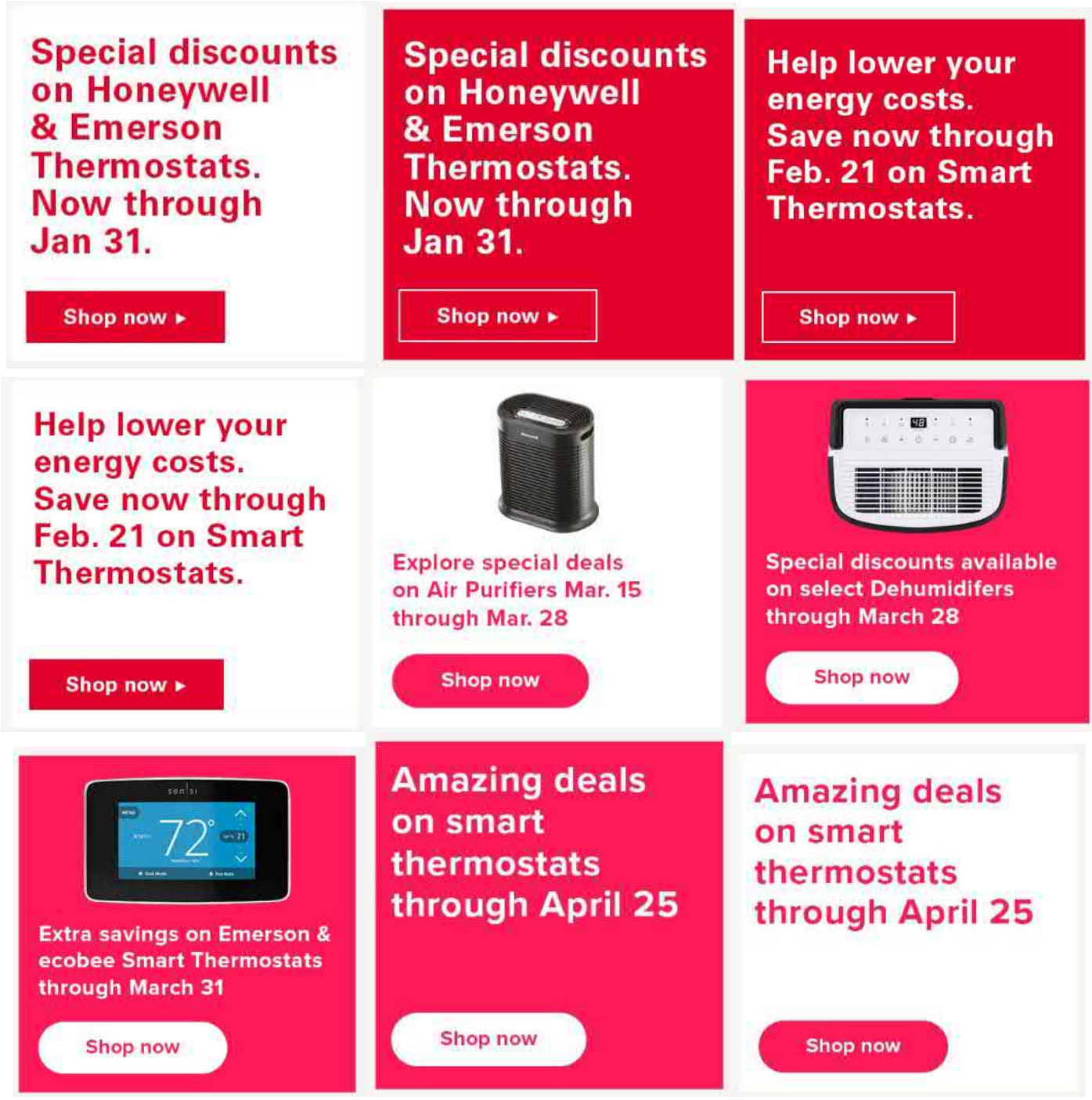






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3.5.38 EA POPS Marketplace Tiles 2023



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Up to $90 off through June 6

Shop now

Get an additional 10% discount on air purifiers through June 6

Shop now



Get $20 discount

Shop now



Get up to $60 discount

Shop now



Special discount through June 13

Show now



Up to $90 off through June 27

Shop now



Get special pricing on specialty bulbs

Shop now



15% off through June 27

Shop now

Recycle your old fridge or freezer. Receive a $25 rebate.

Learn more

Savings to keep you comfortable

Shop now



Ditch your fridge Earn $25

Learn more

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3.5.39 August Newsletter POPS Marketplace



Maximize your energy-saving opportunities

This time of year, we all want to prepare our homes to be as comfortable as possible—which is why it's also the best time to start saving energy. Improving the energy-efficiency of your home not only helps you save on energy bills, but can also help your home stay cooler in the summer heat.

Entergy makes it easy to reduce your energy, with instant discounts on a wide variety of energy-saving solutions for your home.

Here are three easy ways to get started:

1. Get smart with a programmable Wi-Fi thermostat.

Stop wasting energy and start taking advantage of smart technology. ENERGY STAR® certified smart thermostats offer a convenient way to keep you and your loved ones comfortable all year long.

Your device can automatically adjust to an energy-saving mode when no one is home, when you're away, or based on your own personal preferences and schedule. Or you can manually adjust your temperature anytime, from anywhere.

However you choose to set it and forget it, smart thermostats make it easy to save energy. And for a limited time, you can save up to $90 on a Google Nest smart thermostat through our online marketplace.

2. Focus on weatherization.

Proper air sealing and insulation has a huge impact on the energy-efficiency of your home. Weatherization can prevent your HVAC system from overworking and can also reduce pests and pollen, help control humidity and greatly improve your comfort.

Take a few minutes to examine the windows and doors throughout your home to identify places where outside air could be creeping in. One easy way to test for drafts is to hold a candle near a windowsill, door or any place else you suspect air might be entering your home. If the candle flickers, you know you've identified an area in need of sealing or weatherstripping.

When you're ready to stop drafts in their tracks, our online marketplace is stocked with weatherstripping, foam seals, door sweeps and more to help you seal in greater comfort.

3. Pull the plug on our outdated fridge or freezer.

Did you know that on average, an aging refrigerator uses about 35% more energy than a new, more efficient one? Consider upgrading to an ENERGY STAR® certified refrigerator, which can save you more than $260 over a 12-year lifetime. * You can also get up to $50 back with a rebate when you purchase an ENERGY STAR certified compact, chest or upright freezer.**

It can be hard to figure out what to do with an old refrigerator or freezer when you've made the decision to upgrade. Luckily, Entergy Arkansas is offering a convenient new way to remove and recycle your old, energy-inefficient refrigerator or freezer.

Simply schedule an appointment and we'll pick up your old fridge or freezer and recycle it for free. Not only will you be doing your part to keep old appliances out of the landfill, you'll also receive a $25 rebate.

To schedule a pick-up appointment, visit entergy-arkansas.com/recycle, email EntergyARrecycling@clearesult.com, or call 833-748-7329.

More cool ways to save

Explore all the ways you can save on energy costs with support from Entergy Arkansas.

**Source: energystar.gov*

***Please note: This is not a replacement program. While we will collect the old appliance and issue the rebate, customers must purchase their own replacement appliance.*

3.5.40 July Newsletter EE Tips



Energy efficiency tips for summer months

Signs of summer are already here. Entergy Arkansas cares about our customers and wants to help them save both energy and money. Taking time to prepare your home for higher temperatures can ultimately help you save money on your utility bills.

During the warmer months, cooling costs make up more than 55% of an average customer's electric bill. This means that taking steps to save energy can help lower your electric bills when temperatures are hot. You can manage your energy usage and save money by installing energy efficient upgrades through the Entergy Solutions program for Entergy Arkansas customers. Examples of products and services available at little to no cost include LED bulbs, smart thermostats, AC tune-ups, duct sealing and insulation.

Additionally, the program offers home assessments that yield energy efficiency recommendations. A Home Performance with ENERGY STAR assessment reduces the up-front cost of installing energy efficiency upgrades.

Customers also can save money with these quick and easy energy efficiency tips:

- **Change air filters.** Air filters on some air conditioning units require monthly cleaning or replacing.
- **Setting the thermostat to 78 degrees or the highest comfortable temperature.** Every degree lower than 78 can raise a bill as much as 3%.
- **Buy a programmable thermostat.** A programmable thermostat can help manage costs, is controllable, and can help monitor usage.
- **Use fans to cool off.** Ceiling fans, box fans and oscillating fans use very little electricity to circulate the air. Make sure ceiling fans are rotating in the right direction – counter-clockwise during summer – to push cooler air down into the room. Be sure to turn all fans off in unused rooms.
- **Close blinds, shades and curtains to keep the sun out and the cool air in.** Also, close air conditioning vents in rooms that are not in use.

- **Seal cracks and holes around doors, windows and ductwork.** Weather stripping and caulk will help keep the cold air in and the hot air out.
- **Use the myAdvisor tool on myentergy.com.** The usage and cost tool can compare usage history by month, day and hour.

For customers struggling to pay their bill, Entergy offers a number of payment options, such as level billing, auto-pay and more, as well as tools and programs designed to help customers manage energy usage. For more information, visit myentergy.com/a/programs or call 1-800-ENTERGY (1-800-368-3749) to speak with a customer service representative.

There also are third party agencies that provide utility bill assistance for seniors, disabled individuals and programs that are income-based. Through Entergy's The Power to Care program, local nonprofit agencies provide emergency bill payment assistance to seniors and disabled individuals. You also may be eligible to receive federal payment assistance through the Low-Income Home Energy Assistance Program or LIHEAP.

For any additional questions or information regarding customer bills, please visit entergy.com/answers.

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3.5.40 EA POPS Social Media 2023

Entergy Arkansas
January 25, 2023 ·

Smart thermostats make it easy to save energy. Entergy makes it easy to save on smart thermostats.

Through January 31, save up to $90 with instant rebates on select Honeywell and Emerson Sensi thermostats. Find smart thermostat deals and other energy-saving solutions to help you stay cozy all winter long on our online marketplace.

Learn more http://enter.gy/61823buqp



Entergy Arkansas
February 8, 2023 ·

Looking for an easy way to save money on rising fuel costs? We can help.

Smart thermostats maintain the comfort of your home, while automatically adjusting to your schedule and preferences to help conserve energy.

Feb. 8 through 21, visit our online marketplace to save up to $110 on select ENERGY STAR® certified smart thermostats—plus free shipping.

Learn more http://enter.gy/61893cq0J



Entergy Arkansas
March 21, 2023 ·

Need to recycle an old fridge or freezer? We'll pick yours up at no cost.

It can be hard to figure out what to do with an old refrigerator or freezer when you've made the decision to upgrade. Let Entergy Arkansas do the heavy lifting.

Simply schedule an appointment, and we'll pick up your old refrigerator and recycle it at no cost. Not only will you be doing your part to keep old appliances out of the landfill, you'll also receive a $25 rebate.* ... See more



Entergy Arkansas
March 30, 2023 ·

Entergy Arkansas is honored to receive the ENERGY STAR Excellence award for the fifth year in a row.

Learn more http://enter.gy/6186ODtj8

#WePowerLife



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Entergy Arkansas
April 22, 2023 ·

Celebrate #EarthDay with a new, ENERGY STAR®, planet-friendly upgrade. Shop our online marketplace today to find instant discounts on LEDs, smart thermostats, air purifiers, dehumidifiers and more. Some offers end April 25.

Don't miss out http://enter.gy/6187Ouv3h



Entergy Arkansas
April 25, 2023 ·

Do you have an outdated refrigerator or freezer you need to get out of your house? Let Entergy Arkansas do the heavy lifting.

Visit entergyarkansas.com/recycle and then call or email to schedule your no-cost appliance pickup. You'll also receive a $25 incentive.*

* Appliance must be in working condition. Offer valid now through December 31, 2023.



Entergy Arkansas
May 22, 2023 ·

Take a deep breath: Spring is finally here. Make the most of it with a germ-fighting, allergen-capturing, odor-reducing, ENERGY STAR® certified air purifier — get an additional 10% off through June 6 through our online marketplace. Shop and save now http://enter.gy/6182OlKgr



Entergy Arkansas
May 24, 2023 ·

Entergy Arkansas has launched a new recycling program for residential customers to make replacing their outdated refrigerator or freezer easier. The program allows customers to schedule a free pick-up of a working refrigerator or freezer and receive a $25 incentive check for recycling their old appliance.

Learn more http://enter.gy/6182OmocE



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Entergy Arkansas
May 25, 2023 ·

Get ready for the coolest summer ever. ENERGY STAR® certified Most Efficient room air conditioners use at least 10 percent less energy than standard models, deliver quiet and consistent cooling—and now qualify for a $50 instant discount from Entergy Arkansas. Find a participating store near you.

Learn more http://enter.gy/6181OWXsZ



Entergy Arkansas
May 25, 2023 ·

When compared to traditional lighting, LEDs last longer, produce better quality light and generate less heat which can impact energy efficiency and comfort. Shop our online marketplace now to take advantage of discounts on LEDs.

Hurry because this offer ends in June. Shop our online marketplace http://enter.gy/6186OWXLQ



Entergy Arkansas
September 12, 2023 ·

Do you have a second refrigerator in your garage or basement? While tech advances have made today's refrigerators more #energyefficient than ever, the growing trend of homeowners buying a new model and keeping the old one is negating those efficiency gains. If you have a second fridge, we encourage you to send it packing and recycle it properly. Learn more http://enter.gy/6182P2SWe



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Entergy Arkansas
October 9, 2023 ·

Is it time to pull the plug on your old fridge? Get free pickup and recycling, a $25 rebate—and peace of mind.

Just schedule an appointment and we'll pick up your old fridge or freezer at no cost to you.

You'll also receive:... See more



Entergy Arkansas
October 11, 2023 ·

Entergy Arkansas is proud to celebrate ENERGY STAR Day and help Arkansans save today, save tomorrow and save for good. Visit energystar.gov/SaveForGood to learn more and see the ways Entergy Arkansas customers can save with energy-saving programs, rebates and incentives by visiting entergysolutionsar.com. #ENERGYSTARDay



Entergy Arkansas
October 18, 2023 ·

It's an energy-saving party! In celebration of Energy Awareness Month, Entergy Arkansas customers will have access to discounts on all the best energy-saving products for fall.

Whether you prefer to drop by your favorite local retailer, or shop from the comfort of home, you can save on advanced power strips, ENERGY STAR certified air purifiers and more.

Shop now and save: http://enter.gy/6187ukqh7



Entergy Arkansas
November 13, 2023 ·

Do you know how to track and manage your energy use? Learn more
http://enter.gy/6181uag13

#WePowerLife #EnergyEfficiency



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Entergy Arkansas
November 24, 2023 ·

Black Friday might just be the greenest time of year. Shop our online marketplace now through December 5 for deep discounts on energy-saving products, including:

Up to $133 off air purifiers
Up to $140 off smart thermostats
Up to $40 off dehumidifiers... See more



Entergy Arkansas
November 27, 2023 ·

This #CyberMonday, give your family the gift of reliable, energy-efficient hot water this holiday season. Qualifying A. O. Smith heat pump water heaters from participating stores come with a $500 Entergy Arkansas discount—and can save you as much as $500 more in energy costs every year.

Plus, you may qualify for a federal tax credit of up to $2,000. Find a participating location here http://enter.gy/6186R6EPy



Entergy Arkansas
December 26, 2023 ·

Still wanting to celebrate the holiday season? Give an energy-saving gift that keeps on giving. We're all spending more time indoors this time of year, so why not consider a gift that helps save energy all winter long?

Whether you're treating yourself, or sharing with others, a Wi-Fi-enabled thermostat is a smart way to reduce energy use and save on energy costs.

Save up to $75 on select smart thermostats here: entergy-arkansas.com/marketplace



Entergy Arkansas
December 27, 2023 ·

According to the EPA, a well-sealed home uses 25-40% less energy for heating and cooling than a leaky one. Stop air leaks and start getting cozy with instant discounts on weatherization supplies including:

Weather sealing
Door sweeps
Caulking cord

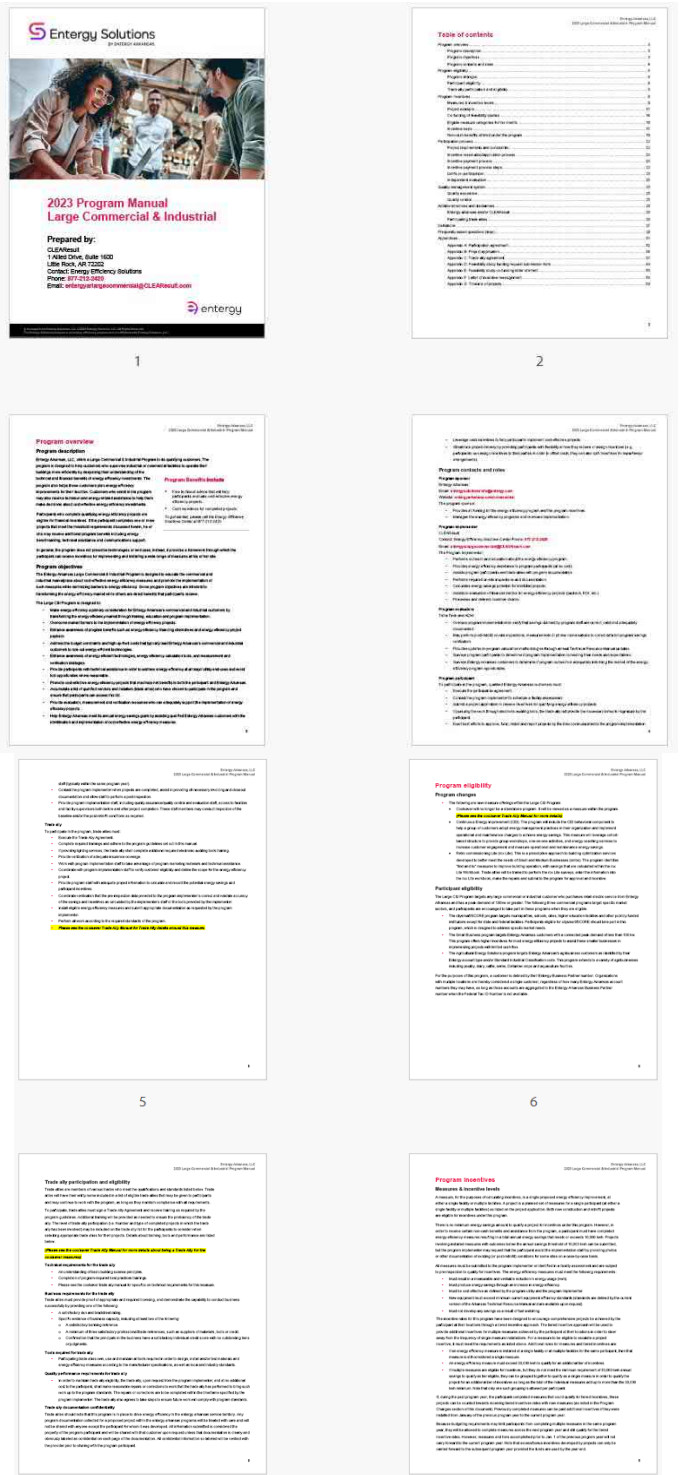
Find it all on the Entergy Arkansas Marketplace http://enter.gy/6187RX6NL



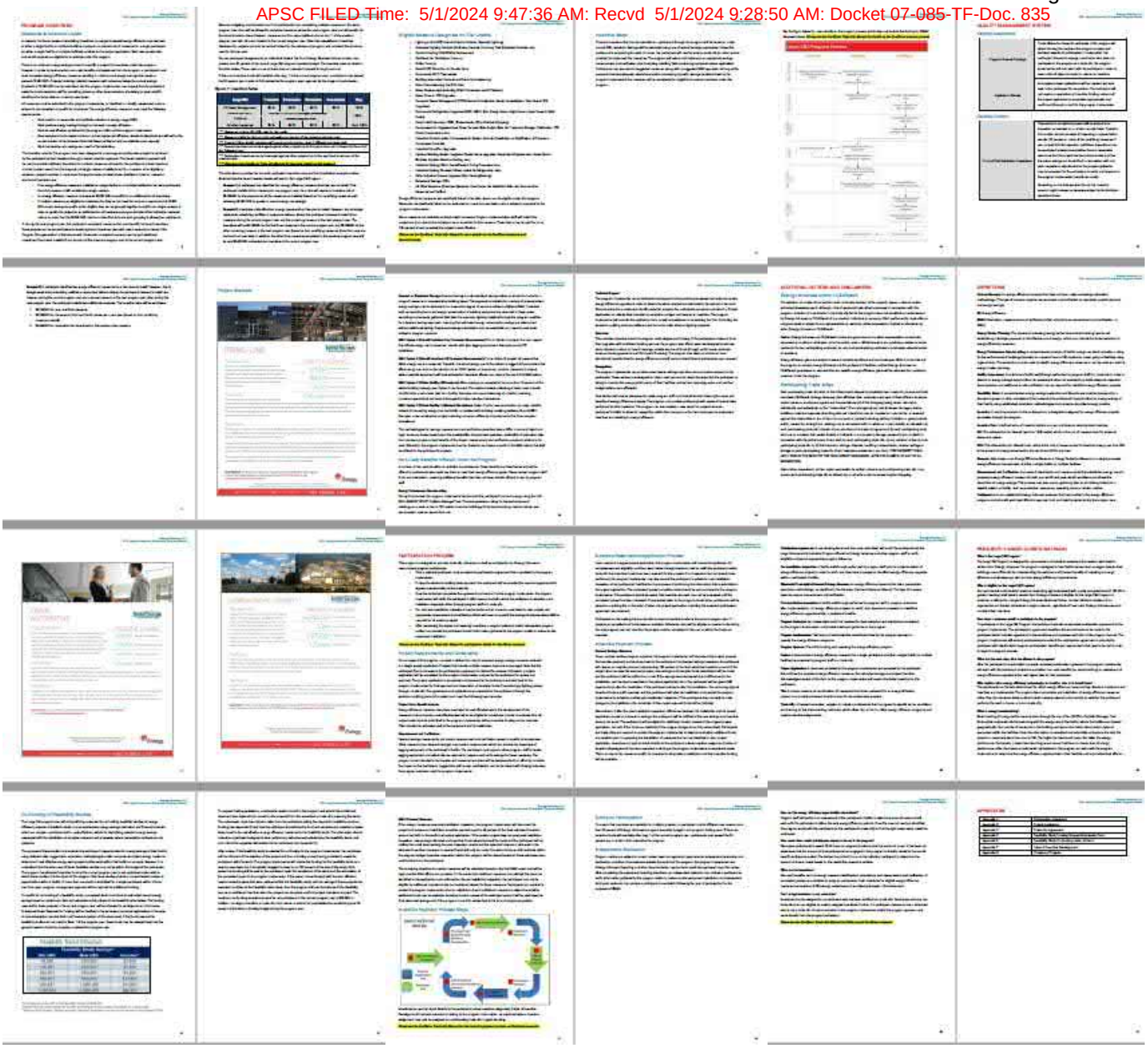
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3.6 Large Commercial and Industrial Solutions

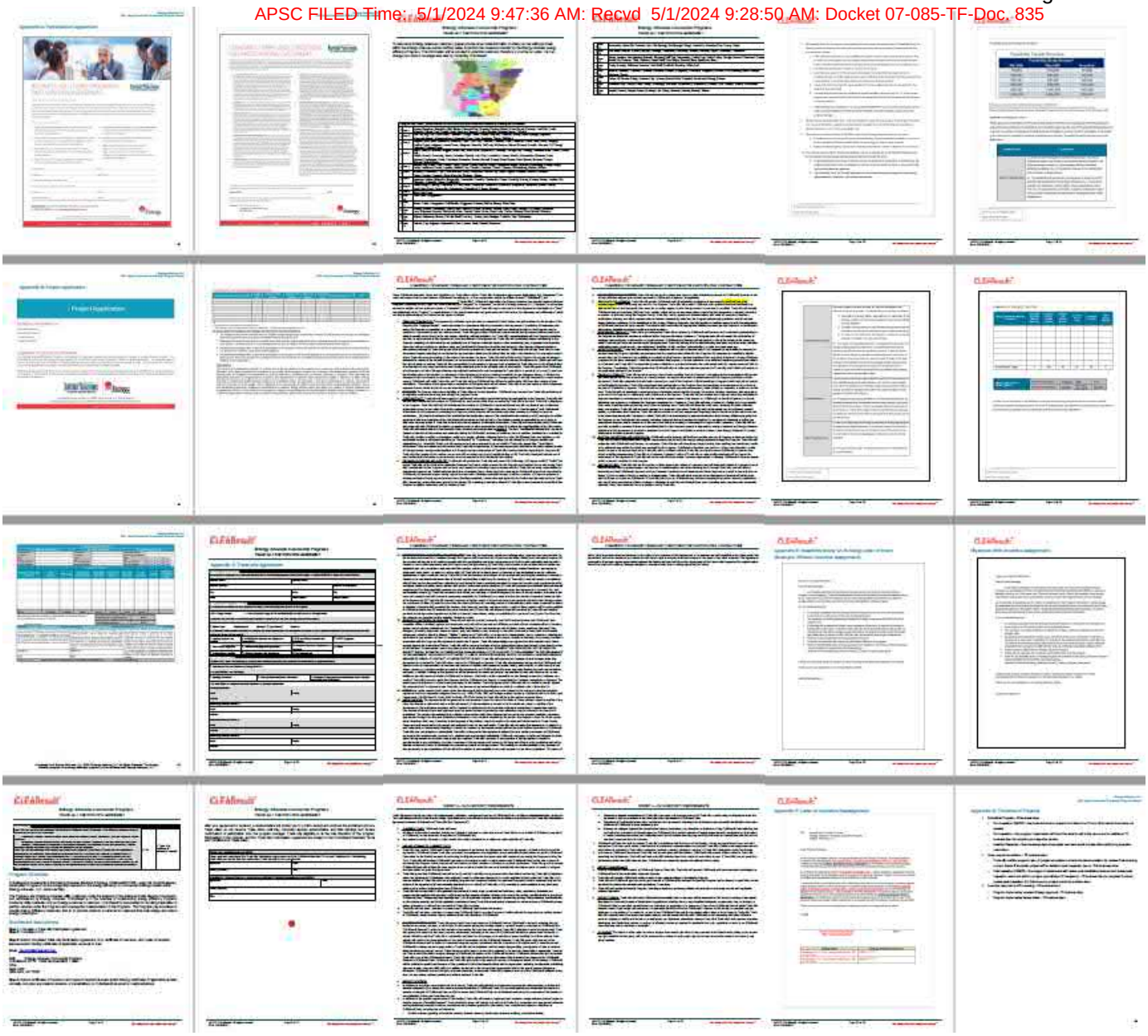
3.6.1 Large C&I Program Manual 2023



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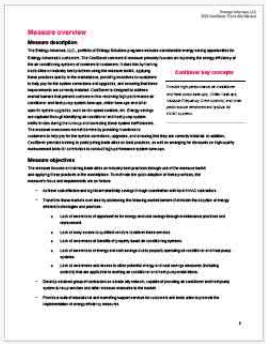
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3.6.2 Coolsaver Program Manual 2023



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3.6.3 2023-Fact Sheet_Flyers-compressed-air_CLEAN

Entergy Solutions



Compressed air systems

Get big savings from your system

Did you know that electric compressed air systems account for as much as 30% of an industrial facility's energy costs? We can help your business use less. By joining one of the Entergy Arkansas energy efficiency programs, you can find out how much energy your system is wasting and receive suggestions for effective repair and replacement options, such as repairing air leaks and installing variable speed drives or no-loss drain valves.

Benefits

Newer variable speed drive compressors are highly efficient, quieter and more stable. This boosts reliability and reduces maintenance costs. Plus, the cash incentives you'll receive from Entergy Arkansas will reduce your up-front costs, shortening the payback period on your investment.

How to participate

1. Contact us at **877-212-2420** or visit **entergyarkansas.com/commercial** to enroll in one of the Entergy Arkansas energy efficiency programs.
2. We'll perform an on-site inspection of your existing systems—at no cost to you.
3. You'll receive a customized project recommendation, tailored to your company's needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. The system upgrades will be installed.
6. You'll receive cash incentives for all qualifying completed projects.

Air leak facts

- Leaks typically account for 20–30% of all air use in a compressed system.*
- Leaks are best detected by an ultrasonic acoustic detector that recognizes the high-frequency hissing sound that often accompanies an air leak.
- You need 7–8 horsepower of electrical power to operate a 1 HP air motor.**



*Source: U.S. Department of Energy
**Source: ENERGY STAR®

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.4 2023-Fact Sheet_Flyers-continuous-energy-improvement-overview



Entergy Solutions

Continuous Energy Improvement

Take control of your energy use

Energy is typically one of an organization's largest operating expenses and impacts everything from the bottom line to occupant comfort. For many, limited time, awareness and expertise prevent optimal management of this resource.

Our Continuous Energy Improvement initiative provides energy efficiency strategies, technology, consulting advice and technical expertise at no additional cost to customers. This initiative changes the way people use energy within your facility, leading to quantifiable savings and fostering a culture of energy awareness.

Benefits of CEI

- Potentially lower energy use and reduced utility costs
- Access to tailored CEI energy models, tools, consultants and resources
- Best practices for facility operations
- Process efficiencies, reduced maintenance and increased comfort for occupants
- Increased awareness of energy use
- Networking with other CEI participants and learning best practices for energy management

What CEI offers

- Strategic planning and guidance
- On-site technical analysis and facility assessments
- Identification of low-/no-cost energy-saving and quick-payback project opportunities
- Facilitated and targeted training and education for staff and occupants
- Cutting-edge modeling to track energy performance at no additional cost to your organization
- Incentive bonus for CEI energy savings ($0.02 per annual kWh saved)

How it works

CEI is built on principles of continuous improvement and organizational change, integrating cost-saving and operational excellence initiatives such as Lean and Six Sigma. CEI sets your organization up to save energy by providing your facility and operational managers with on-call energy consultants. Think of it as empowering your organization to control your energy use. Participants attend CEI workshops, complete behavioral or operational energy-saving actions, and engage their leadership and organization in savings efforts and progress.

"The Continuous Energy Improvement initiative has really benefited Johnson Controls by helping us achieve our corporate continuous improvement energy goals this year. Involvement in the CEI initiative, especially in the group workshops, has helped us build a strong JCI Energy Team, as well as enabled us to build teamwork by inclusion of others across our plant in saving energy."

Matt Truitt, UPG EHS Manager, Building Efficiency
Johnson Controls

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First year – workshops and activities

Type	Activity	Timing: Initiative month 1 2 3 4 5 6 7 8 9 10 11 12
Workshops	Cohort kickoff	
	Engaging your organization in saving energy	
	Measuring and modeling energy performance	
	Technical forum	
	Sustaining energy savings/report out	
Individual events	Site review/opportunity assessment	
	Review and prioritize opportunities – CEI plan	
	Mid-year executive sponsor update	
	Energy-saving engagement event	
	Energy management assessment	
Other activities	Monthly check-in calls	
	Milestones	

Questions?
Contact Richard Gregg at 501-221-4011 or richard.gregg@clearesult.com.

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3.6.5 2023-Fact Sheet_Flyers-continuous-energy-improvement-reserve-your-seat-flyer_CLEAN



Entergy Solutions

Reserve your Continuous Energy Improvement cohort seat

Entergy Arkansas is pleased to offer your organization the opportunity to participate in our upcoming CEI initiative. Please review the following information, participation guidelines and criteria.

Continuous improvement process for saving and managing energy

- **Choose** a member of your executive management team to be the executive sponsor to oversee CEI implementation, and conduct regular progress reviews with the energy champion and team.
- **Designate** an energy champion to lead CEI efforts and provide the energy champion with resources and oversight reasonably necessary to accomplish the goals described in this document.
- **Establish** an energy team consisting of representatives from various sites and functional areas.
- **Establish** an energy policy or charter that includes an energy reduction goal and assigns responsibilities to appropriate persons for meeting that goal.
- **Implement** cost-effective energy efficiency activities and projects (as defined by your organization).
- **Provide** information to establish an energy use baseline and maintain an energy performance model.

Benefits

- Potentially reduce utility costs for electricity and other energy sources.
- Gain access to energy management training resources for your staff.
- Receive tools and templates to help implement strategic energy management.
- Receive knowledgeable coaching and mentoring.
- Get technical assistance to help staff identify and quantify energy-saving opportunities.
- Get documentation of energy consumption levels and savings.
- Earn incentives for energy savings.

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Commitments and requirements

The CEI initiative begins with a one-year initial engagement with the option to continue as part of the CEI alumni cohort. The initiative will engage the participants' designated representatives in on-site meetings and peer-to-peer group training sessions that will typically occur monthly during the first CEI year. Participants are asked to send to each session at least two staff members who must actively participate, including presenting on relevant topics or progress.

Participants are asked to make a good faith effort to fulfill the requirements of participation. Lack of responsiveness on communications, repeated missed attendance at meetings or trainings, last-minute cancellations or other similar actions indicating a lack of organizational commitment may result in CEI services being withdrawn.

The number of participants is limited and designed to meet CEI savings targets. Entergy Arkansas and CLEAResult reserve the right to manage participation according to CEI initiative design and available space and to address potential competitive concerns between prospective participants.

Customer participation agreement

Participants are asked to sign a customer participation agreement, which sets forth the legally binding terms for the Entergy Solutions programs including confidentiality, incentives and liability. Participation in CEI is voluntary, and there are no additional costs beyond your staff engagement.

Participant information

Company (participant) name		Date	
Company address	City	State	ZIP
Executive sponsor (print name)	Executive sponsor title		
Primary contact/energy champion (print name)			
Energy champion phone number	Energy champion email address		

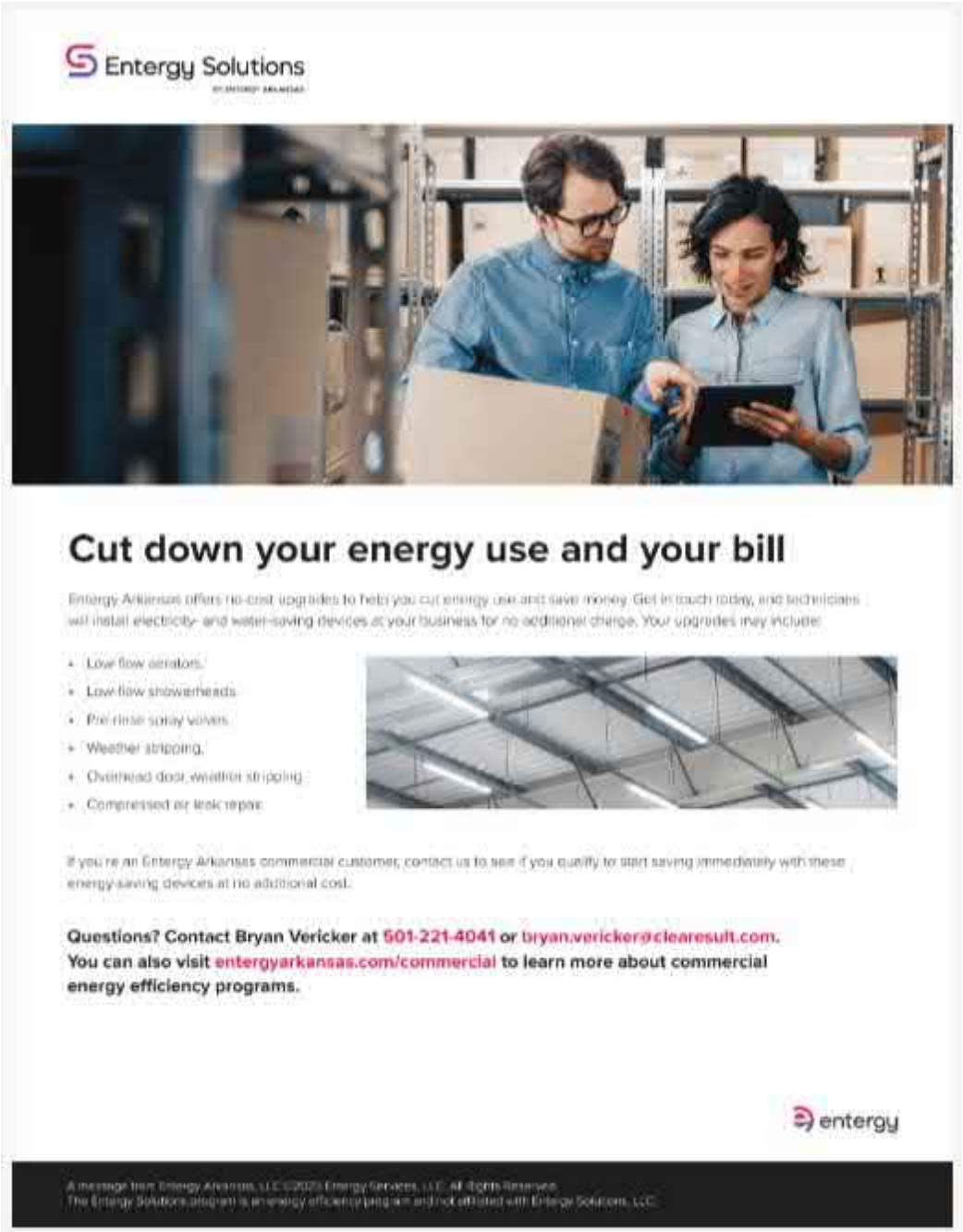
Email this document to richard.gregg@clearesult.com.

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3.6.6 2023-Fact Sheet_Flyers-Direct Install Flyer_CLEAN



Entergy Solutions

Cut down your energy use and your bill

Entergy Arkansas offers no-cost upgrades to help you cut energy use and save money. Get in touch today, and technicians will install electricity- and water-saving devices at your business for no additional charge. Your upgrades may include:

- Low flow aerators
- Low flow showerheads
- Pre-rinse spray valves
- Weather stripping
- Overhead door weather stripping
- Compressed air leak repair

If you're an Entergy Arkansas commercial customer, contact us to see if you qualify to start saving immediately with these energy-saving devices at no additional cost.

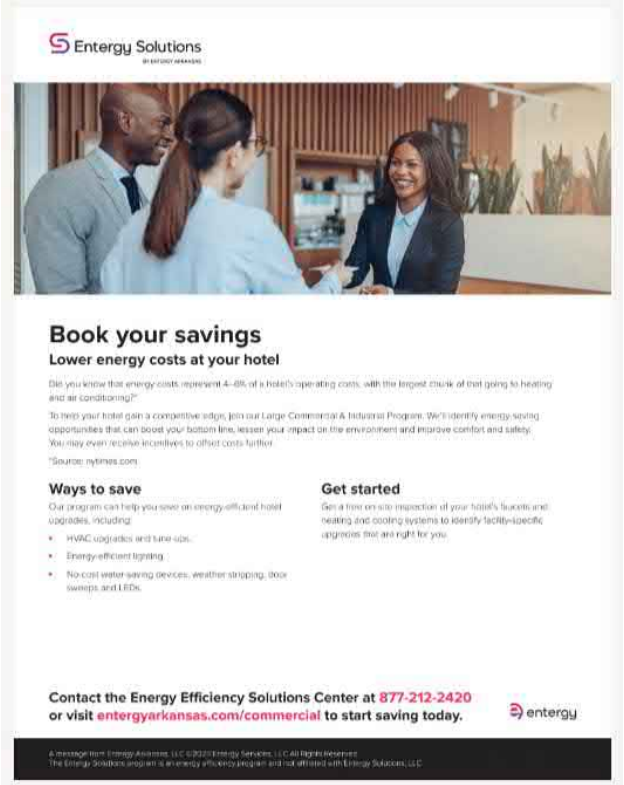
Questions? Contact Bryan Vericker at 501-221-4041 or bryan.vericker@clearesult.com.
You can also visit entergyarkansas.com/commercial to learn more about commercial energy efficiency programs.

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3.6.7 2023-Fact Sheet_Flyers-hotels_CLEAN



Entergy Solutions

Book your savings

Lower energy costs at your hotel

Did you know that energy costs represent 4–6% of a hotel's operating costs, with the largest chunk of that going to heating and air conditioning?*

To help your hotel gain a competitive edge, join our Large Commercial & Industrial Program. We'll identify energy-saving opportunities that can boost your bottom line, lessen your impact on the environment and improve comfort and safety. You may even receive incentives to offset costs further.

*Source: nytimes.com

Ways to save

Our program can help you save on energy-efficient hotel upgrades, including:

- HVAC upgrades and tune-ups
- Energy-efficient lighting
- No-cost water-saving devices, weather stripping, door sweeps and LEDs

Get started

Get a free on-site inspection of your hotel's faucets and heating and cooling systems to identify facility-specific upgrades that are right for you.

Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial to start saving today.

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Available incentives

Some of the energy-saving measures eligible for incentives under the program include:

Upgrade	Estimated incentive	Estimated annual energy cost savings
Replacing a 175-watt metal halide wall pack with an 80-watt LED.	$77	$46
Replacing a 400-watt metal halide in your parking lot with a 190 watt LED.	$157	$95
Installing weather stripping on exterior doors.	No charge	$160
Installing an aerator that slows the flow of a faucet to 0.5 gallons per minute.	No charge	$16
Installing a low-flow showerhead.	No charge	$30
Installing an ENERGY STAR® certified ice maker.	$45	$27
Installing PTAC occupancy setback controls.	$58	$36
Replacing a four-lamp, four-foot T8 lighting fixture with two 18-watt LED tubes.	$77	$48
Installing an energy-efficient exit sign.	$53	$32

Other energy-saving upgrades are also eligible for incentives, including high-efficiency HVAC units, water heaters, gaskets and strip curtains.

See how it adds up

By installing just a few energy-efficient upgrades in a typical* hotel room, you could earn an estimated incentive of $58 and save $56 in annual energy costs.

*Typical hotel room consisting of four LED lighting fixtures, one shower and one sink.

Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial to start saving today.

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3.6.8 2023-Fact Sheet_Flyers-Lighting_Controls_Measure_Sheet_CLEAN

Entergy Solutions



Lighting controls and sensors

Lighting and your building

According to ENERGY STAR®, lighting consumes 35% of a building's electricity, more than any other end use. Lighting sensors are control devices that allow you to better manage your energy use by automatically turning lights on and off based on space needs. Using infrared or ultrasonic technology, occupancy sensors provide automatic control. Similarly, daylight controls provide automatic control based on incoming natural light.

Benefits

Occupancy sensors provide convenience by turning lights on automatically when someone enters a room and save energy by turning lights off soon after the last occupant has left the room. Projects typically pay for themselves in energy savings alone within a few years; however, Entergy Arkansas offers incentives to help offset the initial cost.

More on sensors

Ultrasonic sensors detect sound, while infrared sensors detect heat and motion. Occupancy sensors must be located where they will detect occupants or occupant activity in all parts of the room.

*Source: energystar.gov

How to participate

1. Contact the Energy Efficiency Solutions Center at **877-212-2420** or **entergyarkansas.com/commercial** to enroll in one of Entergy's commercial and industrial programs.
2. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
3. Your selected trade ally will schedule a visit to your facility to perform an on-site, room-by-room inspection of the existing lighting system—at no cost to you. This assessment will investigate the different types of fixtures used, number of lamps, hours of operation and existing light levels.
4. The trade ally will create a customized list of recommendations for your business, designed to increase efficiency, reduce your Entergy bills and improve both lighting quality and comfort.
5. You'll receive cash incentives for any qualified completed projects.

Lighting facts

- Lighting uses about 18% of the electricity generated in the U.S.*
- Lighting in commercial buildings accounts for approximately 71% of overall lighting electricity use in the U.S.*
- Improved lighting enhances visual comfort, reduces eye fatigue and improves overall performance.

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.9 2023-Fact Sheet_Flyers-Opt-in-Flyer_CLEAN

Entergy Solutions



Saving energy is smart business

The Entergy Solutions program helps commercial customers improve the energy efficiency of their buildings or facilities. Get in touch today and our program team will:

1. Schedule a meeting with company stakeholders to discuss possible energy efficiency upgrades that could be completed for the current year and subsequent four years. The team will discuss company priorities, savings potential, possible projects, estimated costs and incentives for five years in advance of any potential expansion, site growth or new construction.
2. Conduct site walk-throughs to discover opportunities for energy reduction. These walk-throughs will help you and our team gain a better understanding of your energy usage and how to best assess your direct needs.
3. Use site walk-through information along with any applicable operations data available to create an energy usage baseline. This information will be used to help calculate a savings profile for the identified energy efficiency opportunities, as well as a financial analysis of potential energy efficiency projects.
4. Present the financial analysis findings to company stakeholders, outlining what energy efficiency projects make good financial sense and help you make an informed Entergy Solutions program participation decision.

Benefits

- Understand the Entergy Solutions program offerings.
- Obtain a no-cost energy assessment.
- Receive a financial analysis of potential energy efficiency projects.
- Make a well-informed participation decision.

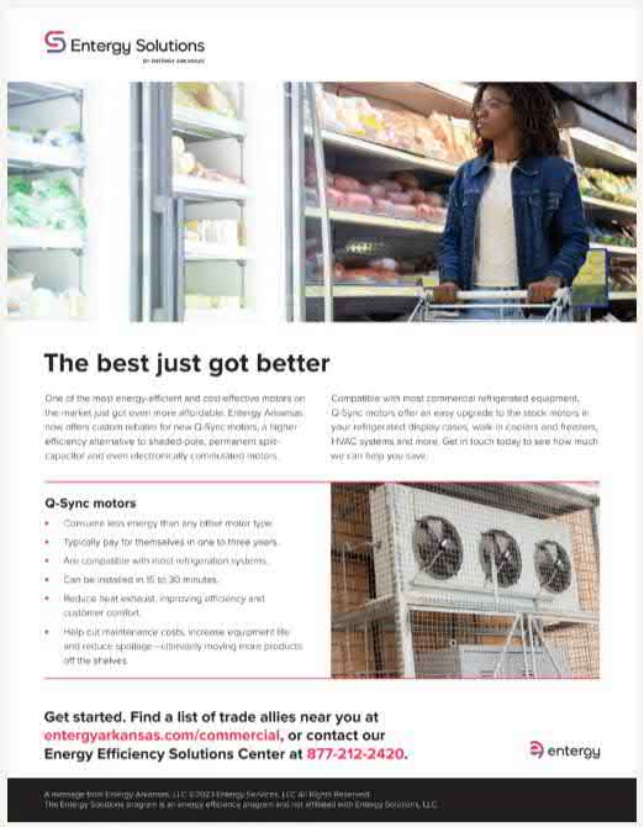
It's easier than ever to save energy and money. Ready to begin? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.10 2023-Fact Sheet_Flyers-QSync-Single-Measure Sheet_CLEAN



Entergy Solutions

The best just got better

One of the most energy-efficient and cost-effective motors on the market just got even more affordable. Entergy Arkansas now offers custom rebates for new Q-Sync motors, a higher efficiency alternative to shaded-pole, permanent split-capacitor and even electronically commutated motors.

Compatible with most commercial refrigerated equipment, Q-Sync motors offer an easy upgrade to the stock motors in your refrigerated display cases, walk-in coolers and freezers, HVAC systems and more. Get in touch today to see how much we can help you save.

Q-Sync motors

- Consume less energy than any other motor type.
- Typically pay for themselves in one to three years.
- Are compatible with most refrigeration systems.
- Can be installed in 15 to 30 minutes.
- Reduce heat exhaust, improving efficiency and customer comfort.
- Help cut maintenance costs, increase equipment life and reduce spoilage—ultimately moving more products off the shelves.

Get started. Find a list of trade allies near you at entergyarkansas.com/commercial, or contact our Energy Efficiency Solutions Center at 877-212-2420.

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A cooler way to save

How it works

1. Discover. You or a participating trade ally identifies your facility's existing evaporator fan motors.
2. Verify. An Entergy Arkansas representative verifies the existing evaporator fan motors.
3. Repair. You or your trade ally replaces existing motors with Q-Sync motors. You or your trade ally documents the material cost and labor or saves a copy of the invoice if using an outside contractor.
4. Confirm. An Entergy Arkansas representative confirms all replacements.



Motor comparison

	Q-Sync	ECM	Permanent split-capacitor	Shaded-pole
Operational efficiency	70–80%	50–60%	40–50%	20%
Refrigerated space—estimated annual energy costs per motor*				
9–12 Watt	$14.96	$20.35	$40.62	$48.97
38–50 Watt	$39.91	$53.86	$68.32	$126.96
Freezer space—estimated annual energy costs per motor*				
9–12 Watt	$17.77	$24.18	$48.26	$58.17
38–50 Watt	$47.41	$64.10	$85.16	$149.61

*This analysis assumes an electric rate of $0.08 per kWh.

Let's sync up. Visit entergyarkansas.com/commercial to find a trade ally near you, or call 877-212-2420.

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3.6.11 2023-Fact Sheet_Flyers-restaurant_CLEAN

Entergy Solutions



Serve up the savings

Achieve long-term savings at your restaurant through energy efficiency

Did you know that the average restaurant uses 5–10 times more energy per square foot than other commercial buildings?* Our Large Commercial & Industrial Program and Small Business Program help restaurant owners like you invest in cost-effective, turnkey improvements that will narrow the energy-consumption gap between you and neighboring businesses. Since these improvements result in lower energy bills month after month, they often pay for themselves over time while making your restaurant more comfortable for customers and employees.

*Source: energystar

Ways to save

Our program offers incentives and services on energy-efficient equipment and measures, including:

- Upgrading heat pumps, air conditioning units and other HVAC equipment with a CoolSaver® A/C Tune-up
- Implementing technologies that boost refrigeration efficiency
- Installing energy-efficient lighting and advanced lighting controls
- Equipping your kitchen with demand-based ventilation controls

Get started

To help you identify facility-specific upgrades that are right for you, we offer free on-site inspections of your restaurant's refrigeration, lighting, and heating and cooling systems.

To start saving, contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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Available incentives

Some of the energy-saving measures eligible for incentives under the program include:

Upgrade	Estimated annual electricity savings (kWh)	Estimated annual energy cost savings
Refrigeration		
Installing an anti-sweat heater control on a refrigerated display case with five doors	2,737	$246
Equipping a 3' x 7' freezer or refrigerator door with a strip curtain	3,375	$304
Installing an energy-efficient novelty case cooler	4,604	$414
Installing a refrigerator door gasket	1,192	$107
HVAC controls		
Installing hood controls in your kitchen	4,227	$380
Upgrading to SEER 16 or better HVAC unit		
Using controls for scheduling, set points, setbacks and improved occupant comfort		
Lighting controls		
Installing a two-fixture fluorescent or LED occupancy sensor in one of your bathrooms	68	$6
Lighting		
Replacing one 100-watt incandescent lamp in your freezer with a 9-watt LED	367	$33
Replacing a four-lamp, four-foot T8 lighting fixture with two 18-watt LED tubes	362	$33
Installing an energy-efficient exit sign	353	$32
Other		
Installing an aerator that slows the flow of a faucet to 0.5 gallons per minute	1,437	$129
Installing a pre-rinse spray valve that slows the water flow while maintaining pressure	5,000	$450

Other energy-saving measures are also eligible for incentives, including high efficiency HVAC units, water heaters, gaskets and strip curtains.

To start saving, contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.12 2023-Fact Sheet_Flyers-RetroCommissioning-Lite-Flyer_CLEAN

Entergy Solutions



Retrocommissioning-Lite

Optimize your building (and your savings)

The Entergy Solutions program has expanded its offerings to commercial customers to include Retrocommissioning-Lite. Where full retrocommissioning requires comprehensive, time-intensive and costly engineering services, Retrocommissioning-Lite is a right-sized alternative for small and medium-sized businesses. Through the Entergy Solutions programs, Entergy Arkansas offers a streamlined, no-cost energy survey to identify energy inefficiencies and correct them to improve building operations.

Benefits

- Improve building energy performance and reduce energy use by an estimated 5%.
- Advance occupant comfort and productivity.
- Extend equipment life and reduce maintenance needs.
- Increase internal knowledge of building systems and controls.

Who is eligible?

Facilities under 100,000 square feet using an Entergy Solutions trade ally may be eligible for Retrocommissioning-Lite. Common projects include programmable thermostat scheduling, ventilation adjustments, economizer installations and more.

How to participate

1. Call **877-212-2420** or visit **entergyarkansas.com/commercial** to enroll in one of the Entergy Solutions programs.
2. We'll provide a list of Entergy Solutions trade allies trained in the Entergy Arkansas energy efficiency offerings.
3. Your selected trade ally will perform a no-cost on-site inspection to examine your existing building control systems.
4. You'll receive a list of customized recommendations for your business designed to increase efficiency, reduce your Entergy Arkansas bills, optimize your facility's performance and improve occupant comfort.
5. Get cash incentives for all qualifying completed projects.

Did you know?

Approximately 72% of the measures implemented through retrocommissioning are centered around operations and control. That means lower costs for you.

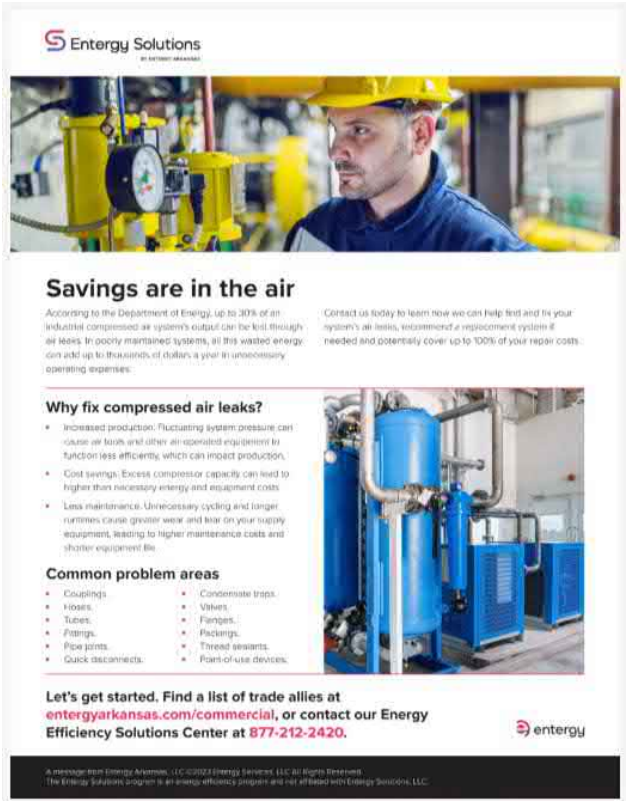
Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.13 2023-Fact Sheet_Flyers-Single Measure-Sheet-Compressed Air leaks_CLEAN



Entergy Solutions

Savings are in the air

According to the Department of Energy, up to 30% of an industrial compressed air system's output can be lost through air leaks. In poorly maintained systems, all this wasted energy can add up to thousands of dollars a year in unnecessary operating expenses.

Contact us today to learn how we can help find and fix your system's air leaks, recommend a replacement system if needed and potentially cover up to 100% of your repair costs.

Why fix compressed air leaks?

- Increased production. Fluctuating system pressure can cause air tools and other air-operated equipment to function less efficiently, which can impact production.
- Cost savings. Excess compressor capacity can lead to higher than necessary energy and equipment costs.
- Less maintenance. Unnecessary cycling and longer runtimes cause greater wear and tear on your supply equipment, leading to higher maintenance costs and shorter equipment life.

Common problem areas

- Couplings
- Hoses
- Tubes
- Fittings
- Pipe joints
- Quick disconnects
- Condensate traps
- Valves
- Flanges
- Packings
- Thread sealants
- Point-of-use devices

Let's get started. Find a list of trade allies at entergyarkansas.com/commercial, or contact our Energy Efficiency Solutions Center at 877-212-2420.

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Stop leaking money

How it works

1. Discover. You or a participating trade ally identifies, tags and labels all compressed air leaks in your system. Compressed air leaks are easy to find with ultrasonic acoustic detectors, which can recognize the high-frequency hissing associated with air leaks.
2. Verify. An Entergy Arkansas representative measures and verifies each leak.
3. Repair. You or your trade ally repairs air leaks following internal safety protocols. Most leaks are simple and inexpensive to fix. Document the cost and labor of all leak repairs, or save a copy of the invoice if using an outside contractor.
4. Confirm. An Entergy Arkansas representative confirms all repairs and retrieves the tags. We can also provide preventative maintenance training upon request.



Typical cost savings

The following examples show the estimated savings for repairing air leaks totaling up to 20% of the system capacity of a typical compressed air system operating 5,000 hours per year at a specific power of 0.18 kW/cfm with an electricity rate of $0.06 per kWh.

Compressor (HP)	Est. capacity (ACFM)	Available incentives	Est. annual savings
200	1,000	Up to 100%	$10,800
150	750	Up to 100%	$8,100
100	500	Up to 100%	$5,400
50	250	Up to 100%	$2,700

Let's get started. Find a list of trade allies at entergyarkansas.com/commercial, or contact our Energy Efficiency Solutions Center at 877-212-2420.

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3.6.14 2023-Fact Sheet_Flyers-single-measure-sheet-chiller_CLEAN

Entergy Solutions



Chiller replacements

Replace your chiller for cool savings

Did you know that the annual energy cost of operating a chiller can be as much as one-third of its purchase price!* By joining one of the Entergy Arkansas energy efficiency programs, you can learn how much energy your chiller is wasting and how to improve its efficiency. We'll even provide cash incentives to help fund the project.

Benefits

- Lower monthly energy costs and use.
- Reduced upfront costs, thanks to Entergy Arkansas incentives that shorten the payback period on your investment.
- Improved efficiency of your chiller plant.
- Less chance of needing repairs in the future, which reduces interruptions and boosts productivity.

How to participate

1. Visit **entergyarkansas.com/commercial** or contact us at **877-212-2420** to enroll in one of the Entergy Arkansas energy efficiency programs.
2. We'll perform an on-site inspection of your existing chillers—at no cost to you.
3. You'll receive customized project recommendations, tailored to your company's needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. The system upgrades will be installed.
6. You'll receive cash incentives for all qualifying completed projects.

Chiller replacement facts

- For every degree the temperature of chilled water is raised, energy usage is decreased by 1–1.5%.**
- Water-cooled water plants are approximately twice as efficient as air-cooled equipment.***
- Air-cooled chillers larger than 100 tons should be replaced with water-cooled chillers and cooling towers.***



*Source: U.S. Environmental Protection Agency
**Source: Energy Management Handbook, 8th edition
***Source: U.S. Department of Energy

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.15 2023-Fact Sheet_Flyers-small-compressed-air_CLEAN

Entergy Solutions



Small air compressors

Upgrade your small system to save big

Compressed air, though very useful, is one of the most expensive sources of energy. By joining one of the Entergy Arkansas energy efficiency programs, you can find out how much energy your compressed air system is wasting and how to improve its overall efficiency. We'll even provide cash incentives to help make it all possible.

Benefits

- A quieter system that's more efficient, stable and reliable
- Reduced upfront costs, thanks to Entergy Arkansas incentives
- Shortened payback period on your investment

How to participate

1. Contact us at 877-212-2420 or visit entergyarkansas.com/commercial to enroll in one of the Entergy Arkansas energy efficiency programs.
2. We'll perform an on-site inspection of your existing systems—at no cost to you.
3. You'll receive customized project recommendations, tailored to your company's needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. The system upgrades will be installed.
6. You'll receive cash incentives for all qualifying completed projects.

Who is eligible?

Small single-compressor systems up to 75 horsepower qualify.

Compressor facts

- Only 25% of all compressors sold are 50–100 HP and 65% are less than 50 HP.*
- A variable speed drive compressor saves approximately 20% more than a modulating compressor.**

*Source: Consortium for Energy Efficiency, Inc.
**Source: Compressed Air & Gas Institute

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.16 2023-Fact Sheet_Flyers-Tiered_Incentive_Flyer_CLEAN

Entergy Solutions



Boost your earning power

Our Large Commercial & Industrial Program's tiered incentive structure rewards businesses for implementing multiple energy-saving projects. The more projects you complete, the bigger incentives you can earn.

Tier it up

For every qualifying and unique measure completed at your facility within the two-year program period, you'll move to a higher incentive tier—allowing you to earn even more.

Incentives are awarded based on kWh savings over your baseline annual usage. Each additional and unique measure must result in at least 30,000 kWh in annual savings to qualify.

Incentive tiers

$0.14	Tier 1
$0.15	Tier 2
$0.16	Tier 3
$0.18	Tier 4

Bonus incentives

If your project earns more in incentives than the incremental cost to implement it, you're allowed to apply that bonus to another energy efficiency measure completed within the next two-year program period up to the program incentive cap.

For example, if your project has a $50,000 implementation cost and earns $55,000 in incentives, you can apply that extra $5,000 to help cover the cost of a future qualifying project.

Go retro

Our tier system also works retroactively. That means, if you complete an additional project(s) within the same two-year program period, we'll apply the difference on any previously completed project within those two program years, up to a maximum of $0.18 per kWh reduced and the program incentive cap.

Learn more to earn more.

Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial to get started.

*The Entergy Arkansas Energy Efficiency Solutions program year is Jan. 1 through Dec. 31.

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3.6.17 2023-Fact Sheet_Flyers-Variable-Frequency-Drive-flyer_CLEAN

Entergy Solutions



Variable speed drives

Drive home savings for your business

Did you know that reducing a machine's fan speed by even 20% can reduce its electricity use by about 50%?*

By joining one of the Entergy Arkansas energy efficiency programs, you can receive incentives toward the installation of variable speed drives on HVAC systems, cooling tower fans, water pumps, air compressors, process equipment and more.

Benefits

- Receive cash incentives that offset your upfront costs
- See monthly energy cost savings that you can reinvest in your business
- Reduce your impact on the environment

*Source: ENERGY STAR®
**Source: U.S. Department of Energy

How it works

Installing VSDs on motors saves energy by utilizing the affinity laws. These laws show that a small decrease in the rotating speed of the motor can greatly reduce the power input needed and yield big savings.**

How to participate

1. Contact us at **877-212-2420** or visit **entergyarkansas.com/commercial** to enroll in one of the Entergy Arkansas energy efficiency programs.
2. We'll perform an on-site inspection of your existing systems at no cost to you.
3. You'll receive customized project recommendations, tailored to your facility's needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. The system upgrades will be installed.
6. You'll receive cash incentives for all qualifying completed projects.

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.18 TA Recruitment Emails 2023-Ongoing

Entergy Solutions



Deliver superior service all year long

Frigid winter storms and scorching summertime heat often mean frantic service calls and long working hours. Entergy Arkansas wants to help get ahead of those critical moments and it all starts with dedicated **commercial HVAC contractors**. Looking to take your skillset to the next level? We can help to set you apart.

Learn more

The CoolSaver A/C Tune up initiative is designed to overcome the market barriers that can prevent commercial customers from receiving high-performance A/C and heat pump system tune-ups while helping commercial HVAC contractors like you.

- Sign more maintenance contracts
- Increase your customer base
- Reduce call backs and increase profits
- Keep appointment calendars full
- Leverage energy-efficiency incentives
- Integrate state-of-the-art equipment into standard practices
- Boost your knowledge

Get in on it

Email or give us a call at 877-212-3420

CoolSaver

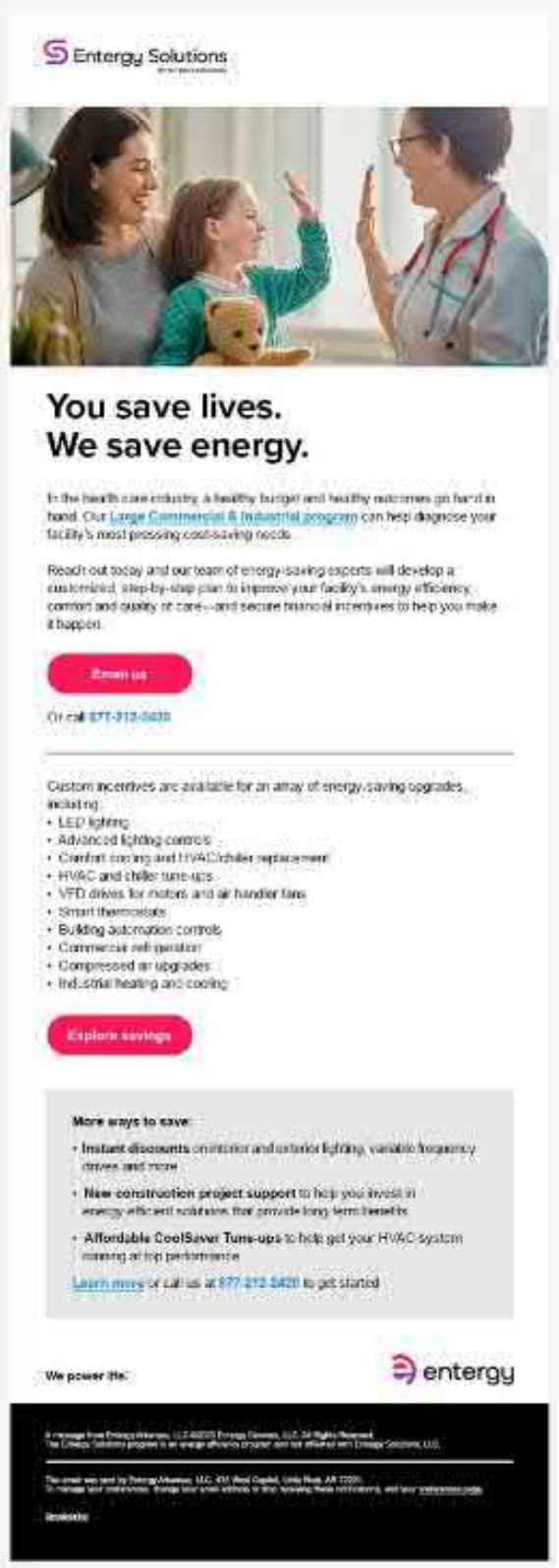
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3.6.19 Segmented Emails 2023-Industry Focus Emails_Healthcare



Entergy Solutions

You save lives.
We save energy.

In the health care industry, a healthy budget and healthy outcomes go hand in hand. Our Large Commercial & Industrial program can help diagnose your facility's most pressing cost-saving needs.

Reach out today and our team of energy-saving experts will develop a customized, step-by-step plan to improve your facility's energy efficiency, comfort and quality of care—and secure financial incentives to help you make it happen.

Email us

Or call 877-212-5420

Custom incentives are available for an array of energy-saving upgrades, including:

- LED lighting
- Advanced lighting controls
- Comfort cooling and HVAC/chiller replacement
- HVAC and chiller tune-ups
- VFD drives for motors and air handler fans
- Smart thermostats
- Building automation controls
- Commercial refrigeration
- Compressed air upgrades
- Industrial heating and cooling

Explore savings

More ways to save:

- **Instant discounts** on interior and exterior lighting, variable frequency drives, and more
- **New construction project support** to help you invest in energy-efficient solutions that provide long-term benefits
- **Affordable CoolSaver Tune-ups** to help get your HVAC system running at top performance

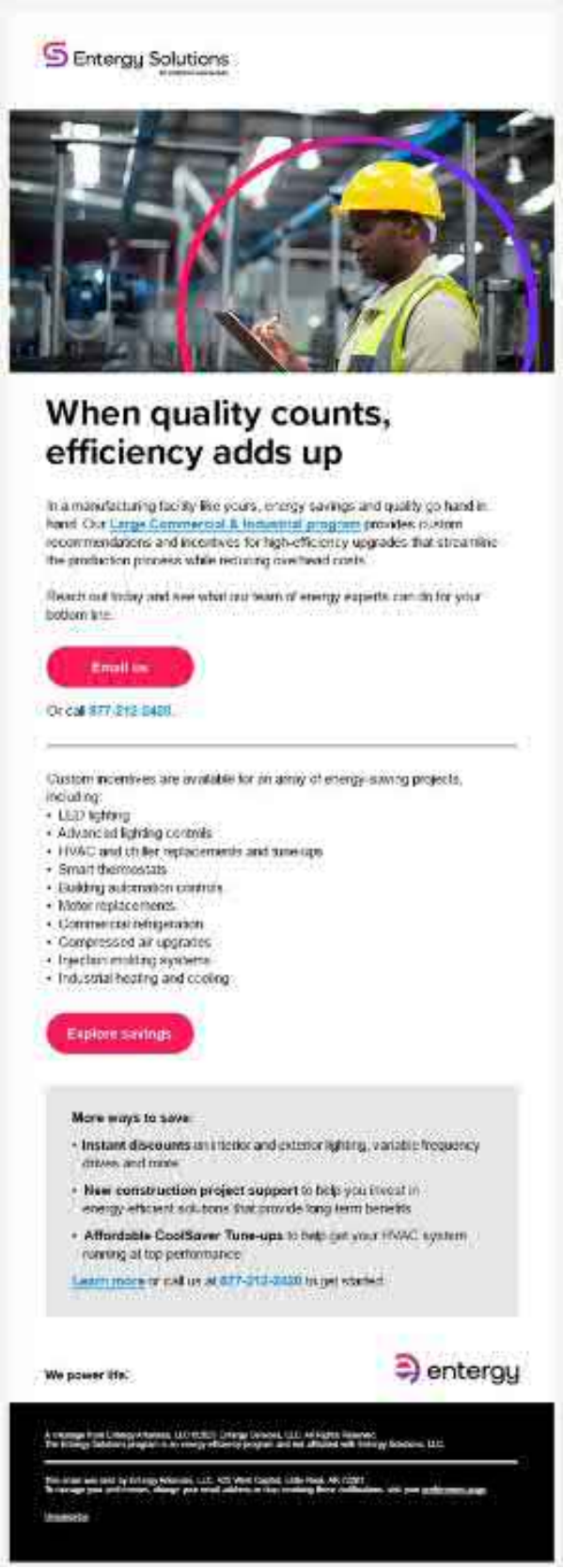
Learn more or call us at 877-212-5420 to get started

We power life.

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3.6.20 Segmented Emails 2023-Industry Focus Emails_Manufacturing



Entergy Solutions

When quality counts, efficiency adds up

In a manufacturing facility like yours, energy savings and quality go hand in hand. Our Large Commercial & Industrial program provides custom recommendations and incentives for high-efficiency upgrades that streamline the production process while reducing overhead costs.

Reach out today and see what our team of energy experts can do for your bottom line.

Email us

Or call 877-213-9400

Custom incentives are available for an array of energy-saving projects, including:

- LED lighting
- Advanced lighting controls
- HVAC and chiller replacements and tune-ups
- Smart thermostats
- Building automation controls
- Motor replacements
- Commercial refrigeration
- Compressed air upgrades
- Injection molding systems
- Industrial heating and cooling

Explore savings

More ways to save:

- **Instant discounts** on interior and exterior lighting, variable frequency drives, and more
- **New construction project support** to help you invest in energy-efficient solutions that provide long-term benefits
- **Affordable CoolSaver Tune-ups** to help get your HVAC system running at top performance

Learn more or call us at 877-213-9400 to get started.

We power life.

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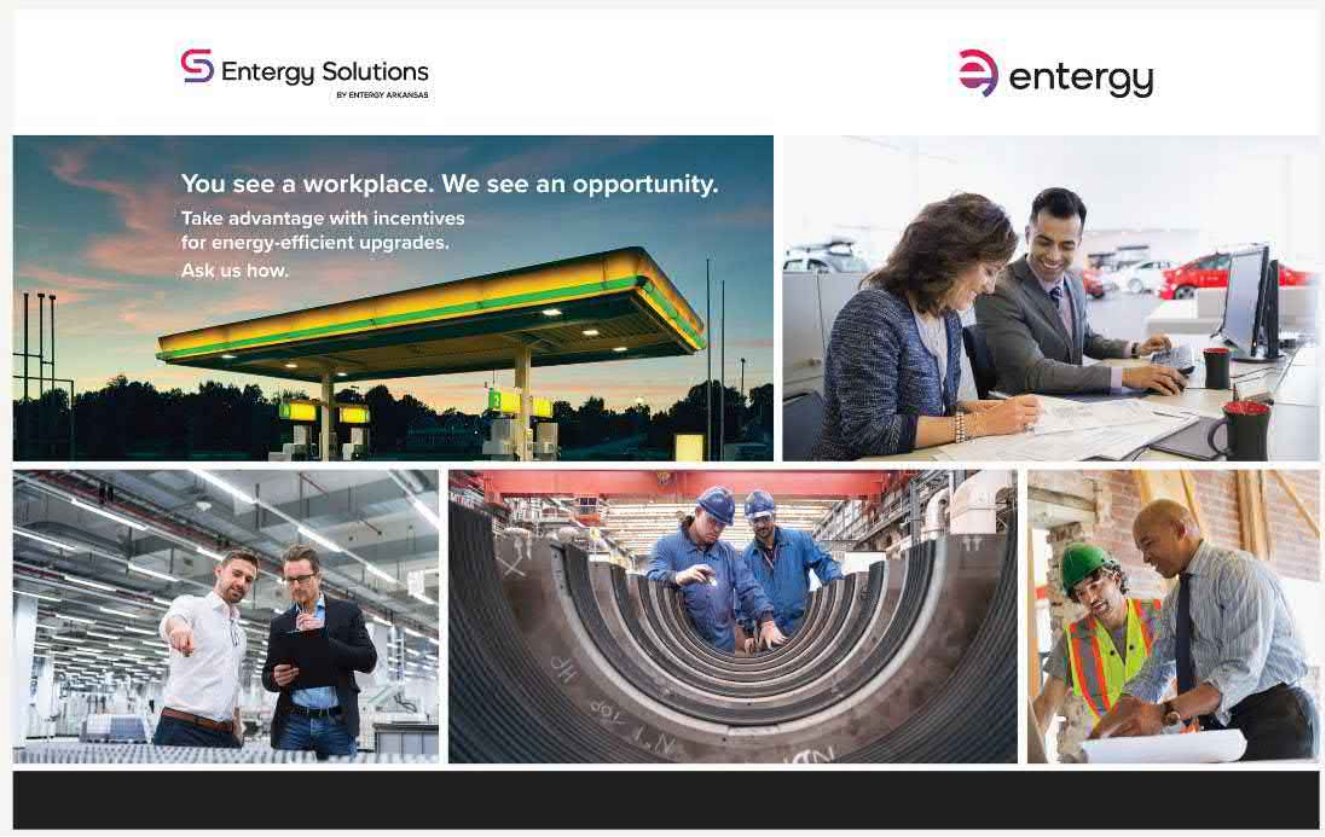
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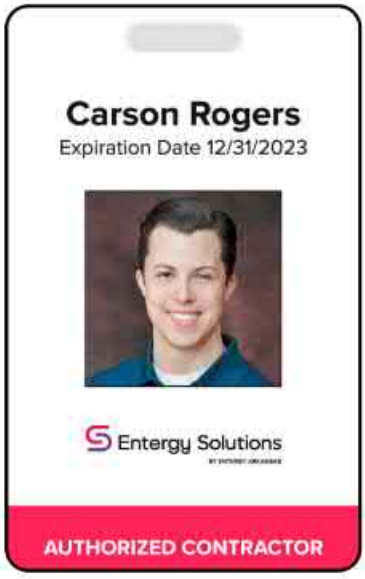
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3.6.21 2023 Trade Ally Summit Assets_BACKDROP_CLEAN



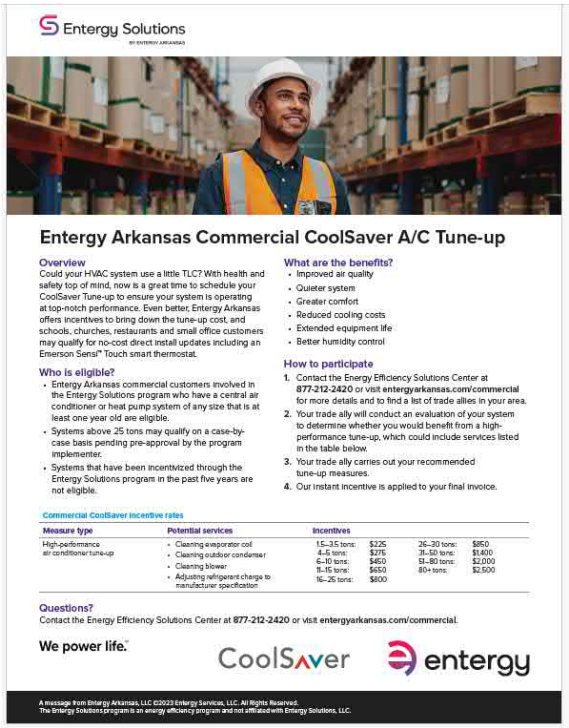
3.6.22 C&I Contractor Badges





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3.6.23 0123-EA-C&I-3459847-CoolSaver Fact Sheet (2).pdf



Entergy Solutions

Entergy Arkansas Commercial CoolSaver A/C Tune-up

Overview
Could your HVAC system use a little TLC? With health and safety top of mind, now is a great time to schedule your CoolSaver Tune-up to ensure your system is operating at top-notch performance. Even better, Entergy Arkansas offers incentives to bring down the tune-up cost, and schools, churches, restaurants and small office customers may qualify for no-cost direct install updates including an Emerson Sensi® Touch smart thermostat.

Who is eligible?
- Entergy Arkansas commercial customers involved in the Entergy Solutions program who have a central air conditioner or heat pump system of any size that is at least one year old are eligible.
- Systems above 25 tons may qualify on a case-by-case basis pending pre-approval by the program implementer.
- Systems that have been incentivized through the Entergy Solutions program in the past five years are not eligible.

What are the benefits?
- Improved air quality
- Quieter system
- Greater comfort
- Reduced cooling costs
- Extended equipment life
- Better humidity control

How to participate
1. Contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial** for more details and to find a list of trade allies in your area.
2. Your trade ally will conduct an evaluation of your system to determine whether you would benefit from a high-performance tune-up, which could include services listed in the table below.
3. Your trade ally carries out your recommended tune-up measures.
4. Our instant incentive is applied to your final invoice.

Commercial CoolSaver incentive rates

Measure type	Potential services	Incentives			
High-performance air conditioner tune-up	• Cleaning evaporator coil • Cleaning outdoor condenser • Cleaning blower • Adjusting refrigerant charge to manufacturer specification	1.5–3.5 tons:	$225	26–30 tons:	$850
		4–5 tons:	$275	31–50 tons:	$1,400
		6–10 tons:	$450	51–80 tons:	$2,000
		11–15 tons:	$650	80+ tons:	$2,500
		16–25 tons:	$800		

Questions?
Contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial**.

We power life.®

CoolSaver entergy

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Example CoolSaver A/C Tune-up report
Facilities with multiple units will find our CoolSaver A/C Tune-up report particularly beneficial. The report includes the number of tune-ups performed, estimated savings after one year and after five years, average cooling increase across units and average energy efficiency rating (EER) increase across units.

Summary of all activities

tune-ups performed	80

Performance breakdown

estimated kW savings	284 kW
estimated cost savings	$7,000
estimated one-year savings	$20,000.00
estimated five-year savings	$100,000.00
average capacity increase across	6 tons
average kW reduction	1.68

Screening criteria

existing seven (7) seasonal	10.00
existing percentage of rated cooling capacity	70%
$ per watt	$0.00

Results

recommended action	quantity or units
[illegible]	20
[illegible]	10
[illegible]	50

The CoolSaver A/C Tune-up report scores your units in terms of how closely they meet the recommended minimum criteria for SEER and cooling capacity, allowing you to accurately budget red units for replacement.
GREEN: Both criteria met
ORANGE: One of two criteria met
RED: Neither met

The CoolSaver A/C Tune-up report also provides specific information about each individual unit in your facility. The data generated for each unit includes the location, type, serial number, model, delivered SEER rating and an efficiency color score.

Account name	Service address	Project ID	Unit ID	Outdoor unit or compressor manufacturer	Outdoor unit or compressor model #	Outdoor unit or compressor serial #	Unit SEER	Unit cap. vs. Rated	Score
[illegible]	[illegible]	[illegible]	[illegible]	Carrier	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	Carrier	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	Carrier	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

The CoolSaver difference
CoolSaver's state-of-the-art diagnostic tools and procedures go far beyond a typical tune-up. In addition to lowering your facility's energy and maintenance costs, a CoolSaver A/C Tune-up is carefully designed to provide a cooler, more comfortable and more productive work environment.

Questions?
Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.6.24 Large C&I Commercial POPS Participation Agreement

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Commercial Point Of Purchase Solutions Energy Efficiency Program Participation Agreement

Save real money with high efficiency equipment.

The Entergy Arkansas Commercial Point of Purchase Solutions Energy Efficiency Program offers incentives at the time of purchase for specific high efficiency equipment. Entergy Arkansas commercial customers can obtain the products through their standard purchasing methods, and incentives are processed through the equipment supplier.

How will I benefit?

- Savings, now and later. Equipment upgrades typically pay for themselves in energy savings alone within a few years, and you can also save immediately through incentives for purchasing select high efficiency products.
- Simplified process. The incentives are processed through your equipment supplier so you get immediate benefits and the supplier handles the paperwork.
- Entergy Arkansas commercial customers can obtain discounted high efficiency products through standard purchasing methods.

Frequently asked questions

1. **Are there any commercial customers that aren't eligible for participation in the program?**
   Any nonresidential Entergy Arkansas customer is eligible to receive discounts through the program, even if you've completed a commercial project for which you received Entergy Arkansas incentives, though incentives cannot be claimed for the same socket or fixture twice.
2. **Do all efficient products qualify for discounts through the program?**
   No, only certain categories of lighting, hand dryers, small air compressors and variable-frequency drives of a certain size are eligible for discounts through the program.

How to Participate:

1. Sign the back of this form and submit it to your product supplier. This enrolls you in the program and authorizes us to process the incentives for your purchase.
2. Purchase qualified products from your supplier. The incentive amount will be automatically deducted from the purchase price.
3. Install your product within 30 days of the purchase date. One of our program representatives may contact you to verify installation.
4. Enjoy the benefits of your completed project.

Commercial Point Of Purchase Solutions Energy Efficiency Program

Customer Participation Agreement

Entergy Arkansas has contracted with CLEAResult to implement, promote and administer the Commercial Point of Purchase Solutions Energy Efficiency Program (herein referred to as "program"). _____ (herein referred to as "participant") recognizes it is a willing participant of this program and is an Entergy Arkansas commercial customer. This participation agreement reflects the voluntary collaboration between your organization and the Entergy Arkansas-sponsored Commercial Point of Purchase Solutions Energy Efficiency Program. The terms below list the general commitments of the participant in order to improve the energy efficiency of your organization.

To participate in this program, you will need to understand and agree to these terms:

1. The program will provide incentive funds (in the form of a direct discount from the participating supplier) for eligible energy-saving products to be installed by the participant within facilities served by Entergy Arkansas. Installation address must be provided.
2. Participant will promptly install all energy-saving products purchased for their facilities within 30 days of the purchase date of the energy-saving products. Repayment of incentives received may be requested for any products found not installed upon inspection 30 days following purchase.
   ☐ Please initial.
3. Participant will allow necessary post-inspections to be administered by the program for verification of installation of the energy-saving products and arrange for any necessary inspection/participant surveys to be administered by the program evaluator of record.
4. Participant acknowledges that, as part of its participation in this program, it will maintain eligibility to receive program services and incentives for a period of two years from the date the participant receives the discount for the purchase of energy-saving products installed at its organization.
5. If the individual signing this form is NOT the account holder, the signer acknowledges that he/she is authorized to make purchasing decisions on the account holder's behalf. All terms and conditions in this agreement apply regardless of who signs the agreement.

Disclaimer

The purchasing of eligible energy saving products from a participating supplier is the sole decision of the participant. The inclusion of a participating supplier for the program does not constitute an endorsement by Entergy Arkansas or CLEAResult of any product, individual or company. Eligible energy-saving products purchased by the participant from a participating supplier are not guaranteed or subject to any representation or warranty, either expressed or implied or otherwise, by either Entergy Arkansas or CLEAResult. Neither Entergy Arkansas nor CLEAResult makes any guarantee or any other representation or warranty, expressed or implied or otherwise, as to the quality, cost or effectiveness of any energy-saving product(s) provided by any participating supplier, by any such participating supplier's employees or subcontractors. Energy efficiency gains are subject to a number of variable conditions and circumstances. While it is the intent of the program to achieve energy efficiencies at the participant's organization, neither Entergy Arkansas nor CLEAResult guarantees or warrants that any specific energy efficiency gains will be achieved for a particular customer under the program.

Customer Acknowledgment

I acknowledge that by signing below I understand and agree to the terms listed above. I understand that I will be liable to pay back the participating supplier some (or all) of the discounted amount received for the products purchased if I decide not to proceed with the installation of all purchased products. Incentives will not be paid for products that have also been incentivized through a different program, or if the socket or fixture being replaced was incentivized prior to proposed replacement. I agree to allow my account information and data to be used by the program staff for the purposes of verifying program eligibility and reporting program data to Entergy Arkansas. I acknowledge that I have read and understand the above disclaimer.

By endorsing below, your organization accepts this agreement with Entergy Arkansas. If your organization wishes to end its participation in the program, it may do so at any time by providing the program administrator written notice of its intentions, subject to product installation status and incentives received as outlined above.

Account Holder Point of Contact (First and Last Name): _____

☐ Check if you are NOT the account holder, and see #5 above.

Account Holder Company Name: _____

Installation Location Address, City, State, ZIP: _____

Telephone: _____ Email: _____

SIGNATURE: _____ DATE: _____

Please fill in completely, sign and hand this form to your product supplier.

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarcommercialdiscounts.com.

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3.6.25 0123-EA-C&I- Lighting Incentives Flyer



Commercial Lighting Incentives

Save big with energy-efficient lighting.

The Entergy Arkansas Commercial Point of Purchase Solutions Program offers incentives at the time of purchase for specific high efficiency lighting equipment. Entergy Arkansas commercial customers can obtain the products through their normal purchasing methods, and incentives are processed through the lighting equipment supplier.

How to participate:

1. Find participating lighting product suppliers at **entergyarcommercialdiscounts.com**.
2. You'll need to sign a participation agreement, which your lighting supplier can provide. Signing the agreement enrolls you in the program and authorizes Entergy Arkansas to process the incentives for your purchase.
3. Purchase qualified lighting products from your supplier. The incentive amounts will be deducted automatically from the purchase price.
4. Install your lighting product within 30 days of the purchase date. One of our program representatives may contact you to verify installation.
5. Enjoy your lower energy costs.

With participating suppliers across the state, it's easier than ever to give your lighting an efficiency upgrade. Visit **entergyarcommercialdiscounts.com** to find the participating lighting supplier nearest to you.

Light up savings in your facility.

Did you know that lighting consumes 35% of a building's electricity? That's more than any other use.* Upgrading your lighting can mean years of energy savings—and Entergy Arkansas customers can save even more on high efficiency lighting products that use less energy and generate less heat.

*SOURCE: ENERGY STAR®

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Commercial Point of Purchase Solutions Incentive Amounts (per unit)

Lamps		Fixtures	
ENERGY STAR 19W/20	$8	DLC Troffer/Linear Ambient (5000-7499 lumens)	$10
ENERGY STAR 32W/30	$3	DLC Troffer/Linear Ambient (7500-9999 lumens)	$20
ENERGY STAR 59W/50	$5	DLC Troffer/Linear Ambient (10000-12000 lumens)	$25
ENERGY STAR A Lamps (2601-3400 lumens)	$1	DLC Lowbay LED Fixtures (10000-14999 lumens)	$35
ENERGY STAR A Lamps (1490 lumens)	$3	DLC Lowbay LED Fixtures (15000-19999 lumens)	$45
ENERGY STAR Globe	$3	DLC Highbay LED Fixtures (20000-24999 lumens)	$55
ENERGY STAR Candle/Decorative	$4	DLC Highbay LED Fixtures (25000-40000 lumens)	$75
ENERGY STAR Downlight Retrofit	$6	DLC LED Exterior (5000-9999 lumens)	$20
ENERGY STAR or DLC LED Linear Lamp, 3ft (600-2000 lumens)	$2	DLC LED Exterior (10000-19999 lumens)	$55
ENERGY STAR or DLC LED Linear Lamp, 4ft (2600-3900 lumens)	$2	DLC LED Exterior (20000-39999 lumens)	$65
ENERGY STAR or DLC LED Linear Lamp, 8ft (3800-6000 lumens)	$6	DLC LED Exterior (40000-64999 lumens)	$115
DLC LED TLS (2000-3900 lumens)	$3	DLC LED Parking Garage (5000-9999 lumens)	$20
DLC 4 Pin LED (6000-25000 lumens)	$3	DLC LED Parking Garage (10000-19999 lumens)	$75
		DLC LED Parking Garage (20000-39999 lumens)	$85

All items listed above must be DLC or ENERGY STAR certified.

LED Troffers – includes troffer luminaires, integrated and lamp-style retrofit kits.

LED Lowbay/Highbay – includes lowbay/highbay luminaires, retrofit kits and HID replacement lamps.

LED Parking Garage – includes parking garage luminaires, retrofit kits and HID replacement lamps.

LED Exterior – includes the following luminaires:

- *Outdoor pole/arm-mounted area, roadway and decorative luminaires.*
- *Outdoor full-cutoff wall-mounted area luminaires.*
- *Outdoor non-cutoff and semi-cutoff wall-mounted area luminaires.*
- *Fuel pump canopy luminaires.*
- *Landscape/accent flood and spot luminaires.*
- *Architectural flood and spot luminaires.*

→ **Questions?** Contact the Energy Efficiency Solutions Center at **877-212-2420** or **entergyarcommercialdiscounts.com**.

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3.6.26 Midstream Counter Display



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3.6.27 Business Solutions Participation Agreement



Business Solutions programs participation agreement

Entergy Solutions

Take control of your energy use.

Entergy Arkansas is proud to offer our commercial customers a suite of programs designed to help your organization save energy and lower costs. From big projects to small, we'll provide financial incentives, resources and expertise to help you achieve meaningful, long-term savings. The Large Commercial & Industrial program and the Small Business program are for commercial customers, and the CitySmart™/SCORE program is designed to improve public sector educational and municipal facilities.

Steps to participate:

1. Sign and submit this participation agreement to enroll. Please also submit a W-9 form as part of incentive payment requirements.
2. Work with the program administrator to determine which specific program your organization is eligible for and to discuss energy efficiency project opportunities.
3. Schedule your pre-installation inspection in order to allow the program administrator to quantify prospective energy savings.
4. Sign and submit a project application to define projects to be completed and to reserveincentive funds.
5. Complete projects defined in the project application, notify program administrator and schedule post-inspection as required.
6. Receive incentive dollars from Entergy Arkansas, and benefit from energy savings.
7. After completing the project and receiving incentives, you may be contacted by an independent evaluator to verify information gathered by the program and/or to review on-site equipment installation.

Organization: _____ Title: _____

First name: _____ Last name: _____

Project site address, city, state, ZIP: _____

Primary contact's address, city, state, ZIP: _____

Telephone: _____ Email: _____

Account number:* _____ Tax ID: _____

*If more than one account number, please provide a separate list of buildings, physical addresses and account numbers.

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com.

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Standard terms and conditions for participating customers

This agreement should be signed by your organization's director, president or similar executive and will remain valid until the program implementor is provided with written notice of your organization's intent to end participation.

SIGNATURE: _____ DATE: _____

Please sign and email to the appropriate contact below.
If electronic submission is unavailable, please fax to 866-420-4450.

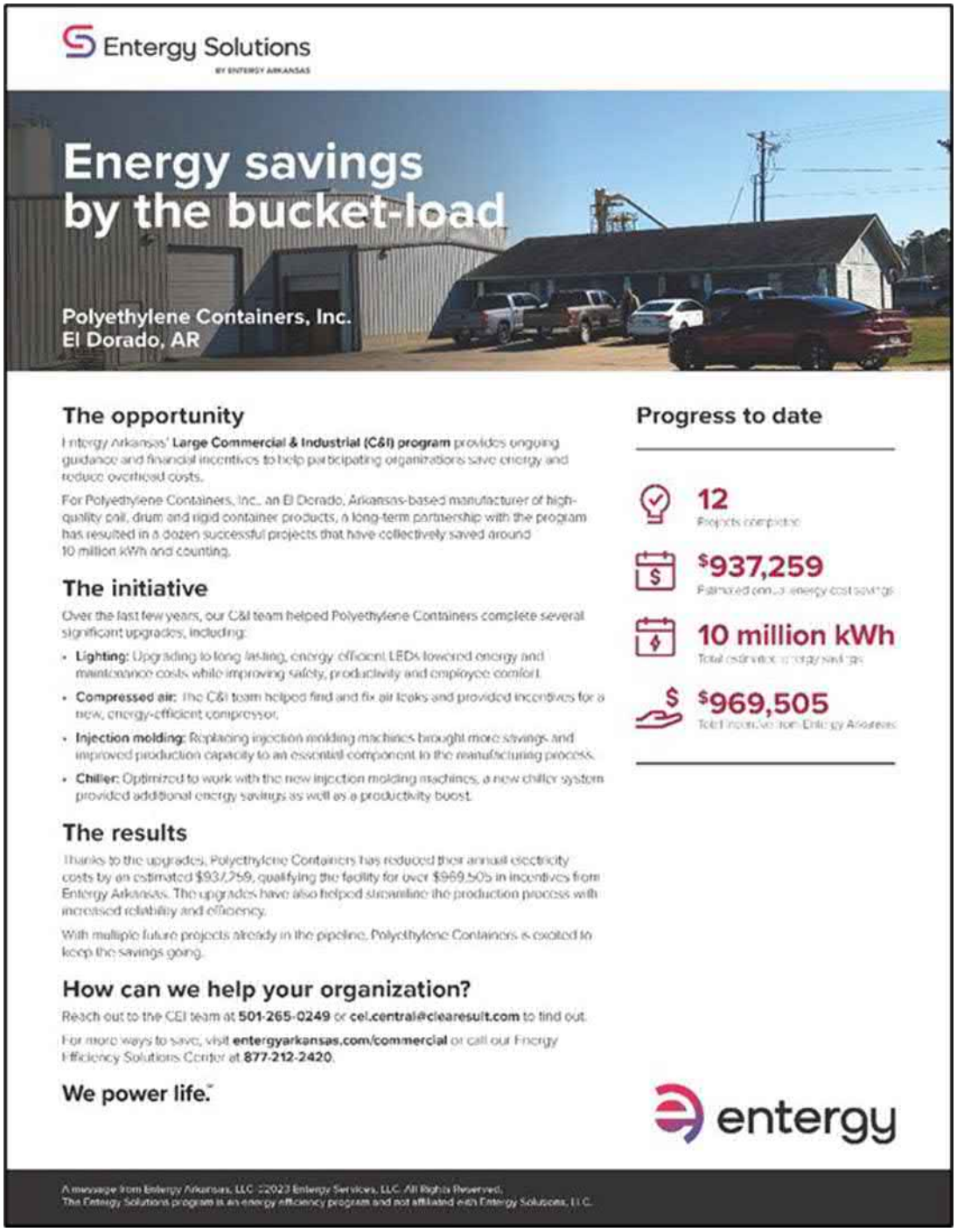
Contact: Trade Ally Specialist
taosupport@clearesult.com
501-221-4021

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3.6.28 Large C&I Case Study Polyethylene Containers



Entergy Solutions
BY ENTERGY ARKANSAS

Energy savings by the bucket-load

Polyethylene Containers, Inc.
El Dorado, AR

The opportunity

Entergy Arkansas' **Large Commercial & Industrial (C&I) program** provides ongoing guidance and financial incentives to help participating organizations save energy and reduce overhead costs.

For Polyethylene Containers, Inc., an El Dorado, Arkansas-based manufacturer of high-quality pail, drum and rigid container products, a long-term partnership with the program has resulted in a dozen successful projects that have collectively saved around 10 million kWh and counting.

The initiative

Over the last few years, our C&I team helped Polyethylene Containers complete several significant upgrades, including:

- **Lighting:** Upgrading to long-lasting, energy-efficient LEDs lowered energy and maintenance costs while improving safety, productivity and employee comfort.
- **Compressed air:** The C&I team helped find and fix air leaks and provided incentives for a new, energy-efficient compressor.
- **Injection molding:** Replacing injection molding machines brought more savings and improved production capacity to an essential component in the manufacturing process.
- **Chiller:** Optimized to work with the new injection molding machines, a new chiller system provided additional energy savings as well as a productivity boost.

The results

Thanks to the upgrades, Polyethylene Containers has reduced their annual electricity costs by an estimated $937,259, qualifying the facility for over $969,505 in incentives from Entergy Arkansas. The upgrades have also helped streamline the production process with increased reliability and efficiency.

With multiple future projects already in the pipeline, Polyethylene Containers is excited to keep the savings going.

How can we help your organization?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com** to find out.

For more ways to save, visit **entergyarkansas.com/commercial** or call our Energy Efficiency Solutions Center at **877-212-2420**.

We power life.™

Progress to date

12
Projects completed

$937,259
Estimated annual energy cost savings

10 million kWh
Total estimated energy savings

$969,505
Total incentives from Entergy Arkansas

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3.6.29 Large C&I Case Study Bryant High School



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3.6.29 Large C&I Case Study Georg Fischer Harvel

Entergy Solutions



Georg Fischer Harvel

The opportunity

Entergy Arkansas' Continuous Energy Improvement (CEI) initiative helps select facilities achieve lasting energy cost savings through simple low- and no-cost improvements. Focusing on behavioral and operational changes, our CEI team offers personalized, step-by-step guidance, resources and processing of incentives paid by Entergy Arkansas to embed energy efficiency into your organization's culture. For Georg Fischer Harvel, a global piping manufacturer with a large facility in Little Rock, the goals of CEI aligned perfectly with the company's long-term commitment to sustainability.

The initiative

During an initial walk-through assessment of Georg Fischer Harvel's Little Rock facility, the Entergy Arkansas CEI team recommended several low- and no-cost energy efficiency improvements.

Completed improvements included:

- **Using leaf blowers** instead of compressed air to blow away dust and debris.
- **Sealing compressed air leaks** to reduce energy waste and improve efficiency.
- **Optimizing new products** for long-term reliability, limited waste and maximum throughput.
- **Installing** motion sensors for office lighting.
- **Upgrading to LED fixtures** to improve efficiency, light quality and safety.
- **Turning off extrusion grinders** at night to save energy and extend equipment life.
- **Scheduling machines** to run according to production needs and not idle excessively.

Progress to date

7.76%
Reduction in overall electricity use

$62,686
Estimated annual cost savings

937,012 kWh
Estimated annual energy savings

$18,740
Estimated annual incentive

"This has been an important catalyst to help Georg Fischer Harvel exceed our corporate sustainability targets. We look forward to our continued partnership with Entergy Arkansas."

–Marcus Waters, Energy Champion
Georg Fischer Harvel

The results

Thanks to their improvements, the facility has reduced its overall electricity use by **7.76%**, resulting in around **$62,686** in savings on annual utility costs and **$18,740** worth of incentives from Entergy Arkansas.

Questions?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com**. For all the ways we can help your business save, visit **entergyarkansas.com/commercial** or call our Energy Efficiency Solutions Center at **877-212-2420**.

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3.6.30 Large C&I Case Study 3M

Entergy Solutions



3M Little Rock

The opportunity

Entergy Arkansas' Continuous Energy Improvement (CEI) initiative helps select facilities achieve lasting energy cost savings through simple low- and no-cost improvements. Focusing on behavioral and operational changes, our CEI team offers personalized, step-by-step guidance, resources and yearly incentives to embed energy efficiency into your organization's culture. For large commercial and industrial facilities like 3M Company's plant in Little Rock, those energy-saving enhancements can also lead to significant improvements in productivity, employee comfort and, ultimately, your bottom line.

The initiative

The 3M Little Rock plant manufactures colored and specialty roofing granules for the asphalt shingle industry. After an initial walk-through with maintenance staff, the Entergy Arkansas CEI team helped identify, prioritize and implement a series of no-cost, energy-saving improvements.

Completed improvements included:

- **Production schedule changes** reduced the need for frequent cleanings, leading to dramatic improvements in energy efficiency and productivity.
- **Bag house timing adjustments** increased the intervals between bag cleanings, saving energy from the air compressor system while reducing wear and tear on equipment and filters.
- **Consolidating partially loaded equipment,** like refrigerators and air conditioners, reduced unnecessary energy waste.
- **Optimizing exterior lighting timing** saves energy during the day and extends the life of the lights.
- **Shutting down idling conveyors** during lunch and other periods of inactivity saved energy, extended the life of the conveyor motors and increased safety.
- **Sealing compressed air leaks** reduced energy waste and improved the efficiency of the air compressor system.

As items were completed throughout the year, new opportunities were identified and added to the list for an ongoing energy-saving strategy.

Project at a glance

8.27%
Reduction in overall electricity use

$119,334
Estimated annual cost savings

$1,783,767 kWh
Estimated annual energy savings

$35,675
Estimated annual incentive

"At 3M Little Rock, we are identifying the baseline of our process, putting behind old cultural ways and changing with today's standards."

–Richard Holmes
Electrical Systems Engineer, 3M

The results

All told, the improvements have reduced the facility's overall electricity use by an incredible **8.27%**—saving an estimated **$119,334** a year in energy costs. In addition to the cost savings, the facility is set to earn an estimated **$35,675** a year in Entergy Arkansas incentives.

Questions?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com**. For all the ways we can help your business save, visit **entergyarkansas.com/commercial** or call our Energy Efficiency Solutions Center at **877-212-2420**.

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3.6.31 Large C&I Case Study UACC Morrilton



Entergy Solutions

University of Arkansas Community College at Morrilton

The opportunity

Entergy Arkansas' Continuous Energy Improvement (CEI) initiative helps qualified facilities achieve lasting energy cost savings through simple, low- and no-cost improvements. Focusing on behavioral and operational changes, our CEI team offers personalized, step-by-step guidance, resources and yearly incentives to embed energy efficiency into your organization's culture. Available to schools, governments and municipalities through our CitySmart Program, CEI recently helped the University of Arkansas Community College at Morrilton lower their overall electricity use by 9.89%.

The initiative

Starting with an engineering walk-through of the school's facilities, the CEI team identified several no-cost actions the school staff could take to save energy when the facilities were less occupied.

Ongoing improvements include:

- **Adjusting HVAC schedules** to increase building setpoints on nights and weekends when buildings were unoccupied.
- **Implementing a shutdown checklist** for staff to use when closing buildings for the evenings and weekends.
- **Organizing staff walk-throughs** before long holiday breaks to ensure equipment is turned off and/or unplugged.

The results

The 16 participating facilities saw their electricity use drop by an average of **9.89%**, with some individual facilities saving **as much as 20%**. In financial terms, the improvements are saving UACCM an annual **$14,353** in energy costs and earning them another **$3,377 a year** in incentives from Entergy Arkansas.

Progress to date

9.89%
Reduction in overall electricity use

$14,353
Estimated annual cost savings

168,859 kWh
Estimated annual energy savings

$3,377
Estimated annual incentive

"I'm excited to see the campus embrace this effort. Not only is it the right thing to do, but it also allows us to use some of the money we have saved to do even more projects."

–Allen Holloway, Director of Facilities, UACCM

"We are very happy for UACCM for their commitment to energy improvement."

–Kenny Muhammad, Customer Service Manager, Entergy Arkansas

Questions?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com**. For all the ways we can help your business save, visit **entergyarkansas.com/citysmart** or call our Energy Efficiency Solutions Center at **877-212-2420**.

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3.6.32 Large C&I Case Study Georgia-Pacific Crossett

Entergy Solutions



Georgia-Pacific Crossett

The opportunity

Georgia-Pacific Crossett is one of the world's leading makers of tissue, pulp, paper, packaging, building products, and related chemicals and has been a vital part of the Arkansas community for over 100 years. In 2012, Entergy Arkansas began working with the Crossett facility to determine how energy efficiency could be improved on site, with a focus on lighting, compressed air, pumps and other large motors used in the manufacturing process.

The project

Working with the Large Commercial & Industrial Program team, Georgia-Pacific was able to secure funding for improvements, engineering support for recommended upgrades and technical guidance to improve its overall energy efficiency. Measures undertaken included a retrofit of its exterior lighting system, various pump upgrades and improving different processes throughout the facility to reduce energy usage.

Project at a glance

46,765,037
Annual kWh savings

5,343
Annual kW reduction

$1,870,601
Estimated annual savings

1.2 years
Payback period

The results

As a result of the upgrades, Georgia-Pacific improved the appearance, comfort and energy efficiency of its facility, resulting in savings of **46,765,037 kWh** and **$1,870,601**. Thanks to these energy cost savings and an incentive from Entergy Arkansas, the retrofit will pay for itself in just over one year. The energy savings are equivalent to the carbon sequestered by 13,824 acres of U.S. forests in one year.

Questions?

To learn more about how the Large Commercial & Industrial Program could help your business, contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial**.

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3.6.33 Large C&I Case Study Molex



Entergy Solutions

Phillips-Medisize, a Molex company

The opportunity

Phillips-Medisize, a Molex company, is a global leader in front-end design, development and manufacturing solutions for industries such as pharma, in vitro diagnostics, med tech, consumer, automotive and defense. Since large companies like Molex use a lot of energy, even small changes can have a big impact.

Entergy Arkansas' Continuous Energy Improvement (CEI) initiative helps select facilities achieve lasting energy cost savings through simple low- and no-cost improvements. Focusing on behavioral and operational changes, our CEI team offers personalized, step-by-step guidance, resources and yearly incentives to embed energy efficiency into your organization's culture.

The initiative

Beginning in November 2019, the Entergy Arkansas CEI team has worked with the Molex team in Maumelle to identify, prioritize and implement a series of no-cost, energy-saving improvements.

Completed improvements included:

- **Installing occupancy sensors** in infrequently occupied areas, such as offices and storage rooms, to save energy around the clock.
- **Consolidating idling equipment** to reduce unnecessary energy waste.
- **Adjusting building temperature setpoints** to help match building occupancy and boost comfort and efficiency.
- **Repairing compressed air leaks** to reduce energy waste and improve the efficiency of the air compressor system.
- **Turning off exterior lighting during the day** to save energy and extend the life of lights.
- **Scheduling chilled water pump speeds** according to outside temperatures to optimize energy use and setting air dampers to adjust for seasonality.
- **Hosting employee engagement events** using Entergy Arkansas Energy Efficiency Kits to help employees learn how saving energy at home correlates to work.

Project at a glance

$1,000,000
Estimated total energy cost savings

15,000,000 kWh
Estimated annual energy savings

$300,426
Estimated incentive

"Working with the Entergy Solutions program has been an exciting and beneficial experience for myself personally and professionally. The CEI coaching, workshops and energy audits have all resulted in my company being more energy efficient and sustainable, while encouraging our employees to be more engaged."

–Leland Anderson,
site CEI Energy Champion

The results

Molex qualified for an estimated **$300,426** in total incentives from Entergy Arkansas. All told, the improvements have reduced the site's overall energy usage by **15 million kWh**—which equates to an estimated **$1,000,000 saved in energy costs**. These accomplishments will also allow Molex to pursue additional energy savings projects in the upcoming years.

Questions?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com**.
For all the ways we can help your business save, visit **entergyarkansas.com/commercial** or call our Energy Efficiency Solutions Center at **877-212-2420**.

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3.6.34 Large C&I Case Study Crain Automotive

Entergy Solutions



Crain Automotive

The opportunity

With 17 locations across Arkansas, the Crain Automotive team has enormous potential for energy savings. Like in most dealerships, bright and inviting lighting is essential to attracting business from the road and maintaining a safe and welcoming atmosphere. So Crain partnered with the Entergy Arkansas Large Commercial & Industrial Program to identify and secure generous incentives for energy-efficient lighting upgrades.

The project

Over four years, Entergy Arkansas has helped Crain plan, fund and complete interior and exterior LED lighting upgrades in seven of its dealership locations. They also teamed up to replace the HVAC system in their Little Rock office building. To help cover the cost of the projects, Entergy Arkansas provided Crain with nearly half a million dollars in incentives.

Project at a glance

3,108,781
Annual kWh savings

$310,908
Estimated annual savings

$459,774
Total project incentive

3.25 years
Payback period

The results

Altogether, the upgrades are expected to drive significant savings for years to come. Thanks to more than **$310,000** in estimated annual energy cost savings, Crain will see a return on their investment in just over three years. On top of the cost savings, the LED upgrades also have made the dealerships brighter, safer and more welcoming for customers and employees.

Questions?

Contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial.**

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3.6.35 Large C&I Case Study Prime Line

Entergy Solutions



The opportunity

Prime-Line, a Malvern-based manufacturer of construction products, was looking to reduce heat, humidity and machinery emissions in its facility. With this in mind, the manufacturer decided to work with Entergy Arkansas to complete a ventilation upgrade project.

The project

Thermavent natural ventilation was installed to reduce internal building temperature without the use of a large HVAC system. Situated on the roof, the system allows excess heat from the product lines to flow naturally out of the facility through the open bay doors. That not only reduces interior heat and humidity, but also provides a manageable and comfortable working environment through all four seasons.

Project at a glance

495,267
Annual kWh savings

$88,590
Incentives paid

$34,770
Estimated annual savings

.85 years
Payback period

The results

The project is estimated to save Prime-Line **$34,770** annually in energy costs. The manufacturer received a total of **$88,590** in incentives from Entergy Arkansas, greatly offsetting the project cost and putting the payback period at only 0.85 years (or just over 10 months). It wasn't just financial savings that Prime-Line received. The manufacturer has saved **495,267 kWh** annually, which is equivalent to the greenhouse gas emissions from 834,185 miles driven by an average passenger vehicle or the CO^2 emissions from 36.8 homes' energy use for one year, according to U.S. Environmental Protection Agency calculations. The company is so pleased with these results it already has further projects planned, including new construction, a CoolSaver℠ A/C Tune-up and a compressed air installation.

Questions?

To learn more about the Large Commercial & Industrial Program, contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial**.

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3.6.36 Large C&I Case Study Schulze & Burch Biscuit Co.

Entergy Solutions



Schulze & Burch Biscuit Co.

The opportunity

While Schulze & Burch Biscuit Company has always been recognized as being a pioneer and innovator in baking technology, now it also will be known for its highly efficient facility and commitment to energy efficiency. When Director of Technical Services Alan Freeland was introduced to the Large Commercial & Industrial Program, he took a comprehensive approach to ensure every benefit of the program was realized.

The project

Schulze & Burch began working with program staff in 2012 to identify energy efficiency opportunities and available incentives, and decided to take a comprehensive approach. Freeland moved forward with upgrades to the facility's lighting, air compressor, high pressure low volume fans and building envelope. The initial project proved so successful, Schulze & Burch was able to reinvest the savings into additional improvements to the facility's lighting controls, interior and exterior lighting, and HVAC equipment.

Project at a glance

254.1
Total peak kW reduction

3,601,740
Total kWh reduction

$252,122
Estimated annual savings

$652,082
Total project incentive

1.29 years
Payback period

The results

Thanks to the massive reduction in energy costs and generous incentives from Entergy Arkansas, the projects more than paid off — and will keep doing so for years to come. Not only are the upgrades saving the company an extra **$252,122** every year, they also helped the Schulze & Burch facility become a brighter, safer, more comfortable and more productive place to work.

Questions?

To learn more about the Large Commercial & Industrial Program, contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/commercial**.

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3.7 Small Business Solutions
3.7.1 Small Business Solutions Program Manual 2023

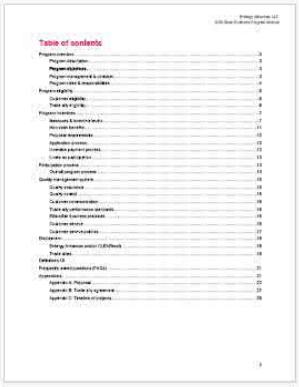

Entergy Solutions

2023 Program Manual
Small Business

Prepared by:
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Little Rock, AR 72202
Contact: Ashley Scott
Phone: 501-221-4010
Email: ascott@CLEAResult.com

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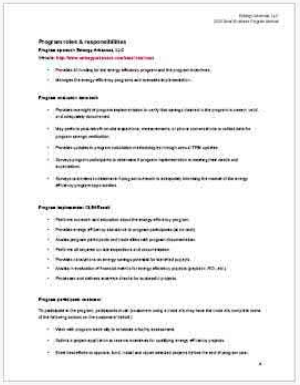

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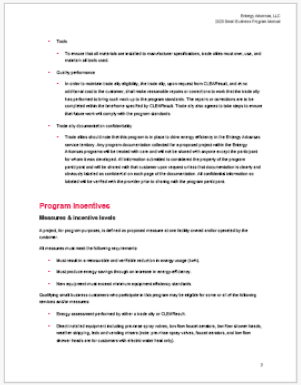

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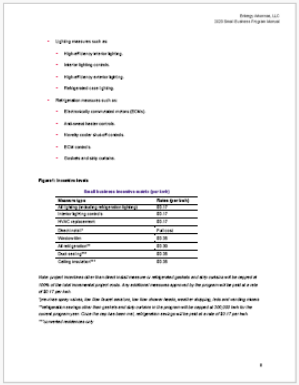
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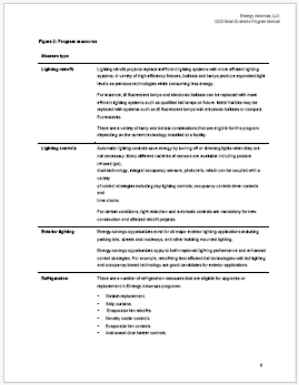
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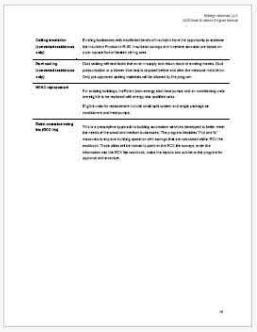
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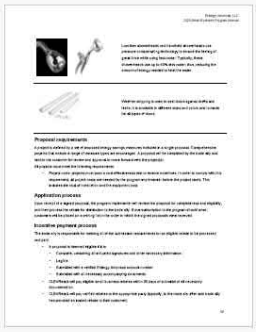

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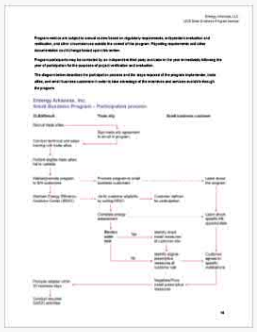
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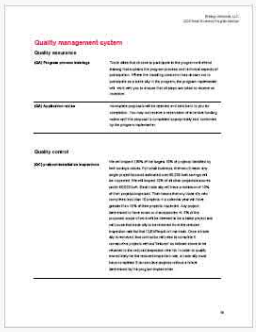

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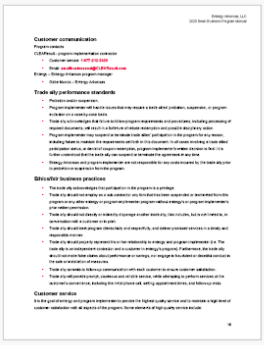

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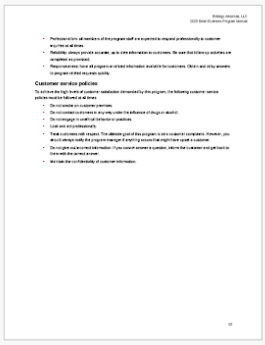

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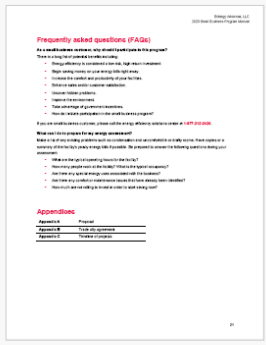

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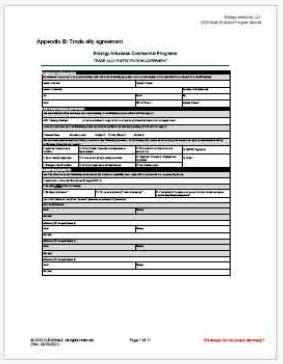

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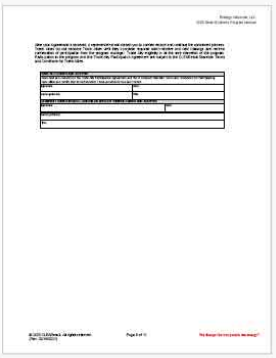

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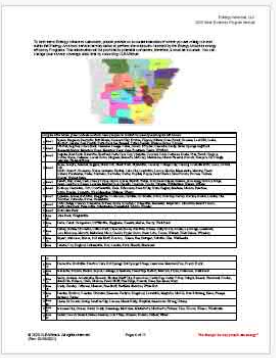

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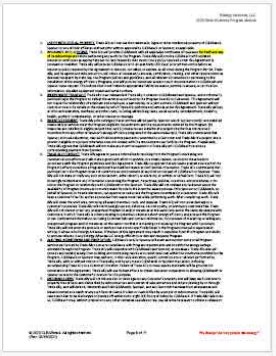

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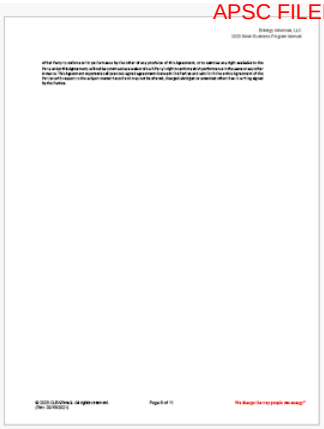

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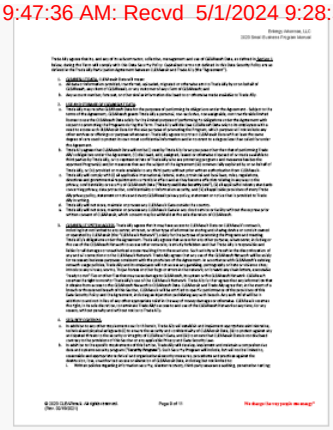

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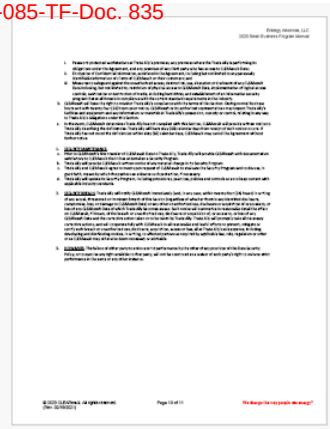
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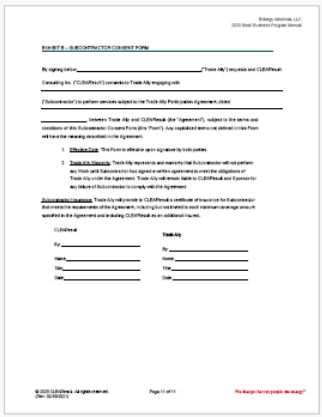
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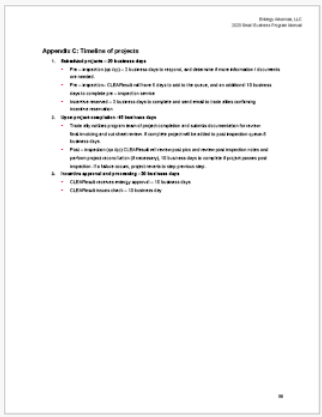
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3.7.2 2023-Fact Sheet_Flyers-Overview-Flyer_CLEAN



Entergy Solutions

Small Business Energy Solutions Program

The Small Business Energy Solutions Program helps business owners like you understand why and when energy efficiency upgrades make good financial sense. Our trade allies will work with you to develop and implement a plan to improve your business's energy efficiency, comfort, health, safety and more.

We'll help you

- Improve the efficiency and performance of your facility.
- Achieve significant, long-term energy savings.
- Earn incentives to help offset the cost of energy efficiency upgrades.

Benefits

- Financial incentives.
- Reduced energy costs and non-energy related impacts.
- Access to trade ally network.
- No-cost walk-through energy assessment and energy efficiency product installations including:
  - Showerheads.
  - Low-flow aerators.
  - Pre-rinse spray valves (electric water heater customers only).
  - LEDs.
- Weather stripping.

Who is eligible?

Small business customers with a valid Entergy Arkansas account and less than 100kW peak demand over the past 12 months are eligible.

How to participate

1. Call the Energy Efficiency Solutions Center at 877-212-2420 to speak to a program representative and to be provided a list of trade allies.
2. Your trade ally will contact you to schedule a walk-through energy assessment of your facility.
3. Upon your approval, your trade ally will install the energy-saving improvements identified.
4. Receive instant rebates from your trade ally.

Program incentives

The most common energy efficiency upgrades in small businesses are listed below.

Small business incentive rates (per kWh)	
Lighting/lighting controls	$0.11
Direct install	Full cost
Refrigeration*	$0.30
Duct sealing (converted businesses only)	$0.35
Ceiling insulation (converted businesses only)	$0.25
HVAC replacement	$0.17

*Total savings allocation for refrigeration savings will be capped at 300,000 kWh for the 2023 program year.

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/smallbusiness.

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Eligible upgrades

Upgrade	Description
Lighting retrofit	Lighting retrofit projects replacing inefficient lighting systems with more efficient ones are eligible. An example is linear fluorescent systems being replaced with LED lamps or metal halides with T5 fluorescent bulbs. A variety of lamp and ballast combinations are eligible for this program, depending on the current technology installed at a facility.
Lighting controls	Automatic lighting controls save energy by turning off or dimming lights when they are not needed. Available sensors include passive infrared (just technology, integral occupancy sensors and photocells, which are used with controls that manage usage based on daylight hours, occupancy or with adjustable timers.
Exterior lighting	Energy can be saved on many major exterior lighting applications – including parking lots, streets and roadways, and other building-mounted lighting – by improving lighting performance, control strategies or both. An example would be retrofitting with LED lighting.
Refrigeration	Measures eligible for upgrades or replacement include evaporator fan upgrades to electronically commutated motors, anti-sweat heater controls and refrigerated door gaskets.
Direct install measures	The following direct install measures are eligible for upgrades or replacement: low-flow faucet aerators, pre-rinse spray valves, LEDs and weather stripping.
Ceiling insulation (converted buildings only)	Existing businesses with insufficient levels of insulation have the opportunity to increase the insulation R-value to R-30. Insulation savings and incentives are based per sq. ft. of heated ceiling area.
Duct sealing (converted buildings only)	Leaks can be sealed in supply and return ducts of existing businesses. Duct pressurization in a blower door test is required before and after measure installation. Only pre-approved sealing materials are permitted by the program.
HVAC replacement	Inefficient heat pumps and air conditioner units are eligible when replaced with efficient units in both existing buildings and new construction. Eligible units include small split-system and single-package air conditioner units and heat pumps.
CoolSaver™ A/C Tune-up*	In addition to lowering your facility's energy and maintenance costs, a CoolSaver A/C Tune-up is carefully designed to provide a cooler, more comfortable and more productive work environment. Plus, churches, restaurants and small office customers may qualify for additional energy-saving upgrades—including a smart thermostat.

*Please see the CoolSaver fact sheet for details on the CoolSaver measures and incentives made available under this program.

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/smallbusiness.

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3.7.3 2023-Fact Sheet_Flyers-convenience-stores_CLEAN

Entergy Solutions



Store up the savings

Achieve long-term energy savings at your convenience store

Reduce consumption, increase savings

It takes a lot of energy to run a convenience store. On average, refrigeration consumes about 40% of a store's energy use, while lighting consumes about 25%—combined, that's more than half of a store's energy use. Our energy efficiency programs offer solutions that can improve the efficiency of not only your refrigeration equipment, but also the lighting and HVAC systems in your facility.

Benefits of energy efficiency upgrades

- Boost your bottom line.
- Lower your energy costs.
- Improve comfort and safety in your store.
- Increase employee productivity.
- Lessen your store's impact on the environment.

Eligible measures

The following measures are available for incentives:

- Refrigeration
- Lighting
- HVAC systems

Participation is simple

1. Enroll in the Entergy Arkansas Small Business Program.
2. We'll perform an on-site inspection of your existing systems at no cost to you.
3. You'll receive customized project recommendations, tailored to your store's needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. The system upgrades will be installed.
6. You'll receive cash incentives for all qualifying completed projects.

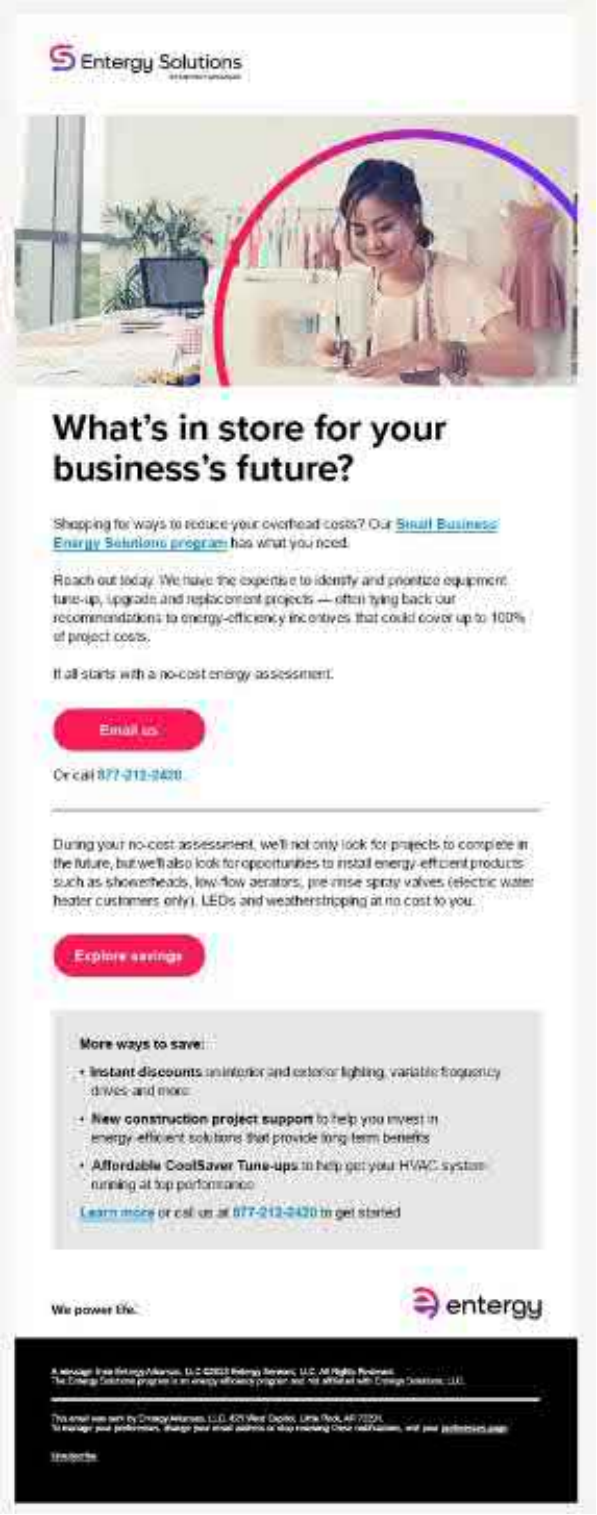
Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/smallbusiness.

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3.7.4 SBCI -Segmented Emails 2023 Retail



Entergy Solutions

What's in store for your business's future?

Shopping for ways to reduce your overhead costs? Our Small Business Energy Solutions program has what you need.

Reach out today. We have the expertise to identify and prioritize equipment tune-up, upgrade and replacement projects — often tying back our recommendations to energy-efficiency incentives that could cover up to 100% of project costs.

It all starts with a no-cost energy assessment.

Email us

Or call 877-213-2420

During your no-cost assessment, we'll not only look for projects to complete in the future, but we'll also look for opportunities to install energy-efficient products such as showerheads, low-flow aerators, pre-rinse spray valves (electric water heater customers only), LEDs and weatherstripping at no cost to you.

Explore savings

More ways to save:

- **Instant discounts** on interior and exterior lighting, variable frequency drives and more
- **New construction project support** to help you invest in energy-efficient solutions that provide long-term benefits
- **Affordable CoolSaver Tune-ups** to help get your HVAC system running at top performance

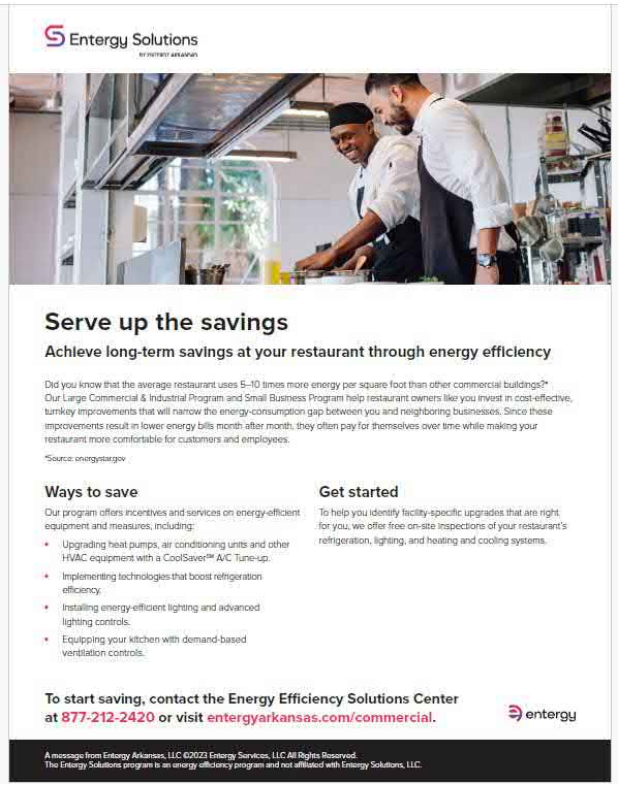
Learn more or call us at 877-213-2420 to get started

We power life.

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3.7.5 2023-Fact Sheet_Flyers-restaurant



Entergy Solutions

Serve up the savings

Achieve long-term savings at your restaurant through energy efficiency

Did you know that the average restaurant uses 5–10 times more energy per square foot than other commercial buildings?* Our Large Commercial & Industrial Program and Small Business Program help restaurant owners like you invest in cost-effective, turnkey improvements that will narrow the energy-consumption gap between you and neighboring businesses. Since these improvements result in lower energy bills month after month, they often pay for themselves over time while making your restaurant more comfortable for customers and employees.

*Source: energystar.gov

Ways to save

Our program offers incentives and services on energy-efficient equipment and measures, including:

- Upgrading heat pumps, air conditioning units and other HVAC equipment with a CoolSaver™ A/C Tune-up.
- Implementing technologies that boost refrigeration efficiency.
- Installing energy-efficient lighting and advanced lighting controls.
- Equipping your kitchen with demand-based ventilation controls.

Get started

To help you identify facility-specific upgrades that are right for you, we offer free on-site inspections of your restaurant's refrigeration, lighting, and heating and cooling systems.

To start saving, contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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Available incentives

Some of the energy-saving measures eligible for incentives under the program include:

Upgrade	Estimated annual electricity savings (kWh)	Estimated annual energy cost savings
Refrigeration		
Installing an anti-sweat heater control on a refrigerated display case with five doors.	2,737	$246
Equipping a 3' x 7' freezer or refrigerator door with a strip curtain.	3,375	$304
Installing an energy-efficient reach-in case cooler.	4,604	$414
Installing a refrigerator door gasket.	1,192	$107
HVAC controls		
Installing hood controls in your kitchen.	4,227	$380
Upgrading to SEER 16 or better HVAC unit.		
Using controls for scheduling, set points, setbacks and improved occupant comfort.		
Lighting controls		
Installing a two-fixture fluorescent or LED occupancy sensor in one of your bathrooms.	68	$6
Lighting		
Replacing one 100-watt incandescent lamp in your freezer with a 9-watt LED.	367	$33
Replacing a four-lamp, four-foot T8 lighting fixture with two 18-watt LED tubes.	382	$33
Installing an energy-efficient exit sign.	353	$32
Other		
Installing an aerator that slows the flow of a faucet to 0.5 gallons per minute.	1,437	$129
Installing a pre-rinse spray valve that slows the water flow while maintaining pressure.	5,000	$450

Other energy-saving measures are also eligible for incentives, including high efficiency HVAC units, water heaters, gaskets and strip curtains.

To start saving, contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.8 Public Institutions Solutions
3.8.1 CitySmart Program Manual 2023



2023 Program Manual
CitySmart℠ – SCORE

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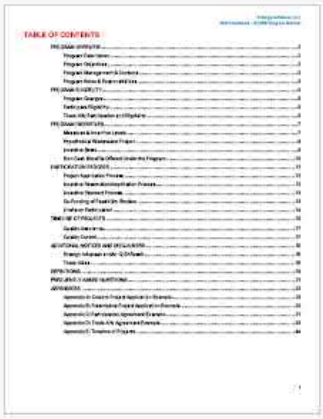
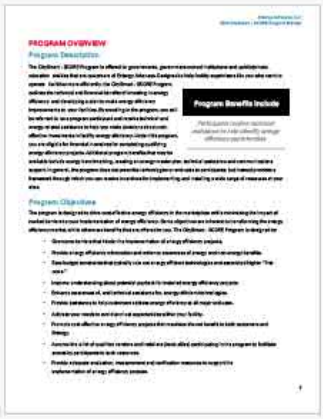


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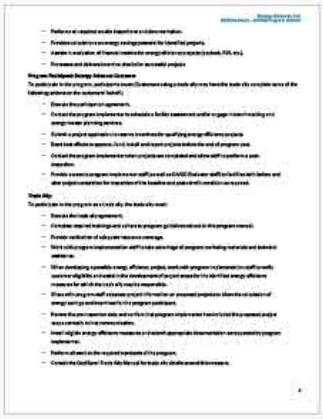
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Program Management & Contacts

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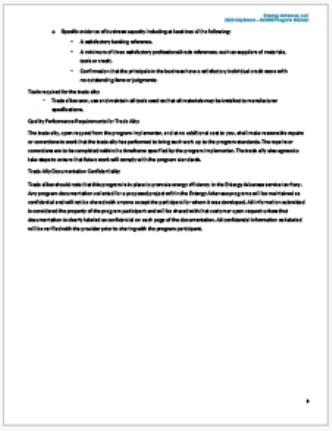
PROGRAM ELIGIBILITY

Program Changes

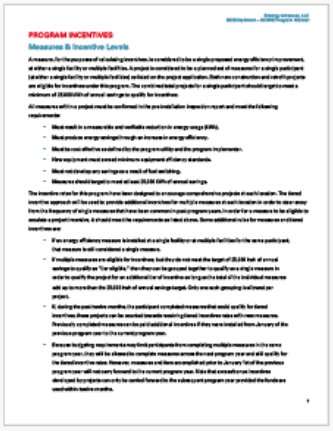
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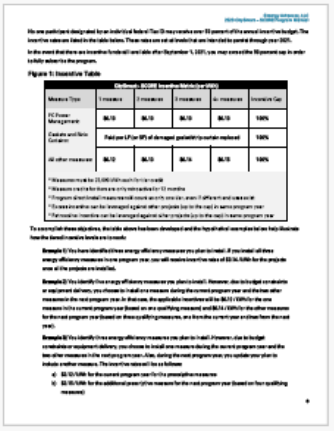
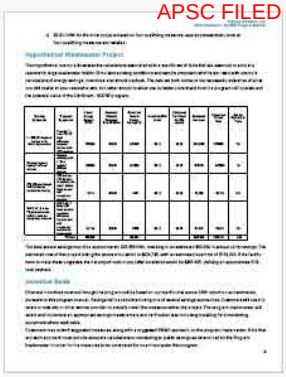


Figure 1: Incentive Table

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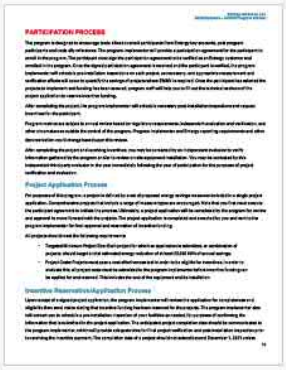
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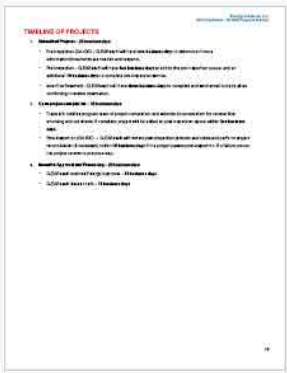
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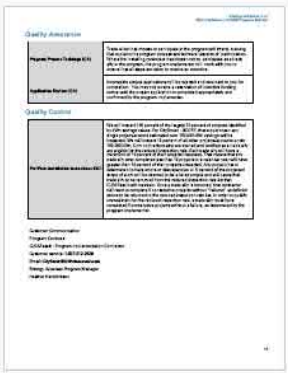
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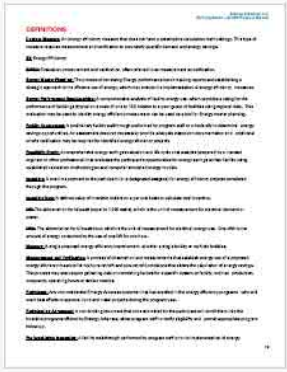
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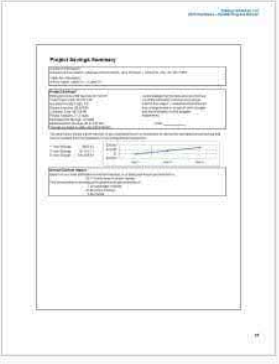
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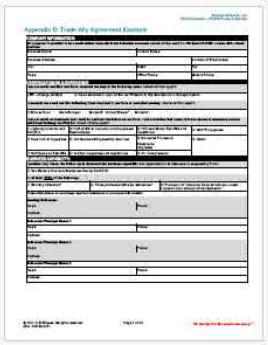


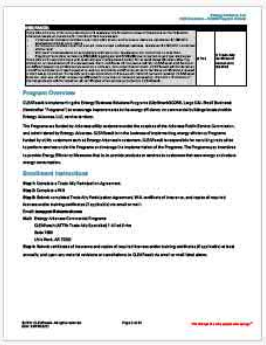
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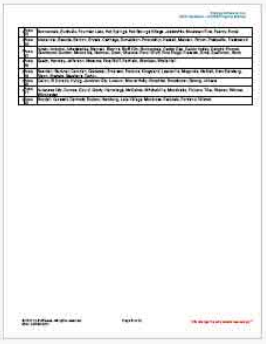
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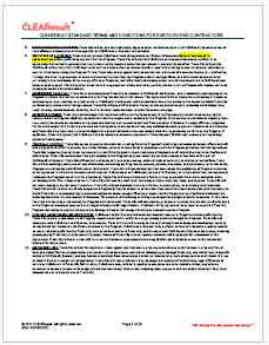

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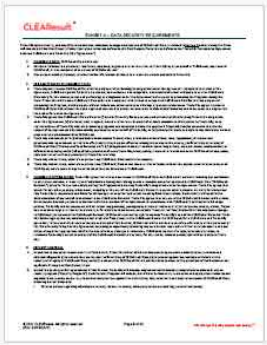

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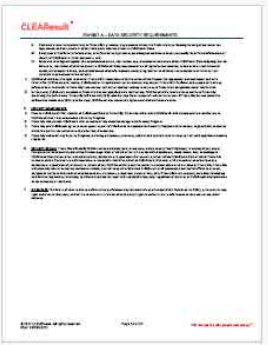

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3.8.2 2023-Fact Sheet_Flyers-benchmarking

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Entergy Solutions



Benchmarking

Understand your energy use

According to ENERGY STAR®, 30% of the energy consumed in commercial and industrial facilities is used inefficiently or unnecessarily.* Benchmarking your municipal building, school, university or commercial facility allows you to identify specific energy-wasting issues and pinpoint the most cost-effective ways to save energy and reduce energy costs.

Benefits

- Our no-cost benchmarking service compares your energy performance metrics to those of similar buildings and includes a prioritized list of projects to help you increase efficiency and reduce your monthly Entergy Arkansas bill.
- We also offer a no-cost energy master planning workshop to help stakeholders in your organization collaborate on short- and long-term plans for managing energy more effectively.
- After you've implemented one or more of the suggested energy efficiency improvements, we can perform re-benchmarking services at no cost so that you can measure your energy savings progress and continue improving the efficiency of your buildings.

How to participate

1. Call us at **877-212-2420** or visit **entergyarkansas.com/citysmart** to sign up.
2. Once you complete the registration process, a program representative will collect data from your building and provide a comprehensive benchmarking report. If you'd like to sign up for a no-cost energy master planning workshop, notify the program representative.
3. We can also provide you with contact details for Entergy Solutions trade allies, who are qualified to install the upgrades recommended in the benchmarking report.
4. Finally, you'll receive cash incentives for any qualified completed projects and be eligible to receive follow-up benchmarking services every two years. To request follow-up benchmarking, call us at **877-212-2420**.

Energy efficiency and benchmarking facts

Organizations that consistently subject their commercial buildings to energy benchmarking can reduce their energy bills by 7% over three years, according to the U.S. Environmental Protection Agency.

- New technologies and renewable energy sources have advanced and grown in popularity in recent years, but according to ENERGY STAR, energy efficiency remains the easiest and most cost-effective way to reduce energy consumption.

CitySmart | SCORE

Questions? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/citysmart.

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Entergy Solutions



CitySmart℠ Program for colleges

Join the CitySmart Program to identify energy-saving opportunities at your college and receive financial incentives toward energy efficiency upgrades. This program will not only help lower your energy use and costs, but also boost comfort and productivity on campus.

Eligible upgrades

The following upgrades are eligible for financial incentives:

HVAC systems

- Includes installing or replacing air conditioning units, heat pumps, demand-controlled ventilation systems and more.

Lighting

- Includes installing or replacing interior and exterior lighting systems in classrooms, hallways, offices, parking lots and between buildings.

Personal computer power management

- Helps control power use on campus.

How to participate

1. Contact us at **877-212-2420** or visit **entergyarkansas.com/citysmart** to enroll in the CitySmart Program.
2. We'll perform an on-site inspection of your institution's end-use energy systems at no cost to you.
3. You'll receive customized project recommendations tailored to your needs.
4. We will provide a list of qualified participating trade allies who are trained in the Entergy Arkansas energy efficiency programs.
5. You'll receive cash incentives for all qualifying completed projects.

College and university energy facts

- Lighting accounts for about 30% of the annual electricity consumed by educational facilities in the U.S.*
- HVAC makes up approximately 46% of the annual electricity consumed by educational institutions in the U.S.**
- Colleges and universities in the U.S. spend almost $14 billion per year on energy.*

*Source: U.S. Environmental Protection Agency
**Source: U.S. Energy Information Administration

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/commercial.

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3.8.4 Rebrand 2023-Fact Sheet_Flyers-K12 Fact Sheet_CLEAN

Entergy Solutions



Smart ideas for school savings

Energy efficiency is vital to helping balance school budgets. The nation's 17,450 K-12 school districts spend more than $5 billion annually on energy costs alone.

When districts implement energy-efficient improvements, they save up to 30% on their annual energy bills and also prevent harmful greenhouse gas emissions, which improves the learning environment.* It is estimated that $2 billion of that 30%—an amount equivalent to the cost of nearly 40 million new textbooks**—can be saved by improving energy efficiency through programs like the Entergy Arkansas CitySmart™ Program.

Lowering your Entergy bill is as easy as 1-2-3

Once you've enrolled in the CitySmart | SCORE Program, a program representative will perform an on-site inspection of your facility's end-use energy systems at no cost to you.

After determining which measures will achieve maximum savings, the program representative will compare the data gathered to industry standards. Such measures typically include interior and exterior lighting technologies, HVAC systems and computer power management.

Next, you will receive a customized list of recommendations. This list prioritizes projects that, if implemented, will increase efficiency and significantly reduce your Entergy bills.

If needed, we can provide a list of qualified trade allies enrolled in Entergy Arkansas' CitySmart | SCORE Program that can install the upgrades. Finally, you'll receive cash incentives for any qualified, completed projects.

K-12 energy facts

- A properly illuminated and ventilated environment is among the many factors that contribute to increased productivity in the classroom, which in turn affects performance and achievement.
- Typically, one-third of the energy used goes to waste largely due to outdated equipment and technology.
- Energy costs are a typical school district's second largest operating expense, after salaries. That's more than the cost of computers and textbooks combined.

Source: *U.S. EPA, 3. DOE 2008/09a DOE, Updates U.S. EPA, 2004b
Source: **energystar.gov

Ready to save? Contact the Energy Efficiency Solutions Center at 877-212-2420 or visit entergyarkansas.com/citysmart.

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3.8.5 2023 Case Study Little Rock CVB

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Entergy Solutions



Little Rock Convention & Visitors Bureau

The opportunity

Little Rock Convention & Visitors Bureau was looking to lower energy use in its Arkansas facility. The bureau reached out to Entergy Arkansas, having worked with the utility company before. During an energy audit, several lighting upgrade opportunities were identified. The bureau enrolled in the Entergy Arkansas CitySmart – SCORE Program to have the work completed.

The project

At the Little Rock Convention & Visitors Bureau facility, over 450 fixtures were replaced or installed during the project. The interior lighting retrofit consisted of replacing 1,000 W high bay metal halides—which were running 24/7—as well as metal halide troffers and high bay quartz fixtures all with LEDs. The facility also had advanced lighting controls installed, which will allow the building operator to schedule when the lights are running and to dim them when the space is unoccupied. Overall, 24% of the project savings came from these advanced lighting controls, a measure few customers choose to implement.

Project at a glance

1,195,884
Annual kWh savings

$167,423
Incentives paid

$95,670
Estimated annual savings

2.3 years
Payback period

The results

The project is estimated to save Little Rock Convention & Visitors Bureau **$95,670** annually. The bureau received **$167,423** in incentives from Entergy Arkansas, putting the payback period at 2.3 years. It saved **1,195,884 kWh** annually, which equates to the greenhouse gas emissions from 178 passenger vehicles driven for one year or the CO^2 emissions from 896,828 pounds of coal burned, according to U.S. Environmental Protection Agency calculations. Little Rock Convention & Visitors Bureau was so pleased with the results, it plans on completing additional interior and exterior lighting retrofits and phase two of the chiller plant optimization.

Questions?

To learn more about the CitySmart - SCORE Program, contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/citysmart**.

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Entergy Solutions



Pulaski County Special School District

The opportunity

To reduce costs and improve learning environments for students throughout the Pulaski County Special School District (PCSSD), administrators partnered with the staff of Entergy Arkansas CitySmart – SCORE Program to identify cost-effective ways to improve energy efficiency throughout the district.

The project

According to ENERGY STAR®, 60% of the computers and monitors at organizations such as K-12 schools are left on at night, and 40% of monitors are not enabled for power management. This results in energy waste that costs schools and other organizations about $750 million every year. To reduce energy costs associated with ineffective computer power management, PCSSD worked with Entergy Arkansas to install PC power management software at 25 schools throughout the district.

Project at a glance

2,357,094
Annual kWh savings

$190,714
Incentives paid

$188,567
Estimated annual savings

0 months
Payback period

The results

PCSSD now houses 1,444 laptops and 4,522 desktops that are equipped with power management software, which will save the district an estimated **$188,567** in energy costs each year. To help PCSSD finance the project, the CitySmart – SCORE Program provided over **$190,000** in cash incentives, which covered the entire cost of the upgrade.

Prior to this project, PCSSD worked with the CitySmart – SCORE Program staff to improve interior lighting quality and efficiency by replacing metal halide lighting fixtures with T-5 fixtures in 11 schools throughout the district. Exterior lighting is next for PCSSD: administrators plan to install energy-saving LED fixtures throughout the district.

Questions?

To learn more about the CitySmart – SCORE Program, contact the Energy Efficiency Solutions Center at **877-212-2420** or visit **entergyarkansas.com/citysmart**.

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3.8.6 2023 Case Study UACCM

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Entergy Solutions



University of Arkansas Community College at Morrilton

The opportunity

Entergy Arkansas' Continuous Energy Improvement (CEI) initiative helps qualified facilities achieve lasting energy cost savings through simple, low- and no-cost improvements. Focusing on behavioral and operational changes, our CEI team offers personalized, step-by-step guidance, resources and yearly incentives to embed energy efficiency into your organization's culture. Available to schools, governments and municipalities through our CitySmart Program, CEI recently helped the University of Arkansas Community College at Morrilton lower their overall electricity use by 9.89%.

The initiative

Starting with an engineering walk-through of the school's facilities, the CEI team identified several no-cost actions the school staff could take to save energy when the facilities were less occupied.

Ongoing improvements include:

- **Adjusting HVAC schedules** to increase building setpoints on nights and weekends when buildings were unoccupied.
- **Implementing a shutdown checklist** for staff to use when closing buildings for the evenings and weekends.
- **Organizing staff walk-throughs** before long holiday breaks to ensure equipment is turned off and/or unplugged.

The results

The 16 participating facilities saw their electricity use drop by an average of **9.89%**, with some individual facilities saving **as much as 20%**. In financial terms, the improvements are saving UACCM an annual **$14,353** in energy costs and earning them another **$3,377 a year** in incentives from Entergy Arkansas.

Progress to date

9.89%
Reduction in overall electricity use

$14,353
Estimated annual cost savings

168,859 kWh
Estimated annual energy savings

$3,377
Estimated annual incentive

"I'm excited to see the campus embrace this effort. Not only is it the right thing to do, but it also allows us to use some of the money we have saved to do even more projects."

–Allen Holloway, Director of Facilities, UACCM

"We are very happy for UACCM for their commitment to energy improvement."

–Kenny Muhammad, Customer Service Manager, Entergy Arkansas

Questions?

Reach out to the CEI team at **501-265-0249** or **cei.central@clearesult.com**. For all the ways we can help your business save, visit **entergyarkansas.com/citysmart** or call our Energy Efficiency Solutions Center at **877-212-2420**.

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3.8.7 CitySmart SCORE Flyer



ENTERGY ARKANSAS
CITYSMART℠ | SCORE PROGRAM

ENTERGY SOLUTIONS

Program overview

The CitySmart | SCORE Program is offered to institutional and public entities, including local state and federal governments, public/private schools and colleges in the Entergy Arkansas service area. The program helps facility supervisors understand the technical and financial benefits of investing in energy efficiency and develop an improvement plan. The program does not prescribe technologies or end uses, but instead provides a framework through which the participants can receive incentives for implementing and installing a wide range of measures at their sites.

Who is eligible?

Institutional and public entities that receive electric service from Entergy Arkansas, including:

- K-12 schools.
- Accredited higher education institutions.
- Local governments.
- State and federal governments.

What are the benefits?

- Financial incentives.
- Reduced energy costs.
- Energy performance benchmarking and master planning.
- Technical assistance.
- Communications support.
- No-additional-costs, directly installed measures (low-flow faucet aerators, pre-rinse spray valves, LEDs, vending misers and weather stripping).

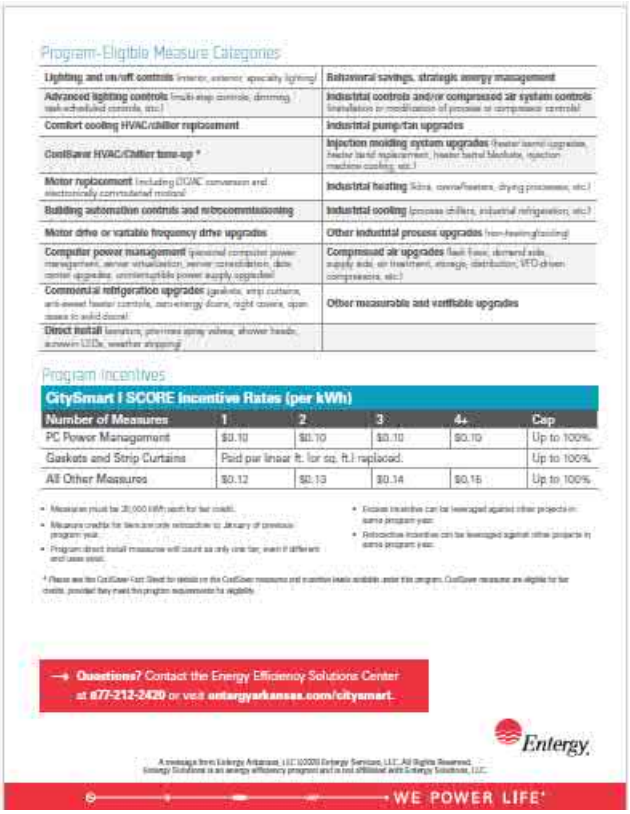
The CitySmart | SCORE Program will help you:

- Identify energy savings specific to your buildings.
- Prioritize a wide range of energy-conservation measures.
- Achieve significant, long-term electricity savings.
- Earn incentives for completing qualifying energy efficiency projects.

The process is simple:

1. **Start** — Sign your participation agreement.
2. **Pre-Inspection** — Program implementer pre-inspects and evaluates for energy-saving opportunities.
3. **Application** — Sign the project application.
4. **Install measures** — Participant has measures installed.
5. **Submit invoice** — Submit your project invoice.
6. **Post-Inspection** — Program implementer conducts post-inspection and finalizes calculations.
7. **Closeout** — Program implementer submits closeout documents.
8. **Receive check** — Receive your incentive check.

WE POWER LIFE®



Program-Eligible Measure Categories

Lighting and on/off controls (interior, exterior, specialty lighting)	**Behavioral savings, strategic energy management**
Advanced lighting controls (multi-step controls, dimming, task-scheduled controls, etc.)	**Industrial controls and/or compressed air system controls** (installation or modification of process or compressor controls)
Comfort cooling HVAC/chiller replacement	**Industrial pump/fan upgrades**
CoolSaver HVAC/Chiller tune-up *	**Injection molding system upgrades** (heater barrel upgrades, heater band replacement, heater band blankets, injection machine cooling, etc.)
Motor replacement (including ECM/AC conversion and electronically commutated motors)	**Industrial heating** (kilns, ovens/heaters, drying processes, etc.)
Building automation controls and retrocommissioning	**Industrial cooling** (process chillers, industrial refrigeration, etc.)
Motor drive or variable frequency drive upgrades	**Other industrial process upgrades** (non-heating/cooling)
Computer power management (personal computer power management, server virtualization, server consolidation, data center upgrades, uninterruptible power supply upgrades)	**Compressed air upgrades** (leak fixes, demand side, supply side, air treatment, storage, distribution, VFD-driven compressors, etc.)
Commercial refrigeration upgrades (gaskets, strip curtains, anti-sweat heater controls, zero-energy doors, night covers, open cases to solid doors)	**Other measurable and verifiable upgrades**
Direct install (aerators, pre-rinse spray valves, shower heads, screw-in LEDs, weather stripping)	

Program Incentives

CitySmart | SCORE incentive Rates (per kWh)

Number of Measures	1	2	3	4+	Cap
PC Power Management	$0.10	$0.10	$0.10	$0.10	Up to 100%
Gaskets and Strip Curtains	Paid per linear ft. for sq. ft.) replaced.				Up to 100%
All Other Measures	$0.12	$0.13	$0.14	$0.16	Up to 100%

- Measures must be 20,000 kWh each for tier credit.
- Measure credits for tiers are rate retroactive to January of previous program year.
- Program direct install measures will count as only one tier, even if different end uses exist.
- Excess incentive can be leveraged against other projects in same program year.
- Retroactive incentive can be leveraged against other projects in same program year.

* Please see the CoolSaver Fact Sheet for details on the CoolSaver measures and incentive levels available under this program. CoolSaver measures are eligible for tier credits, provided they meet the program requirements for eligibility.

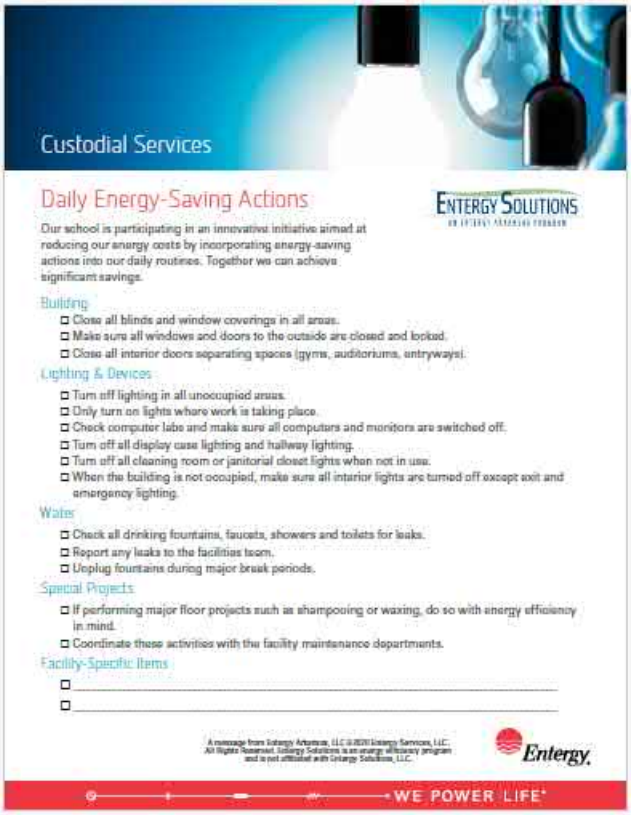
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3.8.8 Custodial Daily Shutdown Handout



Custodial Services

Daily Energy-Saving Actions

ENTERGY SOLUTIONS

Our school is participating in an innovative initiative aimed at reducing our energy costs by incorporating energy-saving actions into our daily routines. Together we can achieve significant savings.

Building

- ☐ Close all blinds and window coverings in all areas.
- ☐ Make sure all windows and doors to the outside are closed and locked.
- ☐ Close all interior doors separating spaces (gyms, auditoriums, entryways).

Lighting & Devices

- ☐ Turn off lighting in all unoccupied areas.
- ☐ Only turn on lights where work is taking place.
- ☐ Check computer labs and make sure all computers and monitors are switched off.
- ☐ Turn off all display case lighting and hallway lighting.
- ☐ Turn off all cleaning room or janitorial closet lights when not in use.
- ☐ When the building is not occupied, make sure all interior lights are turned off except exit and emergency lighting.

Water

- ☐ Check all drinking fountains, faucets, showers and toilets for leaks.
- ☐ Report any leaks to the facilities team.
- ☐ Unplug fountains during major break periods.

Special Projects

- ☐ If performing major floor projects such as shampooing or waxing, do so with energy efficiency in mind.
- ☐ Coordinate these activities with the facility maintenance departments.

Facility-Specific Items

- ☐ _____
- ☐ _____

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3.8.9 Food Svc Daily Shutdown Handout



Food Service

Daily Energy-Saving Actions

ENTERGY SOLUTIONS

Our school is participating in an innovative initiative aimed at reducing our energy costs by incorporating energy-saving actions into our daily routines. Together we can achieve significant savings.

Lighting

- ☐ Turn off walk-in cooler lights when not in use.
- ☐ Turn off all storage room and office lights when unoccupied.
- ☐ Turn off service area lights and table lights once service is complete.

Equipment

- ☐ Turn off open-air milk coolers when not in use.
- ☐ Turn off steam tables, warmers and coolers immediately after service.
- ☐ Turn off ovens and cooking equipment once cooking is complete.
- ☐ Turn off screens and POS systems after service.
- ☐ Consolidate cooler space and unplug any stand-up units not used.
- ☐ Shut off ice machines and drain during break times.
- ☐ Use exhaust fans only when cooking. Report any air returned to the space through the exhaust fan system. Air should be removed by the fan and not reintroduced to the space.

Water

- ☐ Ensure that faucets are turned off when not in use.
- ☐ Report any water leaks immediately.
- ☐ Ensure dishwashing equipment is only on when washing is active.

Facility-Specific Items

- ☐ _____
- ☐ _____
- ☐ _____

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3.8.10 Occupational Daily Shutdown Handout



Classroom

Daily Energy-Saving Actions

ENTERGY SOLUTIONS

Our school is participating in an innovative initiative aimed at reducing our energy costs by incorporating energy-saving actions into our daily routines. Together we can achieve significant savings.

A minute a day keeps our energy costs at bay.

- ☐ **Close window blinds.**

  Did you know? The sun radiates heat onto interior surfaces and increases air conditioning run time and cost. An air gap between windows and blinds acts as an insulating layer that prevents convection of hot or cold air and radiates both out at night.

- ☐ **Turn off ALL devices when not in use: display screen, computers, monitors, audio systems, printers, decorative lighting, desk or floor lamps, aquarium lights, cable boxes, TVs.**

  Did you know? Vampire, or phantom energy (energy used by devices when they are "off"), could account for 10 percent of residential electricity costs.

- ☐ **Close doors and windows.**

  Eliminating just four hours of unneeded lighting per day in 10 classrooms can equate to enough savings to feed three students lunch for the entire school year.

Can you incorporate energy efficiency into your lesson plans?

Engaging your students in these activities will encourage a culture of energy efficiency awareness in your classroom and beyond.

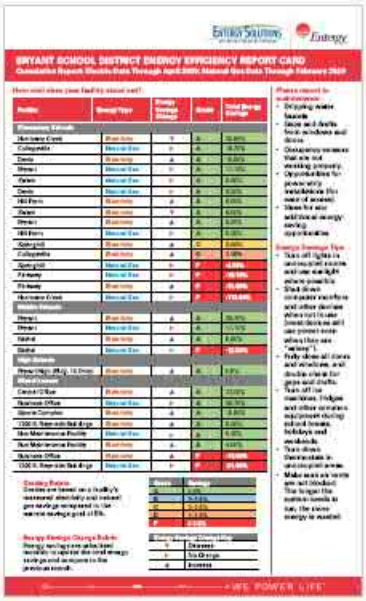
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Entergy.

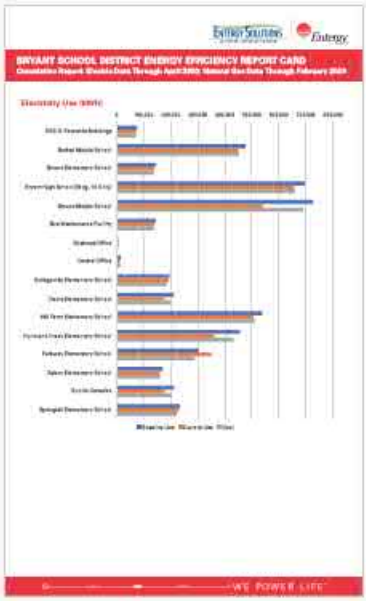
WE POWER LIFE®

3.8.11 EE Report Card- Old Brand

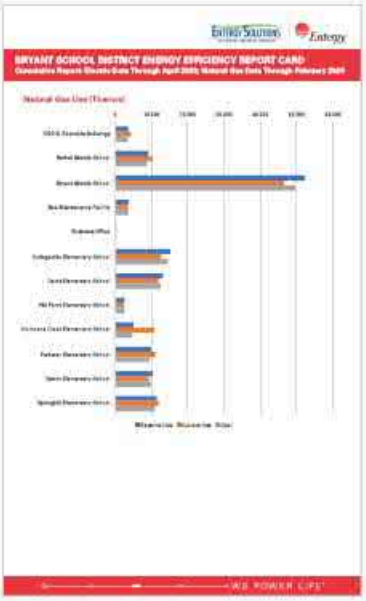
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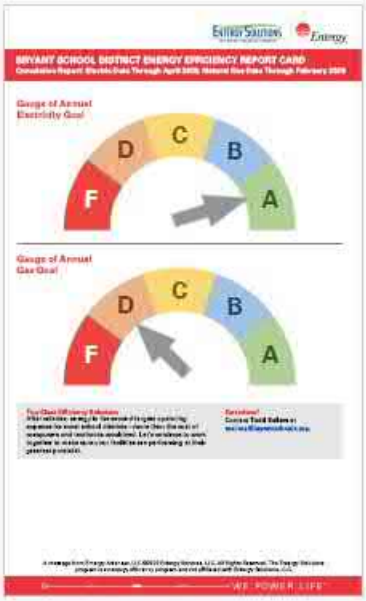
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3.8.12 2023 ECOTY Report Card

Entergy Solutions
BY ENTERGY ARKANSAS

REPORT CARD
2023 Alumni Energy Champion of the Year Award

Participant	Current standings
Molex	40
Planters Cotton Oil	35
Essentra	35
Dassault Falcon Jet	35
Central Arkansas Water	35
Essick Air	25
ARAUCO	20
Georg Fischer Harvel	20
Junction City SD	20
Land O' Frost	20
Bryant SD	20
AmerCable	15
UACCM	15
ASU Three Rivers College	10
Prime-Line	10
Vilonia SD	10
Wabash	10

Entergy Solutions
BY ENTERGY ARKANSAS

REPORT CARD
2023 Alumni Energy Champion of the Year Award

Participant	Current standings
Amcor	5
Anthony Timberlands	5
Searcy SD	5
3M	0
Arkansas Tech University	0
Bryce Corp	0
Conagra	0
Eaton	0
Kohler Faucets	0
Kohler Plastics	0
Northark	0
Roseburg	0

Grading rubric

Keys to success	Points awarded
2023 Employee engagement event or activity held	10
Present at the Report Out Workshop in December	10
Report cards shared outside of energy team*	5
Add new energy team members to internal energy team	5
Additional energy savings projects implemented	5 for each project
Present on CEI at company or school board meeting	5
Attend workshops	5 for each workshop
Highest % savings for 2023*	15
Highest % savings improvement for 2023*	15

° Quarterly at minimum * Awarded in December

Entergy Solutions
BY ENTERGY ARKANSAS

REPORT CARD
2023 Alumni Energy Champion of the Year Award

The 2023 Energy Champion of the Year will be able to choose one of the following prizes:

Fundamentals of compressed air training

Advanced compressed air training

HOBO – 4-channel analog data logger
Used to measure and record temperature, current, CO_2, voltage and more for building performance monitoring applications.

LCV logit data logger
Used for recording A/C current and A/C voltage.

Tips to win

- Conduct as many energy team meetings as possible.
- Present at a CEI group workshop.
- Share all CEI Energy Savings Report Cards within your organization.
- Conduct an executive sponsor update on the company or school's energy savings progress, every six months at minimum.
- Conduct as many employee engagement events as possible.
- Present CEI success to your organization's leadership.
- Conduct an internal training or workshop on energy savings.

Don't forget to send proof of award-eligible activities (workshop attendance, additional projects implemented, etc.) to the Alumni Energy Champion team:

- Deron Neblett: deron.neblett@clearesult.com
- Richard Gregg: richard.gregg@clearesult.com
- Justin Reed: justin.reed@clearesult.com

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3.9 Agricultural Energy Solutions

3.9.1 40121_EAL_AES_Overview_Flyer_v02_Print_RELEASE.pdf



Save energy; increase your profits

It's a competitive marketplace – more than 40% of Arkansas is farmland, which means agribusinesses of all sizes need to make every dollar count. Making your facilities more energy efficient is a simple and effective way to reduce energy costs and boost productivity.

Entergy Arkansas has developed an Agricultural Energy Solutions Program that provides financial incentives and technical assistance to help your agribusiness replace aging, inefficient equipment and systems with new, energy-efficient technologies. The program is designed to maximize your savings through increased energy efficiency and better-managed energy costs.

This special opportunity offers you a variety of options to help you build energy efficiency into every project, whether you are retrofitting existing inefficient equipment, purchasing new equipment, replacing equipment at the end of its life span, conducting major renovations or constructing a new facility.

Agricultural Energy Solutions offers

- Financial incentives to reduce the upfront cost of energy efficiency improvements.
- Technical service to provide you with guidance on energy efficiency opportunities.
- Flexibility by allowing you to engage your own qualified contractor or in-house staff.

Benefits for your business

- Energy-efficient technologies reduce your energy use and minimize costs.
- Investments in energy efficiency can offer a fast return on investment, often paying for themselves in less than two years.
- Energy-efficient equipment can streamline operations, enhancing workplace productivity and improving employee comfort.



A solution that fits

The program's goal is to produce long-term, cost-effective electric savings for agribusinesses by offering incentives structured to cover a portion of the cost of installing energy-efficiency measures.

Custom savings

Our custom approach offers incentives for site-specific, cost-effective opportunities for energy-efficient technologies or multimeasure projects. Projects must be able to show specific and verifiable energy savings and costs. Typical custom measures include, but are not limited to:

- Low-energy livestock waterers.
- Exhaust fans.
- Circulator fans.
- High-volume, low-speed fans.
- Milk pre-coolers.
- Variable-speed controllers for vacuum pumps.
- Variable frequency drives.
- Horticulture controls and lighting.

Eligibility

The Entergy Arkansas Agricultural Energy Solutions Program is available to all nonresidential electric customers on agriculture rate schedules: Agricultural Pumping, General Farm Service, Small General Service and Large General Service. This program extends to a variety of agribusinesses, including:

- Poultry.
- Dairy.
- Cattle.
- Swine.
- Delta/row crops.
- Aquaculture facilities.
- Equipment.
- Controlled environment agriculture.

Ready to get started?

Learn more about the Entergy Arkansas Agricultural Energy Solutions Program and how it can benefit your business by visiting us online at **entergyarkansas.com/agriculture**, calling us at **501-420-2010** or emailing us at **AgricultureEAL@ict.com**.

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3.9.2 40120_EAL_AES_Horticulture_Flyer_v03_Print_RELEASE.pdf
APSC FILED Time: 5/1/2024 9:47:36 AM: Recvd 5/1/2024 9:28:50 AM: Docket 07-085-TF-Doc. 835



Boost production, lower costs and save energy by installing energy-efficient lighting equipment

Lighting can be a major contributor to your horticulture facility's energy use and costs. Installing energy-efficient lighting can make your facility more productive and help you save on your Entergy bill.

Entergy Arkansas offers incentives on eligible LEDs, lighting controls and other qualifying lighting equipment to help you save energy while lowering operating costs.

Discover the benefits

No matter the size of your indoor grow room, greenhouse or other indoor horticulture facility, LEDs:

- Boost production to help you grow your green faster and easier.
- Lower HVAC costs by reducing the energy it takes to cool your facility.
- Improve employee and visitor safety.
- Enhance security.
- Set you apart as an environmentally responsible green facility.

More ways to save

By providing incentives to horticultural businesses that are installing energy-efficient equipment, Entergy Arkansas helps reduce upfront improvement expenses, as well as long-term energy costs. In addition to LEDs, incentives are available on variable frequency drives for irrigation pumps and ventilation equipment.

According to the U.S. Department of Energy, horticulture lighting uses annual electricity equal to approximately 550,000 U.S. households. Switching to LEDs could reduce annual energy use by 40% – saving approximately $240 million per year.

Start saving

To learn more about the Agricultural Energy Solutions Program, call 501-455-3010, visit entergyarkansas.com/agriculture or scan the QR code.

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3.9.3 AES Guidebook 2023 Release



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3.9.4 EAL Homepage Banner_March_2023_AES.docx

Entergy Arkansas EE Homepage Banner
March 2023 - AES



Lower your farm's energy expenses.

Our Agricultural Energy Solutions program offers incentives that can help with your energy-efficient project costs when you install eligible measures.

Learn More

Link button to https://www.entergy-arkansas.com/your_business/save_money/ee/agricultural/

3.9.5 AES Social Media 2023



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Entergy Arkansas
October 12 ·

Happy National Farmer's Day. We take pride in supporting Arkansas farms by providing incentives on high-efficiency equipment through our Agricultural Energy Solutions Program. Join us in harvesting long-term energy savings. Visit entergyarkansas.com/agriculture to explore more about this opportunity.



Entergy Arkansas @EntergyArk · Feb 23

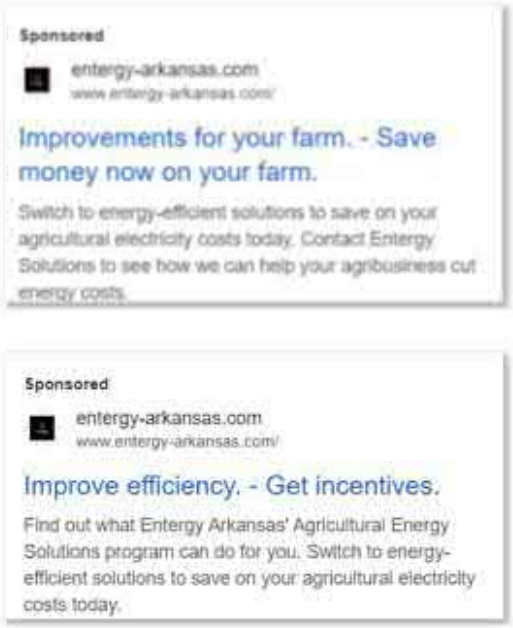
Our Agricultural Energy Solutions Program is dedicated to assisting Arkansas farms in achieving long-term energy savings through incentives on high-efficiency equipment. Visit entergyarkansas.com/agriculture for more information.



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3.9.6 AES Paid Display and Search Ads 2023







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3.10 Residential Direct Load Control

3.10.1 Bilingual Door Hanger



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Thank you for participating in Entergy Solutions Summer Advantage, our central air conditioning and heat pump cycling program that helps participants use energy more efficiently during the hot summer months.

To ensure our installation and operational standards meet your expectations, our field team has performed a routine inspection of our equipment on:

_____

at _____ ☐ a.m. ☐ p.m.

Notes:

_____

_____

_____

_____

For more information, please visit **entergyarkansas.com/summeradvantage** or call **866-224-7812**.

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We power life.™

entergy

Gracias por participar en el programa de Summer Advantage de Entergy Solutions. El programa de encendido y apagado del aire acondicionado central y de bombas de calor ayuda a los participantes a usar energía de modo más eficiente durante los calurosos meses de verano.

Para asegurar que nuestros estándares de instalación y operación cumplan con sus expectativas como consumidor, hemos realizado una inspección de rutina del equipo el día:

_____

a las _____ ☐ a.m. ☐ p.m.

Notas:

_____

_____

_____

_____

Para más información, visite **entergyarkansas.com/summeradvantage** o llame al **866-224-7812**.

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We power life.™

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3.10.2 Summer Advantage Preseason Postcard v.1

Savings are right around the corner

Dear Summer Advantage Program Participant,

The Summer Advantage Program season is about to begin. You are participating at the **50%** level, which rewards you with an incentive payment of up to **$25** this December.

If you become concerned about the operation of your central air conditioner or heat pump this summer, please call **866-224-7812**. Before calling, please check your digital cycling unit (DCU) for a conservation period. You will need to go outside to inspect the device. A red LED light will appear in the window of the DCU throughout the conservation period.

Thank you for your participation in this important energy efficiency program for Arkansas.

The Summer Advantage Program season begins June 1 and continues through Sept. 30.

ENRPS2301

entergy

2512 McCain Blvd., Ste. 2, Box #280
North Little Rock, AR 72116-7930

John Q. Smith
1234 Main Street
Anytown, US 01776-5775

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Ready. Set. SAVE.

We power life.™

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3.10.3 Summer Advantage Preseason Postcard v.2



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3.11 Smart Direct Load Control

3.11.1 EAL DLC Newsletter Article May 2023



Get ready for summer with a smart thermostat saves energy and keeps your home comfortable. With the warm weather approaching, it's the perfect time to upgrade to a device that provides convenience and insights while giving you control over your home's comfort and energy usage.

By connecting to your home's Wi-Fi, a smart thermostat learns your temperature preferences and can automatically adjust the temperature when you come and go. Plus, it can provide you with home-energy-use data that you can track and manage. You can even control the temperature remotely using your smartphone or tablet, making it a great tool for managing your home's energy use.

Enroll in the Entergy Arkansas Smart Direct Load Control Program and get a smart thermostat with professional installation at no cost to you - a $225 value. Plus, you can receive a cash incentive of up to $40 each year you participate in the program. It's a smart and easy way to save energy and upgrade your home.

Already have a qualifying smart thermostat? You can still enroll and receive an enrollment incentive of $50.

But don't stop there. Here are some additional energy-saving tips to help you take your savings to the next level:

- Reduce your use of large appliances like washers, dryers, and dishwashers during the daytime.
- Turn off lights when you leave a room to enjoy natural light and save energy.
- Utilize smart power strips that can automatically sense when devices are inactive and cut their power supply to save energy.
- Keep your vents clear to help your cooling system work more efficiently.

Enjoy smart and simple savings this summer with a new smart thermostat. Visit us online or call 833-807-7682 to learn more.

Links

3.11.2 EAL DLC Newsletter Article September 2023



Save with a new smart thermostat

Keep your home comfortable with a smart thermostat that saves energy. This fall is the perfect time to upgrade to a device that provides convenience and insights while giving you control over your home's comfort and energy usage.

By connecting to your home's Wi-Fi, a smart thermostat learns your temperature preferences and can automatically adjust the temperature when you come and go. Plus, it can provide you with home-energy-use data that you can track and manage. You can even control the temperature remotely using your smartphone or tablet, making it a great tool for managing your home's energy use.

Enroll in the Entergy Arkansas Smart Direct Load Control Program and get a smart thermostat with professional installation at no additional cost - a $225 value. Plus, you can receive a cash incentive of up to $40 each year you participate in the program. It's a smart and easy way to save energy and upgrade your home.

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3.11.3 39579_EAL_DLC_Troubleshooting_Guide_v04 - Release Edits.pdf



Entergy Solutions

Simple HVAC solutions

Easy DIY actions to try before calling the pros

First things first. HVAC stands for heating, ventilation and air conditioning. Your A/C, heat pump and/or furnace are all parts of a complete HVAC system. You should have a professional perform routine maintenance on your system, but even well-maintained equipment can sometimes fail. If your system stops working, here are some things you can try to get your HVAC running again.

1 Make sure your system has power
- Check your breaker to make sure it hasn't flipped or blown a fuse.
- Every furnace has a power switch. Sometimes it's located on the unit itself. In units placed in attics, the light switch and furnace switch may be located close together.

2 Reset
Switch off the breaker for your system, wait 10 seconds and then switch it back on.

3 Make sure your furnace door is closed
Many furnaces won't operate while the service door is open. If the furnace isn't producing heat, open the service door, and shut it again. Once it's tightly closed, turn the breaker back on.

4 Check the thermostat for power
- If the thermostat screen is blank, it has lost power. (Smart thermostats don't use batteries).
- If the thermostat is getting power, check to see if your temperature settings were accidentally changed.

SIMPLE HVAC SOLUTIONS

5 Install a new filter in your furnace or A/C
- Filters that are too dirty or too old reduce air quality and airflow from your vents, leading to inefficiency.
- When replacing the furnace filter, make sure you close the furnace door entirely. If the door is left open, the unit won't operate.

6 Check all vents for obstructions
If parts of your home aren't getting heated or cooled very well, take a look at your vents. They can sometimes get shut or covered without being noticed. Make sure they're free from dirt, dust or objects that could restrict airflow.

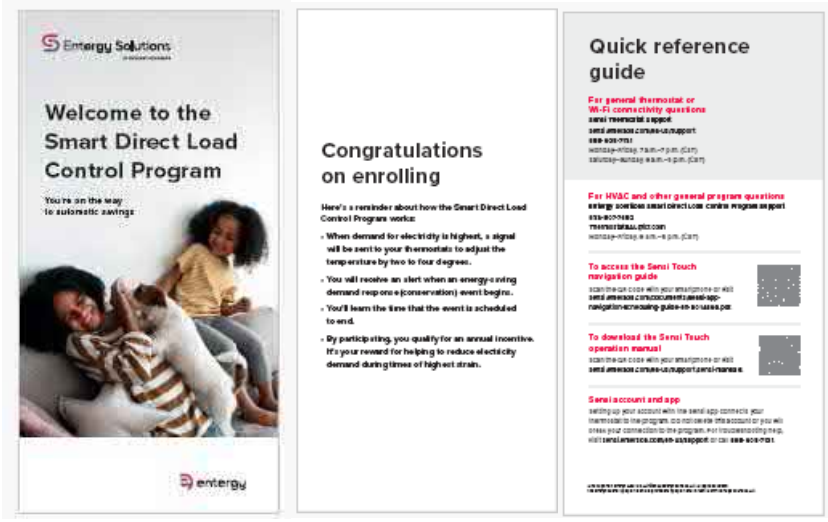
7 Turn off the A/C
Some components can freeze if your A/C has been on for a long time. If your A/C isn't producing cool air, turn it off, and use the fan for a while before trying your A/C again. If the problem continues or happens frequently, it's time to bring in an expert.

8 Check furnace and A/C wires
Wires can become disconnected or damaged. It's more likely to happen to outdoor units, but can occur inside as well. Be careful—don't handle any potentially damaged or exposed wires, as they could carry the risk of electric shock.
Contact a professional if you see disconnected or exposed wires.

Know when to contact service experts
- Many units have control boards with LED flash codes. If you see flashing lights through a glass pane, contact a professional.
- It's also time to contact the pros if the source of a problem is unclear, or the fix is complicated. Many problems require extensive fixes, and trying to resolve them yourself can lead to damage to your system and voided warranties.

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3.11.4 44822_EAL_DLC_Welcome_Trifold_Brochure_v05_Release_Web.pdf



Entergy Solutions

Welcome to the Smart Direct Load Control Program

You're on the way to automatic savings

entergy

Congratulations on enrolling

Here's a reminder about how the Smart Direct Load Control Program works:

- When demand for electricity is highest, a signal will be sent to your thermostats to adjust the temperature by two to four degrees.
- You will receive an alert when an energy-saving demand response (conservation) event begins.
- You'll learn the time that the event is scheduled to end.
- By participating, you qualify for an annual incentive. It's your reward for helping to reduce electricity demand during times of highest strain.

Quick reference guide

For general thermostat or Wi-Fi connectivity questions
Sensi thermostat support
sensi.emerson.com/en-us/support
888-909-7351
Monday–Friday 7 a.m.–9 p.m. (CST)
Saturday–Sunday 8 a.m.–6 p.m. (CST)

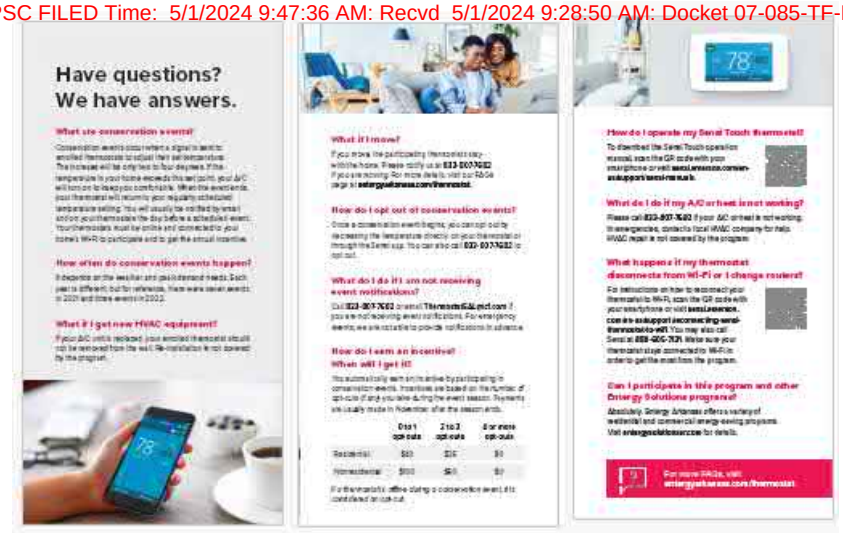
For HVAC and other general program questions
Entergy Solutions Smart Direct Load Control Program support
888-909-7351
TheSmartEmail@EGSI.com
Monday–Friday 8 a.m.–5 p.m. (CST)

To access the Sensi Touch navigation guide
Scan the QR code with your smartphone or visit sensi.emerson.com/document/sensi-app-navigation-screensaving-guide-en-us-users.pdf

To download the Sensi Touch operation manual
Scan the QR code with your smartphone or visit sensi.emerson.com/en-us/support/sensi-manuals

Sensi account and app
Setting up your account with the Sensi app connects your thermostat to the program, so no one else can control your system. If you create this account or you will cross your connection to the program. For troubleshooting help, visit sensi.emerson.com/en-us/support or call 888-909-7351.

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3.11.5 45110_EAL_DLC_Doorhanger_v02.pdf



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Entergy Arkansas is helping its customers save energy the smart way. Join our new Smart Direct Load Control Program for a number of incentives.

Get a smart thermostat

Sign up and receive a smart thermostat with professional installation at no additional cost – a $205 value.

Already have a smart thermostat?

Sign up with your qualifying Emerson Sensi™ Smart Thermostat or Honeywell Wi-Fi Thermostat and receive an enrollment incentive of $50 for residential customers or up to $100 for business customers.

Visit entergyarkansas.com/thermostat for a list of eligible models.

Want more incentives?

Depending on your level of participation, you may also receive an annual incentive of up to $40 per thermostat enrolled (residential customers) or $100 for each thermostat (business customers).

Who's eligible?

Entergy Arkansas residential and eligible commercial customers who own their home or business, have central air conditioners and have Wi-Fi are eligible to participate.

How it works

The Smart Direct Load Control Program can help reduce high energy demand in the summer, when tens of thousands of central air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. That's where you come in.

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a pre-determined set point for the length of the demand response event. These events may occur from June 1 through Sept. 30. You may opt out of up to three of these events, but the amount of your annual participation incentive will be reduced. **The more you participate, the more you earn.**

Benefits

When you automatically reduce your energy use at these important times, you help prevent outages. Plus, Entergy Arkansas will reward you for your participation with a cash incentive at the end of each year.

"I think this is an amazing opportunity for customers like myself. The thermostat has been a blessing."
– enrolled Entergy Solutions customer



FAQs

What are the advantages of a smart thermostat?

Smart thermostats save you energy all year long by learning how your home responds to weather conditions and adjusting the temperature when you're not home. You can also access the thermostat from mobile devices or computers and receive reports about your home's energy usage and savings. Hello, convenience.

How does the smart thermostat work during demand response events?

On select days with high electrical demand, the thermostat's sensors will help manage your air conditioner's runtimes to save you energy, which is known as a demand response event.

When a demand response event occurs, your thermostat will temporarily increase your temperature set point by up to four degrees in order to reduce energy usage. If the temperature in your home exceeds this set point, your air conditioner will turn on to keep you comfortable. Once the event is over, your thermostat will return to your regularly scheduled temperature.

When will my smart thermostat be affected?

Your smart thermostat will only be affected during demand response events. Outside of these times, you are free to set your thermostat to your desired schedule and temperature.

How often do demand response events occur?

The number of demand response events in any given year is dependent on weather conditions and is not entirely predictable. However, they may occur on a few hot or humid weekdays between June 1 and Sept. 30. They're not activated on weekends or holidays. For more information, visit entergyarkansas.com/thermostat.

How can I tell an event is occurring?

In most instances, you will receive a notification by email and on your thermostat the day prior to a scheduled event. Please note that in order to participate in demand response events and be eligible for your participation incentive, your thermostat must be online and connected.

Can I opt out of an event?

You will be able to choose up to three events in which you may opt out of participation – right from your phone, tablet or thermostat. If you ever decide you want to cancel participation in an event, you simply opt out. The system will monitor your opt-out activity. Once you have used your three opt-outs for the year, that option will no longer be available to you. For mandatory events, you must call 833-807-7002.

Save energy and earn cash incentives – all at no additional cost to you.

Let's get started

To enroll or learn more, please visit entergyarkansas.com/thermostat, call 833-807-7002 or scan the QR code.

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3.11.7 40161_EAL_DLC_Co-Branded_Flyer_v04_Print_RELEASE.pdf
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Entergy Arkansas is helping its customers save energy the smart way. Join our new Smart Direct Load Control Program for a number of incentives.

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How it works

The Smart Direct Load Control Program can help reduce high energy demand in the summer, when tens of thousands of central air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. That's where you come in.

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a predetermined set point for the length of the demand response event. These events may occur from June 1 through Sept. 30. You may opt out of up to three of these events, but the amount of your annual participation incentive will be reduced. **The more you participate, the more you earn.**

Benefits

When you automatically reduce your energy use at these important times, you help prevent outages. Plus, Entergy Arkansas will reward you for your participation with a cash incentive at the end of each year.

> **"I think this is an amazing opportunity for customers like myself. The thermostat has been a blessing."**
> — Arkansas Entergy Solutions customer



FAQs

What are the advantages of a smart thermostat?

Smart thermostats save you energy all year long by learning how your home responds to weather conditions and adjusting the temperature when you're not home. You can also access the thermostat from mobile devices or computers and receive reports about your home's energy usage and savings. Hello, convenience.

How does the smart thermostat work during demand response events?

On select days with high electrical demand, the thermostat's sensors will help manage your air conditioner's run times to save you energy, which is known as a demand response event.

When a demand response event occurs, your thermostat will temporarily increase your temperature set point by up to four degrees in order to reduce energy usage. If the temperature in your home exceeds this set point, your air conditioner will turn on to keep you comfortable. Once the event is over, your thermostat will return to your regularly scheduled temperature.

When will my smart thermostat be affected?

Your smart thermostat will only be affected during demand response events. Outside of these times, you are free to set your thermostat to your desired schedule and temperature.

How often do demand response events occur?

The number of demand response events in any given year is dependent on weather conditions and is not entirely predictable. However, they may occur on a few hot or humid weekdays between June 1 and Sept. 30. They're not activated on weekends or holidays. For more information, visit entergyarkansas.com/thermostat.

How can I tell an event is occurring?

In most instances, you will receive a notification by email and on your thermostat the day prior to a scheduled event. Please note that in order to participate in demand response events and be eligible for your participation incentives, your thermostat must be online and connected.

Can I opt out of an event?

You will be able to choose up to three events in which you may opt out of participation – right from your phone, tablet or thermostat. If you ever decide you want to cancel participation in an event, you simply opt out. The system will monitor your opt-out activity. Once you have used your three opt-outs for the year, that option will no longer be available to you. For mandatory events, you must call 833-801-6708.

Save energy and earn cash incentives – all at no additional cost to you.

Let's get started

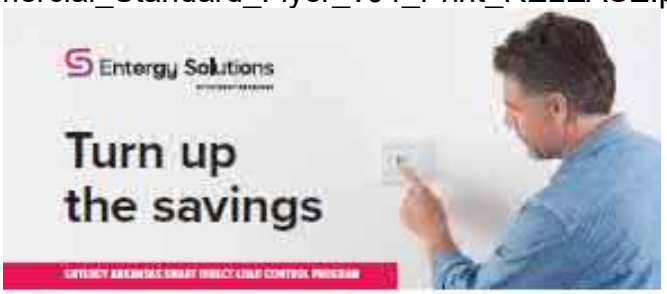
To enroll or learn more, please visit entergyarkansas.com/thermostat, call 833-807-7432, or scan the QR code.

Company Name
Phone Number
Email
Website

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3.11.8 40162_EAL_DLC_Commercial_Standard_Flyer_v04_Print_RELEASE.pdf



Enroll your smart thermostat in the Smart Direct Load Control Program and get up to $200

Entergy Arkansas is helping its commercial customers save energy and money the smart way. Enroll your qualifying smart thermostat in our Smart Direct Load Control Program and earn incentives.

How it works

The Smart Direct Load Control Program helps reduce high energy demand in the summer when tens of thousands of central air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. **That's where you come in.**

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a set point for the length of the demand response event. These events may occur from June 1 through Sept. 30.

Benefits

- **Help prevent outages** by automatically reducing your energy use when electrical demand is high.
- **Earn cash incentives** when you enroll and by participating in events. If you already own an eligible device, all you have to do is sign up.
- **Do your part for the environment** by saving energy.

Who's eligible?

Entergy Arkansas commercial customers who own a business, have central air conditioners, have Wi-Fi and have a qualifying smart thermostat are eligible to participate.

Eligible smart thermostats

- Emerson Sensi Touch and Sensi Wi-Fi
- Honeywell Lyric T5, T5 Plus, T6, T9, T10, 9000i Smart, Wireless Focus RKG and Round Smart

How to enroll

To enroll your eligible thermostat or learn more, visit **entergyarkansas.com/thermostat** or call **833-607-7682**.

Enrollment incentive
Get **$100** for enrolling your qualifying smart thermostat.

Annual participation incentive
Get **$100** per thermostat enrolled for participating in demand response events.



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3.11.9 40162_EAL_DLC_Commercial_Co-Branded_Flyer_v04_Print_RELEASE.pdf



Enroll your smart thermostat in the Smart Direct Load Control Program and get up to $200

Entergy Arkansas is helping its commercial customers save energy and money the smart way. Enroll your qualifying smart thermostat in our Smart Direct Load Control Program and earn incentives.

How it works

The Smart Direct Load Control Program helps reduce high energy demand in the summer, when tens of thousands of central air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. **That's where you come in.**

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a set point for the length of the demand response event. These events may occur from June 1 through Sept. 30.

Benefits

- **Help prevent outages** by automatically reducing your energy use when electrical demand is high.
- **Earn cash incentives** when you enroll and by participating in events. If you already own an eligible device, all you have to do is sign up.
- **Do your part for the environment** by cutting energy.

Who's eligible?

Entergy Arkansas commercial customers who own a business, have central air conditioners, have Wi-Fi and have a qualifying smart thermostat are eligible to participate.

Eligible smart thermostats

- Emerson Sensi Touch and Sensi Wi-Fi.
- Honeywell Lyric T5, T5-Plus, T6, T9, T10, W200 Smart, Wireless FocusPRO and Round Smart.

How to enroll

To enroll your eligible thermostat or learn more, visit **entergyarkansas.com/thermostat** or call **833-807-7682**.

Enrollment incentive

Get **$100** for enrolling your qualifying smart thermostat.

Annual participation incentive

Get **$100** per thermostat enrolled for participating in demand response events.



FAQs

What are the advantages of a smart thermostat?

Smart thermostats save you energy all year long by learning how your business responds to weather conditions and adjusting the temperature. You can also access the thermostat from mobile devices or computers and receive reports about your business's energy usage and savings. Hello, convenience.

How does the smart thermostat work during demand response events?

On select days with high electrical demand, the thermostat's sensors will help manage your air conditioner's run times to save you energy, which is known as a demand response event. When a demand response event occurs, your thermostat will temporarily increase your temperature set point by up to four degrees to reduce energy usage. If the temperature in your business exceeds this set point, your air conditioner will turn on to keep you comfortable. Once the event is over, your thermostat will return to your regularly scheduled temperature.

When will my smart thermostat be affected?

Your smart thermostat will only be affected during demand response events. Outside of these times, you are free to set your thermostat to your desired schedule and temperature.

How often do demand response events occur?

The number of demand response events in any given year varies. Typically, they occur on a few hot or humid weekdays between June 1 and Sept. 30. Events are not activated on weekends or holidays.

How can I tell an event is occurring?

In most instances, you will receive a notification by email and on your thermostat the day prior to a scheduled event. Please note that in order to participate in demand response events and be eligible for your participation incentive, your thermostat must be online and connected.

Can I opt out of an event?

You can opt out of up to three events per year using your phone, tablet or thermostat. The system will monitor your opt-out activity. Once you have used your three opt outs for the year, that option will no longer be available to you. For mandatory events, you must call **833-807-7682**.

Start saving

Save energy and earn cash incentives by enrolling your smart thermostat in the Smart Direct Load Control Program. Visit **entergyarkansas.com/thermostat**, call **833-807-7682** to enroll or scan the QR code.

Company Name
Phone Number
Email
Website

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Enroll your smart thermostat in the Smart Direct Load Control Program and get up to $90

Entergy Arkansas is helping its residential customers save energy and money the smart way. Enroll your qualifying smart thermostat in our Smart Direct Load Control Program and earn incentives.

How it works

The Smart Direct Load Control Program helps reduce high energy demand in the summer, when tens of thousands of central air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. **That's where you come in.**

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a set point for the length of the demand response event. These events may occur from June 1 through Sept. 30.

Benefits

- **Help prevent outages** by automatically reducing your energy use when electrical demand is high.
- **Earn cash incentives** when you enroll and annually for participation. If you already own an eligible device, all you have to do is sign up.
- **Do your part for the environment** by saving energy.

Who's eligible?

Entergy Arkansas residential customers who own a home, have central air conditioners, have Wi-Fi and have a qualifying smart thermostat are eligible to participate.

Eligible smart thermostats

- Emerson Sensi Touch and Sensi Wi-Fi
- Honeywell Lyric T5, T5 Plus, T6, T9, T10, 9000 Smart, Wireless Focus PRO and Round Smart

How to enroll

To enroll your eligible thermostat or learn more, visit **entergyarkansas.com/thermostat** or call **833-807-7682**.

Enrollment incentive

Get **$60** per thermostat for enrolling your qualifying smart thermostat.

Annual participation incentive

Get up to **$30** per thermostat **every year** for participating in demand response events. The more you participate, the more you earn.

ENTERGY ARKANSAS SMART DIRECT LOAD CONTROL PROGRAM

FAQs

What are the advantages of a smart thermostat?

Smart thermostats save you energy all year long by learning how your home responds to weather conditions and adjusting the temperature. You can also access the thermostat from mobile devices or computers and receive reports about your home's energy usage and savings. Hello, convenience.

How does the smart thermostat work during demand response events?

On select days with high electrical demand, the thermostat's sensors will help manage your air conditioner's run times to save you energy, which is known as a demand response event. When a demand response event occurs, your thermostat will temporarily increase your temperature set point by up to four degrees to reduce energy usage. If the temperature in your home exceeds this set point, your air conditioner will turn on to keep you comfortable. Once the event is over, your thermostat will return to your regularly scheduled temperature.

When will my smart thermostat be affected?

Your smart thermostat will only be affected during demand response events. Outside of these times, you are free to set your thermostat to your desired schedule and temperature.



"I was very satisfied with this program. I think all customers should get involved."

How often do demand response events occur?

The number of demand response events in any given year varies. Typically, they occur on a few hot or humid weekdays between June 1 and Sept. 30. Events are not activated on weekends or holidays.

How can I tell an event is occurring?

In most instances, you will receive a notification by email and on your thermostat the day prior to a scheduled event. Please note that in order to participate in demand response events and be eligible for your participation incentive, your thermostat must be online and connected.

Can I opt out of an event?

You can opt out of up to three events per year using your phone, tablet or thermostat. The system will monitor your opt out activity. Once you have used your three opt-outs for the year, that option will no longer be available to you. For mandatory events, you must call **866-8014758**.

Start saving

Save energy and earn cash incentives by enrolling your smart thermostat in the Smart Direct Load Control Program. Visit **entergyarkansas.com/thermostat**, call **833-807-7682** to enroll or scan the QR code.

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Enroll your smart thermostat in the Smart Direct Load Control Program and get up to $90

Entergy Arkansas is helping its residential customers save energy and money the smart way. Enroll your qualifying smart thermostat in our Smart Direct Load Control Program and earn incentives.

How it works

The Smart Direct Load Control Program helps reduce high energy demand in the summer, when tens of thousands of cooled air conditioners and heat pumps are all running at the same time, putting a strain on the power supply. **That's where you come in.**

On days when electricity demand is highest, we will automatically send a signal to your thermostat to raise its temperature to a set point for the length of the demand response event. These events may occur from June 1 through Sept. 30.

Benefits

- **Help prevent outages** by automatically reducing your energy use when electrical demand is high.
- **Earn cash incentives** when you enroll and annually for participation. If you already own an eligible device, all you have to do is sign up.
- **Do your part for the environment** by saving energy.

Who's eligible?

Entergy Arkansas residential customers who own a home, have central air conditioners, have Wi-Fi and have a qualifying smart thermostat are eligible to participate.

Eligible smart thermostats

- Emerson Sensi Touch and Sensi Wi-Fi.
- Honeywell Lyric T5, T5 Plus, T6, T9, T10, 8000 Smart, Wireless FocusPRO and Resideo Smart.

How to enroll

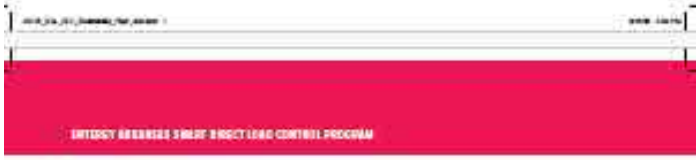
To enroll your eligible thermostat or learn more, visit **entergyarkansas.com/thermostat** or call **833-807-7682**.

Enrollment incentive

Get $50 per thermostat for enrolling your qualifying smart thermostat.

Annual participation incentive

Get up to $40 per thermostat **every year** for participating in demand response events. The more you participate, the more you earn.



FAQs

What are the advantages of a smart thermostat?

Smart thermostats save you energy all year long by learning how your home responds to weather conditions and adjusting the temperature. You can also access the thermostat from mobile devices or computers and receive reports about your home's energy usage and savings. Hello, convenience.

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"I was very satisfied with this program. I think all customers should get involved."

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Can I opt out of an event?

You can opt out of up to three events per year using your phone, tablet or thermostat. The system will monitor your opt-out activity. Once you have used your three opt-outs for the year, that option will no longer be available to you. For mandatory events, you must call **866-[illegible]**.

Start saving

Save energy and earn cash incentives by enrolling your smart thermostat in the Smart Direct Load Control Program. Visit **entergyarkansas.com/thermostat**, call **833-807-7682** to enroll or scan the QR code.

Company Name

Phone Number

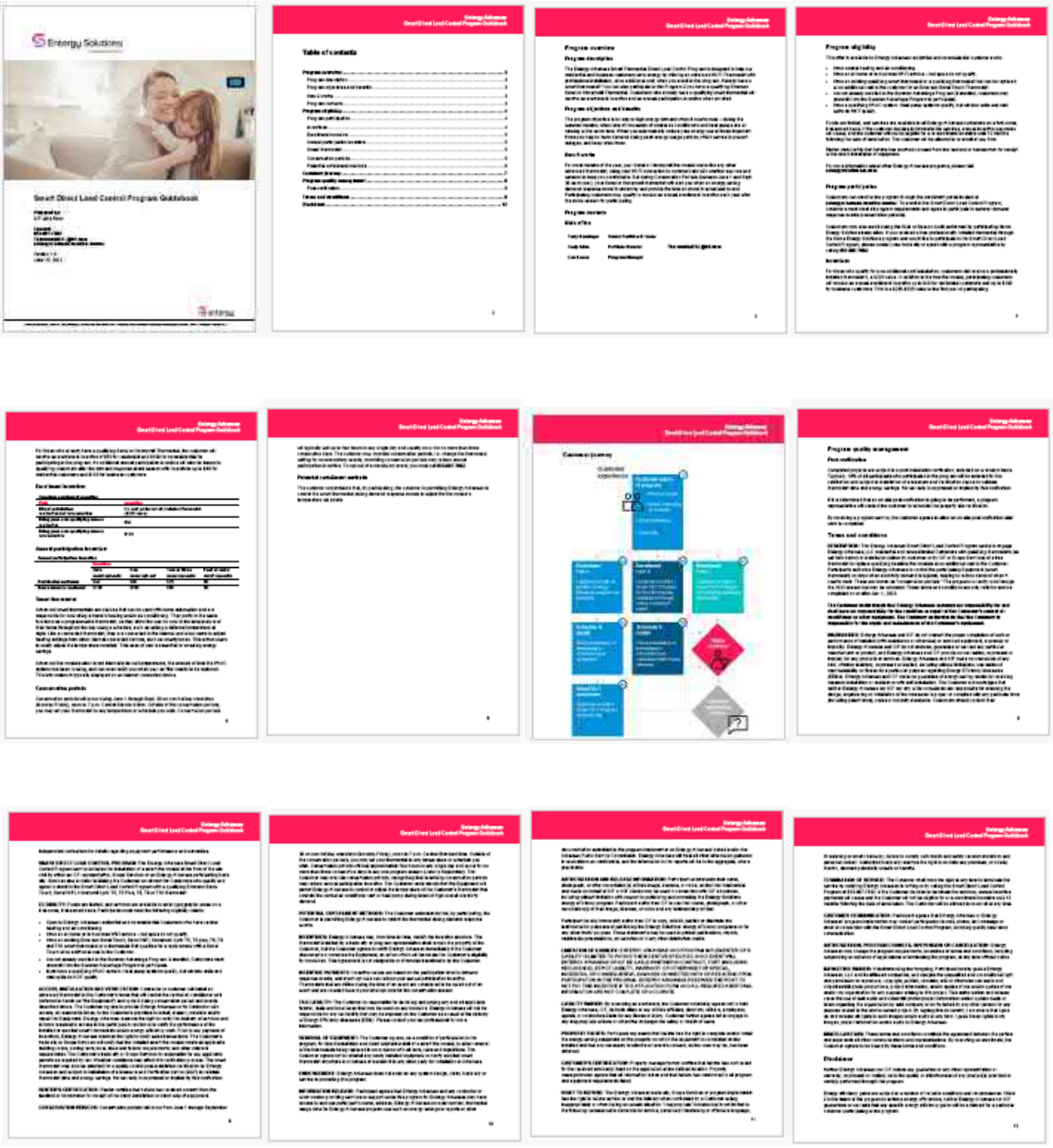
Email

Website

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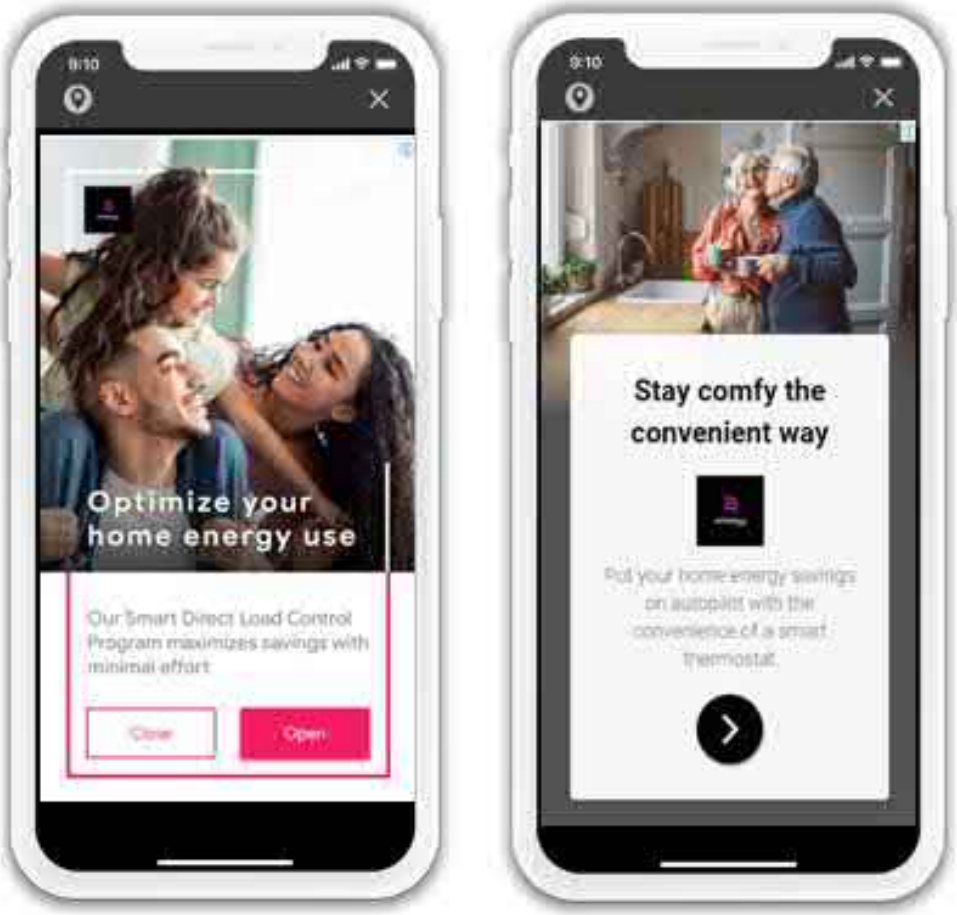
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3.11.12 SDLC Guidebook 2023 Release



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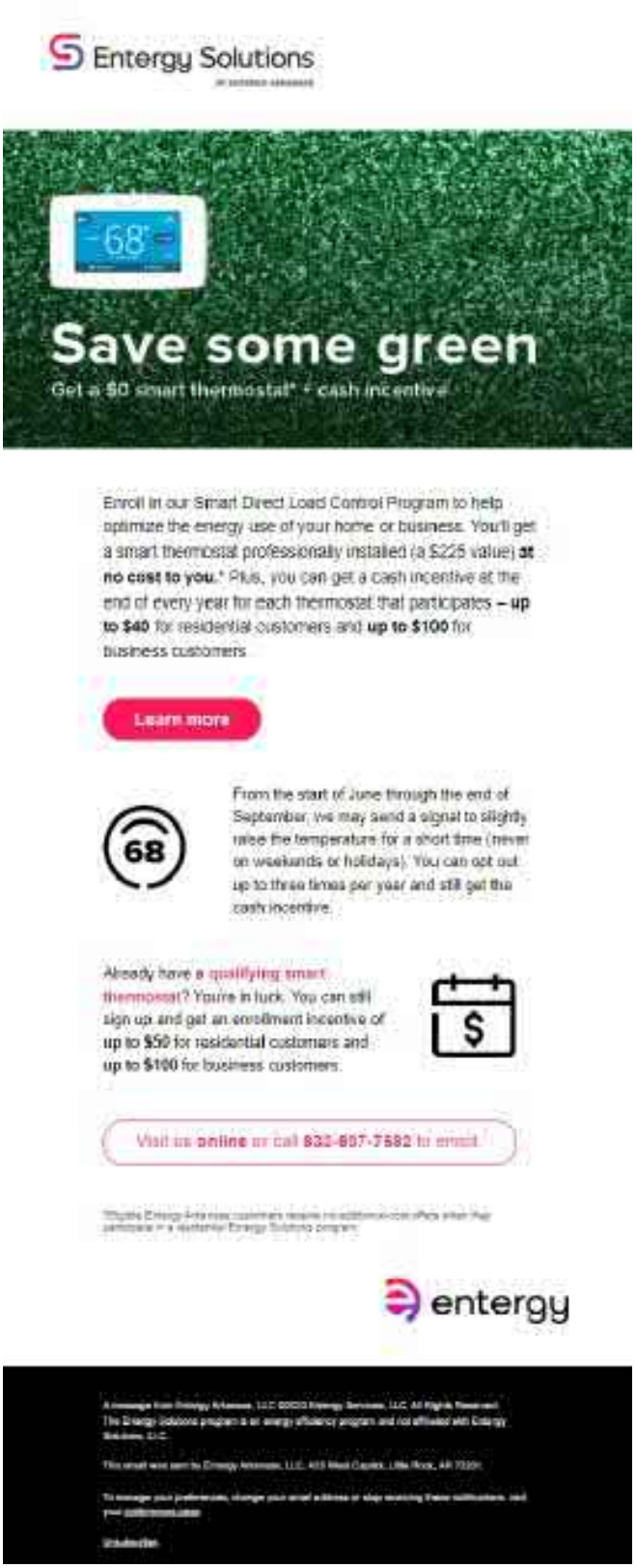
3.11.13 SDLC Paid Display Ads 2023



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3.11.16 May _EAL_DLC_email.pdf

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Entergy Solutions



Optimize your home's energy use by enrolling in our Smart Direct Load Control Program. You'll get a smart thermostat professionally installed (a $225 value) **at no cost to you.*** Plus, you can get a cash incentive of **up to $40** at the end of every year for each thermostat that participates.

Learn more

From June through September, a signal may be sent to slightly raise the thermostat's temperature for a short time—never on weekends or holidays. You can opt out of these events up to three times per year and still collect the cash incentive.

If you already have a qualifying smart thermostat, you can still sign up—and get an enrollment incentive of up to $50.

Visit us online or call 833-807-7682 to enroll

*By participating in the Entergy Solutions Smart DLC program Entergy Arkansas customers receive the smart thermostat and installation at no additional cost to what they pay for their Entergy electric services.

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Entergy Solutions



Optimize how your business uses energy by enrolling in our Smart Direct Load Control Program. You'll get a smart thermostat professionally installed (a $225 value) at no cost to you.* And at the end of each year, you'll get a cash incentive of **up to $100** for every enrolled thermostat that participates.

Enroll me

78

On a few summer days, we may send a signal to slightly raise the temperature for a short time – never on holidays or weekends. You can opt out up to three times per year and still get the cash incentive.

Already have a qualifying smart thermostat? Sign up and get an enrollment incentive of up to $100.

Visit us online or call 833-807-7682 to enroll

*Eligible Entergy Arkansas customers receive no additional cost when they participate in a residential Entergy Solutions program.

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3.11.18 June_EAL_DLC_2 email.pdf
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Entergy Solutions



Get a $0 smart thermostat* for your home or business, plus cash incentives

Enroll in our Smart Direct Load Control Program and you'll get a smart thermostat with professional installation (a $225 value) at no cost to you. Plus, cash incentives are available for each enrolled thermostat that participates—**up to $100** for business customers and **up to $40** for residential customers.

More info and to enroll

78

On a few days from June through September (but never on holidays or weekends), a signal may be sent to your thermostat to slightly raise the temperature for a short time. You can opt out up to three times per year and still get the cash incentive.

You can participate even if you already have a qualifying smart thermostat. Sign up and get an enrollment bonus of **up to $40** for residential customers and **up to $100** for business customers.

Visit us **online** or call **833-807-7682** to enroll.

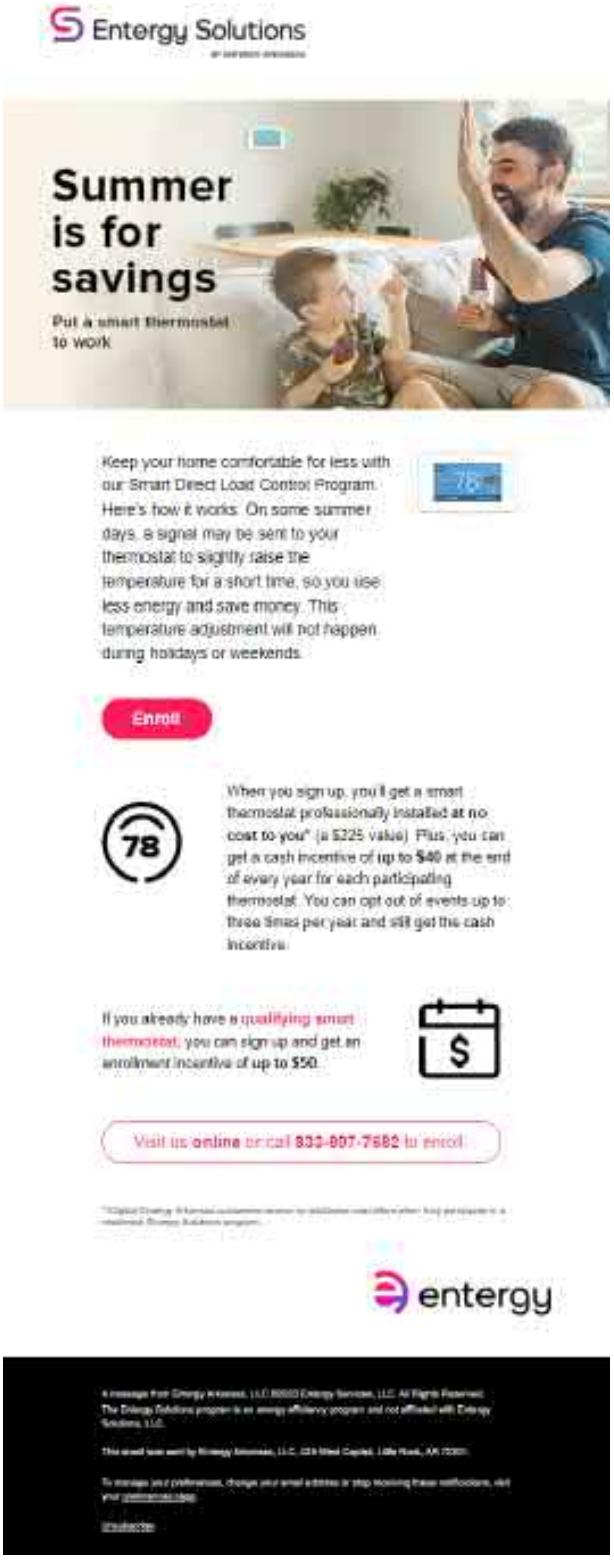
*[illegible]

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3.11.19 August_EAL_DLC_Resemail.pdf



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3.11.20 September_EAL_DLC_Res.pdf

Entergy Solutions



$0 smart thermostat + annual cash incentives

Get help optimizing your energy use with our Smart Direct Load Control Program. Sign up and you'll get a free smart thermostat* (a $225 value), plus an annual cash incentive for participating.

Enroll

78

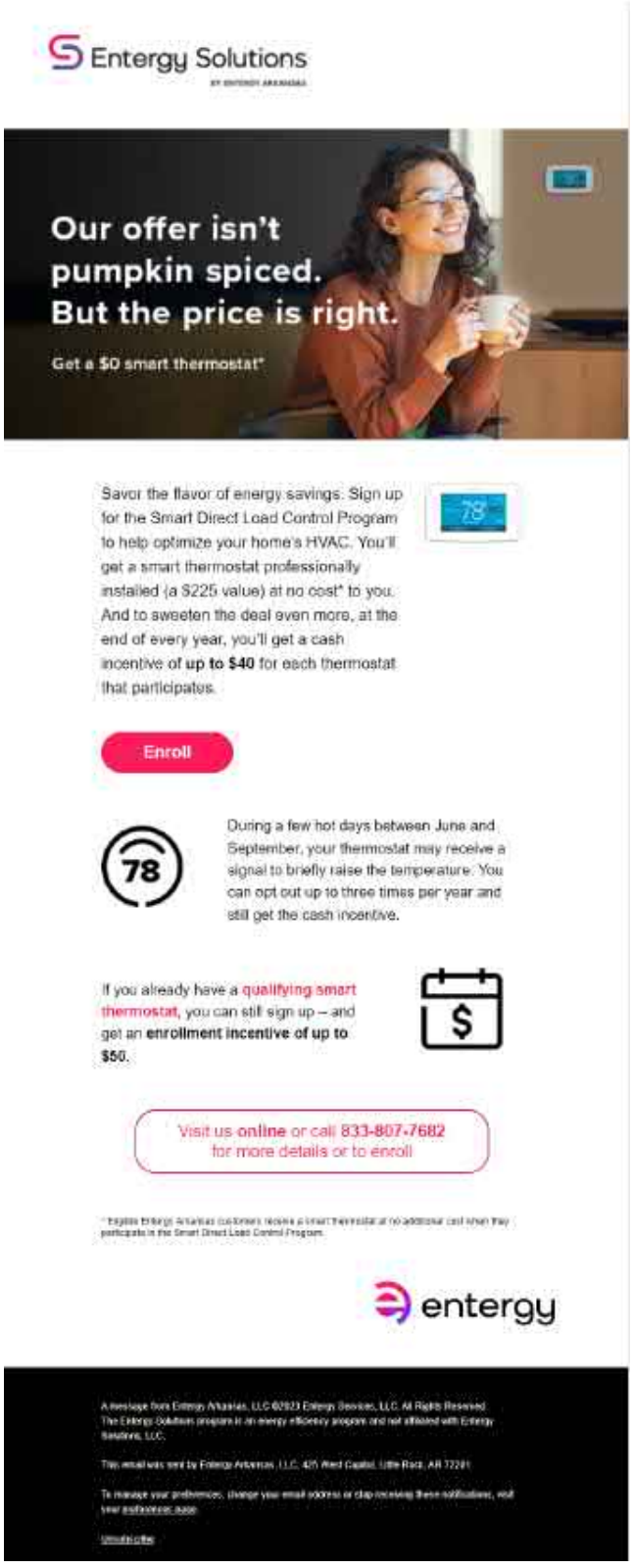
A few times from June through September, a signal may be sent to your thermostat to slightly raise the temperature for a short time. At the end of each year, business customers can get up to $100 for every enrolled thermostat that participates, and residential customers can get up to $40.

Customers that already have a qualifying smart thermostat can sign up and get an enrollment incentive of up to $50. Visit us online or call 833-807-7682 for more details or to enroll.

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3.11.21 October_EAL_DLC_email.pdf



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3.11.22 November_EAL_DLC_email.pdf

Entergy Solutions



Get a smart thermostat at no cost to you.*

Whether for your home or business, enrolling in our Smart Direct Load Control Program can help optimize your energy use. You'll get a smart thermostat professionally installed (a $225 value) *at no cost to you.** Plus, get a cash incentive at the end of every year for each thermostat that participates—**up to $40** for residential customers and **up to $100** for business customers.

Enroll Now

Already have a qualifying smart thermostat ? No problem. You can still sign up and get an enrollment incentive of **up to $50** for residential customers and **up to $100** for business customers.

* Eligible Entergy Arkansas customers receive no-additional-cost offers when they participate in a residential Entergy Solutions program.

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3.11.23 December_EAL_DLC_email.pdf

Entergy Solutions



This holiday season, let's optimize your HVAC system to keep your home cozy while using less energy. You'll get a smart thermostat professionally installed (a $225 value) *at no cost** to you. And the gifts don't stop there—at the end of each year, you'll get a cash incentive of **up to $40** for every enrolled thermostat that participates.

Enroll Me

If you already have a **qualifying smart thermostat**, you can still sign up and get **an enrollment incentive of up to $60**.

Visit us **online** or call **833-807-7682** to enroll.

*Eligible Entergy Arkansas customers receive a smart thermostat at no additional cost when they participate in the Smart Direct Load Control Program.

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The Entergy Solutions program is an energy efficiency program and not affiliated with Entergy Solutions, LLC.

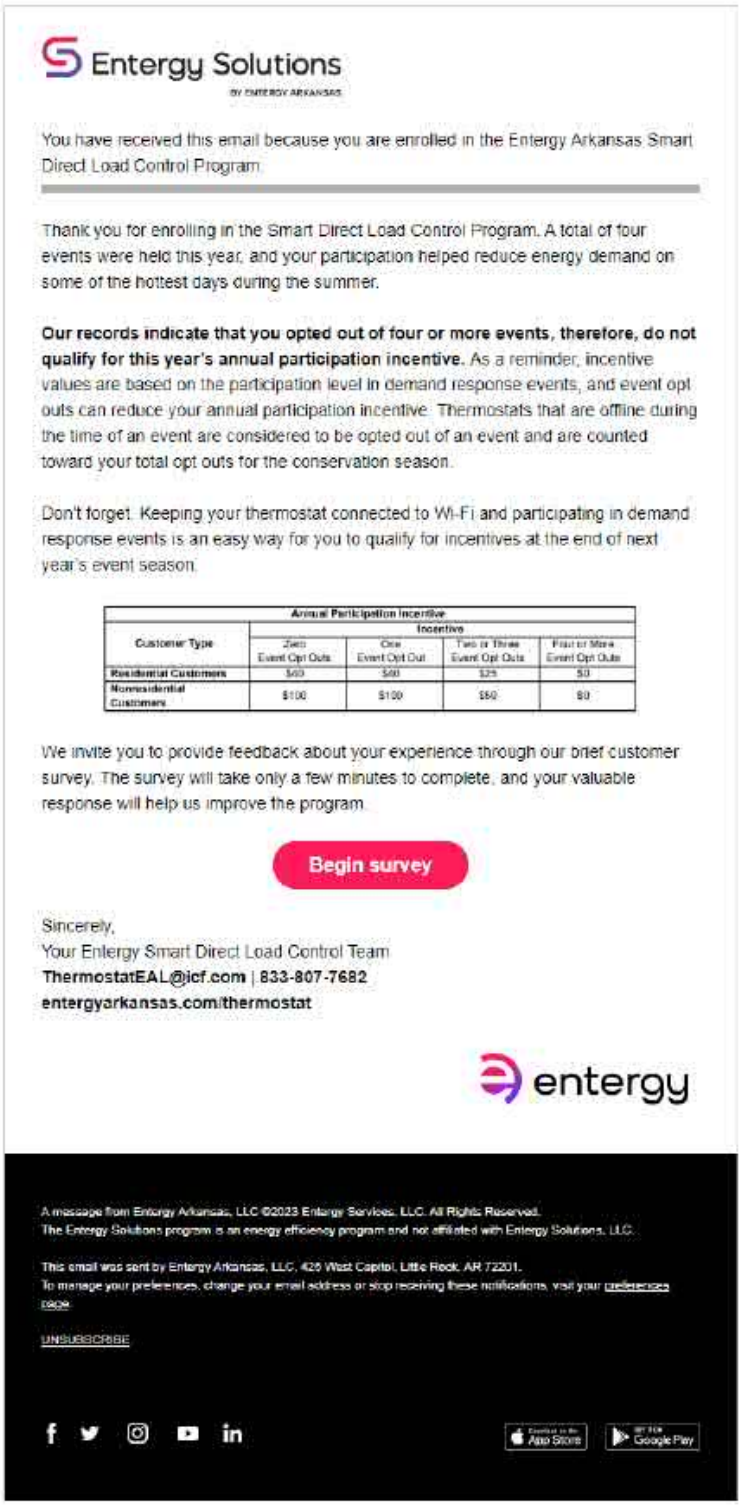
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3.11.24 EAL DLC Post Season Email 1



Entergy Solutions
BY ENTERGY ARKANSAS

You have received this email because you are enrolled in the Entergy Arkansas Smart Direct Load Control Program.

Thank you for enrolling in the Smart Direct Load Control Program. A total of four events were held this year, and your participation helped reduce energy demand on some of the hottest days during the summer.

Our records indicate that you opted out of four or more events, therefore, do not qualify for this year's annual participation incentive. As a reminder, incentive values are based on the participation level in demand response events, and event opt outs can reduce your annual participation incentive. Thermostats that are offline during the time of an event are considered to be opted out of an event and are counted toward your total opt outs for the conservation season.

Don't forget: Keeping your thermostat connected to Wi-Fi and participating in demand response events is an easy way for you to qualify for incentives at the end of next year's event season.

Annual Participation Incentive				
Customer Type	Incentive			
	Zero Event Opt Outs	One Event Opt Out	Two or Three Event Opt Outs	Four or More Event Opt Outs
Residential Customers	$60	$60	$25	$0
Nonresidential Customers	$100	$100	$50	$0

We invite you to provide feedback about your experience through our brief customer survey. The survey will take only a few minutes to complete, and your valuable response will help us improve the program.

Begin survey

Sincerely,
Your Entergy Smart Direct Load Control Team
ThermostatEAL@icf.com | 833-807-7682
entergyarkansas.com/thermostat

entergy

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3.11.25 EAL DLC Post Season Email 2

Entergy Solutions
BY ENTERGY ARKANSAS

You have received this email because you are enrolled in the Entergy Arkansas Smart Direct Load Control Program.

Thank you for enrolling in the Smart Direct Load Control Program. A total of four events were held this year, and your participation helped reduce energy demand on some of the hottest days during the summer.

Incentive checks for participating in the 2023 event season will be mailed to you in four to six weeks. As a reminder, incentive values are based on the participation level in demand response events, and event opt outs can reduce your annual participation incentive. Thermostats that are offline during the time of an event are considered to be opted out of an event and are counted toward your total opt outs for the conservation season.

Annual Participation Incentive				
Customer Type	Incentive			
	Zero Event Opt Outs	One Event Opt Out	Two or Three Event Opt Outs	Four or More Event Opt Outs
Residential Customers	$40	$40	$25	$0
Nonresidential Customers	$100	$100	$60	$0

We invite you to provide feedback about your experience through our brief customer survey. The survey will take only a few minutes to complete, and your valuable response will help us improve the program.

Begin survey

Sincerely,
Your Entergy Smart Direct Load Control Team
ThermostatEAL@icf.com | 833-807-7682
entergyarkansas.com/thermostat

entergy

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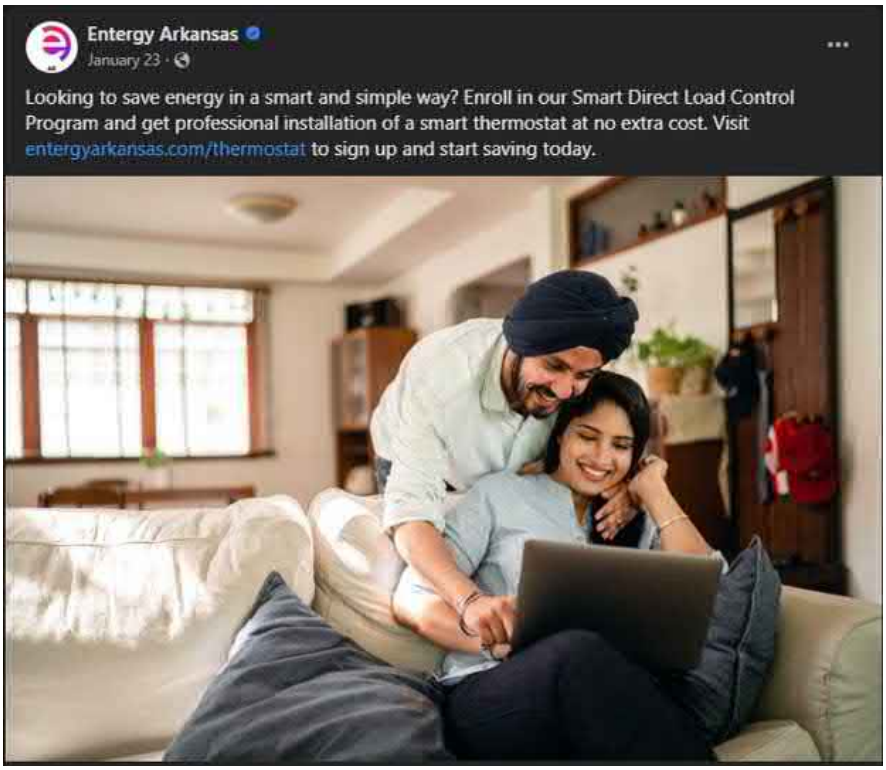
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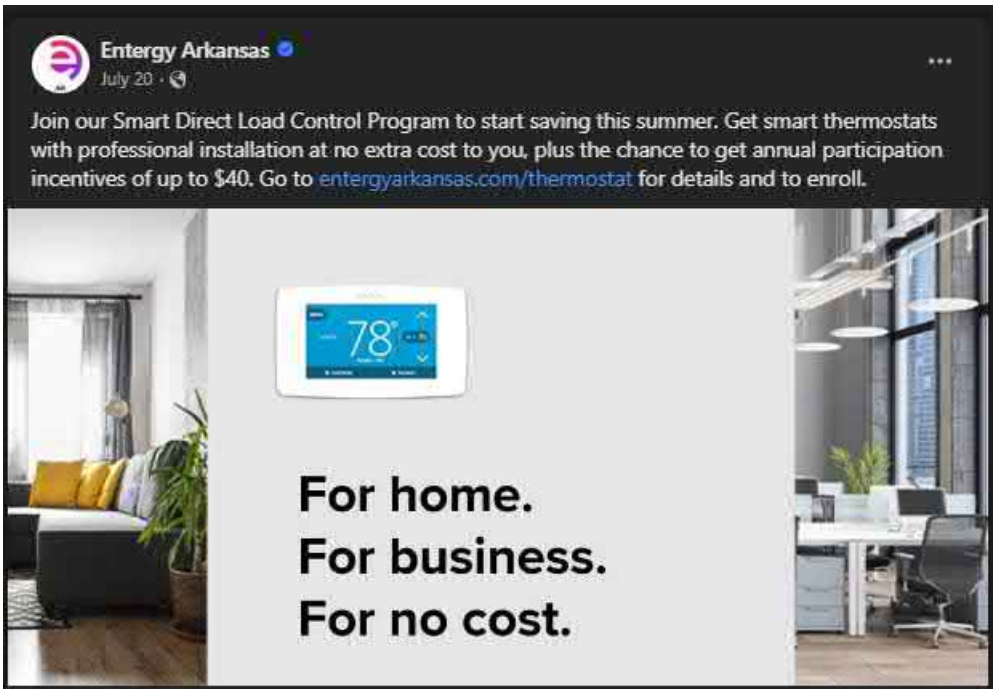
3.11.26 SDLC Social Media 2023



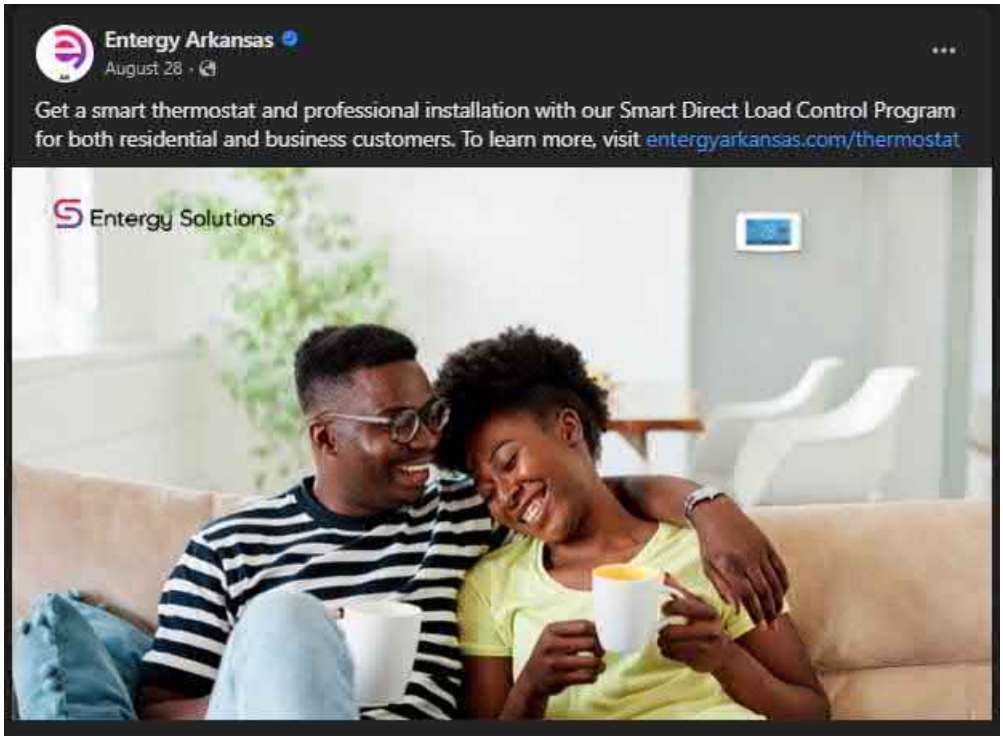


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3.12 Agricultural Irrigation Load Control
3.12.1 2023 AILC Renew Letter

entergy

Santiago Asimbaya
Program Manager
501-377-3512 | sasimba@entergy.com
425 W Capitol Ave, Little Rock, AR 72201

Farmer Business Name % person
Address
City, State Zip

Dear Farmer:

Renew your Agricultural Irrigation Load Control program agreement today to increase your incentive payments this season.

Our records indicate that the load control device has already been installed on some of your active wells; however, these wells are not currently registered to qualify for AILC program rebates under the current customer account.

To renew these wells for 2023, simply scan the QR code shown below with your smartphone camera to be forwarded to the AILC program renewal webpage. Once there, submit the required information and a program representative will return an electronic agreement with the qualified well numbers listed for your review and approval. You can also email **farmers@entergy.com** or call **855-664-3276** for more information or to complete well renewals.

(Scan here to submit a request)

Thank you for doing your part in helping to reduce peak energy load for all Entergy Arkansas customers. Please renew your AILC accounts today and make this a profitable season.

Sincerely,

Santiago Asimbaya
Entergy Arkansas, LLC

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3.12.2 2022 AILC Incentive Letter FINAL – June



entergy

Santiago Asimbaya
Program Manager
501-377-3512 | sasimba@entergy.com

Dear AILC Participant:

We are pleased to provide the attached incentive check to you for your farm's participation in the Entergy Arkansas 2023 Agricultural Irrigation Load Control Program during the month of June.

As the program agreement outlined, the June incentive payment was based on the number of your participating pumps in the program as of the end of the month, the run-time of the pumps during the month and the motor size of each pump. Each participating pump had to have a minimum run-time of 64 hours in the month to qualify for an incentive.

To review the incentive schedule, visit:

entergyarkansas.com/irrigation

Thanks again for your participation in this valuable program.

Sincerely,

Santiago Asimbaya
Entergy Arkansas, LLC

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3.12.3 AILC Incentive Letter FINAL – July



entergy

Santiago Asimbaya
Program Manager
501-377-3512 | sasimba@entergy.com

Dear AILC Participant:

We are pleased to provide the attached incentive check to you for your farm's participation in the Entergy Arkansas 2023 Agricultural Irrigation Load Control Program during the month of July.

As the program agreement outlined, the July incentive payment was based on the number of your participating pumps in the program as of the end of the month, the run-time of the pumps during the month and the motor size of each pump. Each participating pump had to have a minimum run-time of 64 hours in the month to qualify for an incentive.

To review the incentive schedule, visit:

entergyarkansas.com/irrigation

Thanks again for your participation in this valuable program.

Sincerely,

Santiago Asimbaya
Entergy Arkansas, LLC

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3.12.4 AILC Incentive Letter – August



entergy

Santiago Asimbaya
Program Manager
501-377-3512 | sasimba@entergy.com

Dear AILC Participant:

We are pleased to provide the attached incentive check to you for your farm's participation in the Entergy Arkansas 2023 Agricultural Irrigation Load Control Program during the month of August.

As the program agreement outlined, the August incentive payment was based on the number of your participating pumps in the program as of the end of the month, the run-time of the pumps during the month and the motor size of each pump. Each participating pump had to have a minimum run-time of 64 hours in the month to qualify for an incentive.

To review the incentive schedule, visit:

entergyarkansas.com/irrigation

Thanks again for your participation in this valuable program.

Sincerely,

Santiago Asimbaya
Entergy Arkansas, LLC

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3.12.5 AILC Terms and Conditions FINAL V.0.pdf

Entergy Arkansas LLC Agricultural Irrigation Load Control Program
Terms and Conditions

Program Eligibility
To participate in the Agricultural Irrigation Load Control (AILC) program, participants must have 1) An active non-residential account in good standing with Entergy Arkansas LLC; 2) Authorization to modify existing motor configuration 3) A motor size of at least 10 HP, which is the minimum size to participate in the program 4) Accessible motor control panels capable of accommodating program equipment.

Program Incentives
Participating customers may qualify to receive a monthly rebate incentive for the program months of June, July and/or August. The incentive will be paid for each month of active participation regardless of whether any curtailment events were called in that month. Incentive levels will vary by motor size. Entergy Arkansas LLC anticipates the average incentive to be $100 per month for June, July and August, and the incentive level is described in the Table below:

	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Tier 7	Tier 8	Tier 9
Motor HP	10-25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	*Larger*
Monthly Incentive*	$ 50.00	$ 100.00	$ 200.00	$ 250.00	$ 350.00	$ 450.00	$ 550.00	$ 650.00	*Upon Request*
**Incentive void if a participant's actions interfere with a curtailment event. A minimum of 64 run-time hours for a pump is required during the program calendar months of June, July and/or August to qualify for a rebate incentive payment for that month.*									

If a participant chooses to opt out of the program during a curtailment event, the participant forfeits that month's incentive. Active participation is defined as 1) A participant must have an active, non-delinquent, non-residential Entergy Arkansas LLC account 2) The participating account must be equipped with AILC control equipment except where Entergy Arkansas LLC has failed to install equipment through no fault of the participant. 3) The enrolled motor must be available for curtailment during the designated program hours. Only the motor's ability to be activated remotely is required to participate the motor is not required to be on for the motor to be considered available. 4) A minimum of 64 run-time hours during the program month is required. This is equivalent to running the motor 16 hours a day for four times during the month.

Enrollment
The open enrollment period is from February 1, 2021 through August 15, 2021 (or until all of the required enrollments for that program season are received). Eligible customers must furnish Entergy Arkansas LLC written or electronic consent for the installation of the control device. If the participation response is greater than anticipated, Entergy Arkansas LLC will establish a waiting list for program participation for the following program year.

Equipment Installations and Maintenance
BPL Global LLC, d/b/a Connected Energy, Entergy Arkansas LLC's implementing contractor, will coordinate the installation of all program equipment. The equipment will be tested for operability during the installation process. This testing may require the motor to be turned off and on via the controller unit, which utilizes cellular technology. The unit will also be tested to ensure the unit is reporting the correct load after installation. Please note that once the installation is complete, it may take as much as 24 hours for the motor and controller to be operated remotely through the participant web-portal (in most cases the availability will be a matter of minutes).

Existing participants which had the program equipment installed from 2008-2013 may now upgrade your AILC equipment by having a new CNRG controller installed. These participants must re-register using the remote AILC website (https://ter-fp.cnrg.com/) to operate these locations. All program equipment remains property of the AILC program, and any maintenance issues should be reported to the Entergy Arkansas LLC Irrigation Desk at 1-800-324-4709 or Entergy Outage at 1-800-9OUTAGE. For specific controller questions or to gain farmer portal access, participants may call Connected Energy's farmer help line at 1-855-664-FARM (3276). The participant agrees to allow Entergy Arkansas LLC representatives to have access to the pumping unit for the purpose of installing, testing and maintaining the remote control device at all times.

Equipment Operation and Remote Access
After the AILC equipment has been installed, the participant may operate the pump motor as normal. The controller is wired to turn the motor on or off remotely but will not interfere with manual operation. The controller is equipped with an amber LED indicator. When the amber LED is on, a curtailment event is in effect. During a curtailment event, the motor is de-energized and the motor will not operate. To operate the pump remotely, the participant must register in the AILC website (ttps://ter-fp.cnrg.com/). Once registered, the participating wells will be displayed along with their current availability, run status and load. If the motor is on, a history of the load in kW is recorded and displayed. If the motor is available, the motor can be turned on, or if it is already turned on, it may be turned off. As a precaution against motor damage, the start function will be temporarily locked out for six (6) minutes after the motor has been turned off. Remote operations of the pump(s) will not be accessible during any AILC curtailment.

Curtailment Events
Entergy Arkansas LLC may conduct test curtailments during the equipment's installation to test the communications and operations. Other test curtailments may occur as required. The AILC program will only curtail the participating irrigation loads from June 1 through August 31. Except in cases of emergency, the curtailments may only be scheduled on weekdays for a total of up to four hours (not counting an up to 15 minute ramp-up window) and be limited to occur between 12 p.m. noon and 9 p.m. Additionally, Entergy Arkansas LLC will limit planned curtailment events to no more than two events in one calendar week. Emergency Events may occur at any time from June 1 to August 31 regardless of program limitations. Before a curtailment event, the participant will receive an e-mail or text message notifying him or her of an upcoming curtailment. The message will include the duration of the curtailment as long as curtailment notification is selected during the enrollment process. Remote operations of the pump(s) will not be accessible during any AILC curtailment.

Renewals, Termination or Expulsion
Enrollment starts February 1 and continues through August 15 (or until all of the required enrollments for that season are received). Participation in this program shall be from the date of successful equipment installation or June 1, 2021, whichever is later, to August 31, 2021 and shall be automatically renewed for successive peak seasons in succeeding years unless terminated by the participant. If participants find they cannot continue or do not wish to continue participation in the program, participants may opt out or discontinue participation by forfeiting any pending monthly incentives. Participants may opt-out and re-enroll in the program at any time prior to June 1, 2021. After June 1, a participant may opt-out of the program; however, his or her re-enrollment into the program will be considered on a case-by-case basis. Allowable mid-season re-enrollment examples would be administrative error, change of pump ownership or management, account activation or de-activation, and pump motor modifications. Unless equipment removal is requested, opting out of the program will initiate field services to place the load control box on "by-pass" mode. This will allow the opt-out customer to experience uninterrupted service and allow future participation without additional service calls for equipment installation. If there is evidence of alteration or tampering with the AILC program's control equipment, the participant will reimburse Entergy Arkansas LLC for repair costs. Furthermore, if Entergy Arkansas LLC considers the tampering to be recurrent or malicious, Entergy Arkansas LLC may cancel participation in this program, nullify any pending incentives, remove its control device and bill the participant the removal costs of $1,950.00.

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3.12.6 AILC Program Agreement 2023

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ENTERGY ARKANSAS AILC PROGRAM NEW OR RENEWAL ENROLLMENT

Entergy Arkansas, LLC
Agricultural Irrigation Load Control Program Confirmation Agreement

*Attention customer: Based on our information, the wells listed below are eligible to be enrolled or renewed in Entergy's Agricultural Irrigation Load Control program. If you have questions about the AILC program or the wells listed, please call **855-664-3276** for further assistance.*

Customer or Farm Name BORING FARMS
Entergy BP#: 698899
Well(s) for AILC program enrollment or renewal: WELL 134567 WELL 234987 WELL 154665
ESign:_____DATE: _____ Name: *Your electronic signature indicates that you agree with the Entergy AILC program Terms and Conditions (document included) and agree to use an electronic signature.*

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3.12.7 2023 AILC Flyer Overview and FAQ



Save time and earn cash by enrolling now

Your large motor wells receive large checks.

Monthly cashback incentives

Motor Horsepower	10-25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	Large HP
Monthly Incentive*	$50	$100	$200	$250	$350	$450	$550	$650	Upon Request

*Incentives void if customer actions interfere with an event. Minimum of 64 hours of monthly runtime required during AILC Program months.

- The Agricultural Irrigation Load Control (AILC) Program period is June 1 through August 31.
- The program is available to all Entergy Arkansas customers taking service under the Agricultural Pumping Service rate schedule.
- There are no installation fees.
- You will have remote access to your wells throughout the growing season, not just during the program period. Pumps are controlled using wireless signals.
- During the program period, Entergy Arkansas might need to interrupt the electric service to the pump for no more than four hours each weekday, Monday through Friday, between the hours of noon and 9 p.m., excluding holidays.*
- Cashback is mailed approximately two weeks following end of month.
- Maximum irrigation loads and air conditioning loads coincide on hot summer afternoons and place the greatest demand on electricity resources that serve you. This program helps to reduce some of that demand for the benefit of all customers.
- Entergy Arkansas enables farmers to remotely operate wells enrolled in the Agricultural Irrigation Load Control Program year-round from your laptop, tablet or smartphone. Now, you can turn your compatible wells on or off from home, in town or in the field anytime of the day or night.

Program benefits

- Cashback is mailed approximately two weeks following end of month – an average of $100 per pump, per month for the AILC Program months of June, July and August.
- Operate wells from anywhere, anytime with a laptop, tablet or smartphone. There is no more need to drive from well to well in the middle of the night just to turn them on or off.
- You will receive advance notifications from Entergy Arkansas when wells will be turned off or on.
- Save an average of $350 per pump per month in June, July and August on your motors between 100-150hp. Larger motors will qualify for larger monthly incentives.

To certain emergency situations, Entergy Arkansas could be required to curtail service to preserve system integrity. For details, visit us online.

Sign up some or all of your pumps

Program participation is limited, so reserve your place today to be eligible for seasonal monthly incentives.
Call 855-664-FARM (3276) or email farmers@entergy.com now to get more information.
Also visit entergyarkansas.com/irrigation

Frequently asked questions

For complete details, visit our website at entergyarkansas.com/irrigation.

How is the payment calculated?

The payment is based on rated horsepower of the pump motors in the program. At the end of each month, rebate incentives earned for the total number of pumps enrolled for the entire month are calculated. Entergy Arkansas' program agent will send you a check within about two weeks.

How does the remote switching work?

Farmers participating in the AILC Program can use the same technology Entergy Arkansas uses to remotely control their irrigation wells. Farmers will have access to a secure website where they can register any qualified, participating and active irrigation well for remote control by a laptop, tablet or smartphone. Please note: remote control access will not be available during the hours of load control interruption. Otherwise, you can manage your wells' operation at any time during the growing season.

Why is Entergy Arkansas offering this program?

We want to help customers save money and also reduce the total peak load -- the amount of electricity required to serve all our customers during the weekday periods of summer afternoons. As seen in previous years, reducing peak load benefits all of our customers.

Are there any installation fees?

There are no installation fees. To participate, you must allow Entergy Arkansas contractors access to the motor control panel.

Have participating farmers been satisfied with your program?

Yes. Of the farmers polled at the end of the 2022 season, nearly 80% expressed satisfaction in the overall program. 91% of the 2022 respondents plan to stay in the program.

What happens if I choose to terminate the program before the three months are over?

You may end your participation for a specific well or for all of your wells by calling us at 855-664-FARM (3276). But if you do, you will not receive a payment for the month in which you terminate or any subsequent month.

What if something goes wrong with the meter or the switching controls?

Installation and maintenance are Entergy Arkansas' responsibility. During business hours, call 855-664-FARM (3276). During nights, weekends and holidays, call 800-9OUTAGE (800-968-8243).

We make it simple to participate

To participate in the AILC Program, you must agree to allow Entergy Arkansas to:

- Install a load control device on your pump, which will turn the power off and on to the pump. There is no installation fee for these devices.
- Allow us to turn off the pump for up to four hours per day, Monday through Friday, anytime between the hours of noon and 9 p.m., excluding holidays. Pumps will be turned off and on remotely by a two-way communication system.
- Upon request, we will send you texts or emails to let you know when the well will be turned off and when the pump is available again after the interruption.
- You can opt out of the AILC Program anytime during June, July or August. You may end your participation for a specific well or for all of your wells by calling 855-664-FARM (3276). But if you do, your pumps will be ineligible for an incentive payment for the month in which you terminate and all subsequent AILC Program months.

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3.12.8 First chance Fall Enrollment Postcard





Dear Farmer,

Enroll in Entergy's Agricultural Irrigation Load Control (AILC) program today to earn monthly incentive checks next summer. Participating AILC farmers can earn an average of $100 per well each month, and larger pump motors will earn greater incentives.

To enroll wells now for 2024, scan the QR code with your smartphone camera to be forwarded to the AILC program enrollment webpage. Once there, submit the required information, and a program representative will return an electronic agreement with the qualified well numbers listed for your review and approval. You can also email **ailcfarmers@pigglobal.net** or call **855-664-3276** for more information or to complete new enrollment requests.

Enroll your qualified AILC wells today and make 2024 a profitable season.

Entergy Solutions

CONNECTED ENERGY

651 HOLIDAY DR, SUITE 400
PITTSBURGH, PA 15220

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3.12.9 AILC Reenrollment email 203



Entergy Solutions

Enroll today to earn cash in 2024

Enroll in Entergy's Agriculture Irrigation Load Control (AILC) program now to earn incentive checks next summer.

CLICK HERE TO REQUEST YOUR PROGRAM ENROLLMENT

Entergy has determined that your farm manages well accounts that may qualify for seasonal AILC program incentive payments.
Contact us at ailcfarmer@bplglobal.net to enroll these wells now and earn incentive checks in 2024.

Participating AILC farmers can earn an average of $100 per well each month, and larger pump motors will earn greater incentives. This new program enrollment offer is being sent to qualifying Entergy irrigation customers, and participation in 2024 is limited.

To learn more about Entergy's AILC program, please click here for general program and incentive information, call 855-664-FARM (3276) or email ailcfarmer@bplglobal.net.

We power life. entergy

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3.12.10 AILC Social Media 2023





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