OKLAHOMA GAS and ELECTRIC COMPANY

2020 Arkansas Energy Efficiency Program Portfolio Annual Report

Section 9: Annual Reporting Requirements, and Order No. 29 in Docket No. 06-004-R.
Version 3.0 May 20, 2014

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1.0 Executive Summary

Oklahoma Gas and Electric Company ("OG&E" or "Company") hereby submits its Energy Efficiency ("EE") program portfolio Annual Report for Program Year ("PY") 2020 to the Arkansas Public Service Commission ("APSC" or "Commission") pursuant to Order No. 29 in Docket 06-004-R. This report is required to be filed annually by May 1, in accordance with Order No. 7 filed in Docket 13-002-U on May 20, 2014.

HISTORY:

OG&E began implementation of EE programs in Arkansas in December 2007 with its Quick Start program portfolio. The Quick Start Portfolio continued through December 31, 2009. That portfolio contained seven programs in total: five OG&E-administered programs and two state-administered programs. The OG&E-administered programs included the LivingWise® Student Energy Education program, the Residential Energy Audit program, the Commercial Lighting program, the Motor Replacement program, and the Compact Fluorescent Light ("CFL") program. The two state-administered programs included were the Arkansas Weatherization Program ("AWP"), and the Energy Efficiency Arkansas ("EEA") program. The CFL program was not launched with the other Quick Start programs and was ultimately discontinued. The Quick Start portfolio allowed OG&E to build a program delivery framework for its customers in the Arkansas jurisdiction.

The initial Comprehensive Energy Efficiency Program was approved on February 3, 2010 for an 18-month implementation period ending on June 30, 2011. The initial Portfolio included the continuation of the two statewide programs, AWP, and EEA, and three OG&E programs: LivingWise® Student Energy Education, Commercial Lighting, and Motor Replacement programs. The Residential Energy Audit program was renamed the Custom Energy Report ("CER") program and the new OG&E Weatherization program was introduced. The OG&E Weatherization program was established to offer weatherization for residential customers who would not otherwise qualify for the AWP.

The Comprehensive Portfolio was approved on June 30, 2011 for the remainder of PY 2011. PYs 2012 and 2013 were subsequently approved on December 30, 2011. The two statewide programs, AWP, and EEA were continued along with OG&E's Commercial Lighting program and the LivingWise® Student Energy Education program. The OG&E Weatherization program was modified to a collaborative program with Arkansas Oklahoma Gas Corporation ("AOG") to take advantage of administrative efficiencies and cost sharing. The Motor Replacement Program was incorporated into the new Commercial and Industrial Standard Offer Program ("C&I SOP"). In addition, new programs were created for both residential and non-residential customers. For residential customers, the A/C Tune-up and duct repair program, the Window Unit A/C program, and the Multi-Family program were created to provide a more diverse residential portfolio of programs. After the plan was approved, it was determined the Multi-Family program could not be implemented as designed and was discontinued. For non-residential customers, in addition to

the C&I SOP, the Commercial Tune-up program was created to inspect and tune commercial HVAC systems.

In January 2013, the APSC opened Docket 13-002-U to resolve issues related to the development and implementation of the second three-year cycle of EE programs in Arkansas. In Order No. 2 of that same Docket, the APSC approved the request of the Parties Working Collaboratively ("PWC") extending the filing date for the second three-year cycle of EE programs from June 1, 2013 to June 1, 2014. The Commission also directed that energy savings targets, budgets, and the incentive structure previously approved by the Commission shall also be used for PY 2014. The exception to this was if the Utilities sought Commission approval of proposed modifications to their EE portfolios.

OG&E reviewed its portfolio performance through 2013 and filed an application to modify its existing portfolio and enhance its ability to achieve Commission-approved targets for 2014. OG&E's interim filing proposed to modify its portfolio by discontinuing three programs, adding one new program, increasing the budget for industrial programs, and aligning its rebate structure with Commission approved targets. The three programs that were discontinued were the Residential HVAC program, the Commercial and Industrial HVAC program, and the Window Unit AC program. The new program added was the Multi-Family Direct Install program. On March 17, 2014, the Commission approved OG&E's modified portfolio.

In February 2014, the APSC issued Order No. 15, in Docket 13-002-U extending for a second year, the filing date for the second three-year cycle of programs to June 1, 2015. The extension allowed time to complete efforts to develop a collaborative weatherization program, core C&I programs, and complete a potential study. In addition, the Commission approved a target increase of 0.90 percent of 2013 kWh sales for PY 2015. To meet the increased target for 2015, OG&E filed an application to increase the budgets by 40 percent for 3 of its programs to enhance its ability to achieve the new target. On April 1, 2015, the APSC approved OG&E's budget increases for PY 2015.

In August 2015, the APSC issued Order No. 67, in Docket 07-075-TF approving OG&E's PY 2016 Portfolio of Programs. Modifications made from PY 2015 to PY 2016 include the discontinuation of the AWP program, additions to the measure mix, and resulting budget increase for the OG&E/AOG (Unified) Weatherization program.

On June 1, 2016, OG&E filed the next triennial 2017-2019 Portfolio Plan and was approved by the Commission on October 7, 2016 through Order No. 73 in docket 07-075-TF. The most significant change from the prior portfolio is the consolidation of programs into sector-specific umbrella programs offering multiple marketing channels to improve accessibility to incentive funds when one channel is performing in a more cost-effective manner than another. The Commercial Lighting and Standard Offer Programs were combined into one Commercial Energy Efficiency Program ("CEEP") with multiple marketing channels such as Schools and Government, Large C&I, and Small Business Solutions. Multi-Family Direct Install and Schools Energy Education (LivingWise®) were both combined into a Home Energy Efficiency Program ("HEEP") with additional channels such as Consumer Products, Residential Solutions, and HVAC Replacement and Tune-ups. The Consistent Weatherization Approach ("CWA"),

referred to as the OG&E/AOG (Unified) Weatherization Program ("UWP") in Annual Reports previous to Order No. 22 of Docket No. 13-002-U, and the EEA Program remained unchanged as stand-alone programs.

On March 8, 2018, OG&E filed for the inclusion of the Continuous Energy Improvement ("CEI") Pilot Program for 2018 and 2019 into the existing CEEP Program in the 2017-2019 Portfolio Plan and was approved on March 23, 2018 through Order No. 80, in Docket 07-075-TF.

On March 15, 2019, OG&E filed the next triennial 2020-2022 Portfolio Plan and was approved by the Commission on June 17, 2019 through Order No. 88 in docket 07-075-TF. To assist in addressing Act 1102 Low-Income and over age 65 customers, OG&E carved out five percent of the CWA Program funds and incorporated additional health and safety measures. A soft cap of $3,800 per home was implemented. The HEEP Program placed more emphasis on in-home assessments with direct install measures to drive participation in HVAC tune-ups and replacements to offset the reduction in lighting kWh savings. It also targeted remaining cost effective envelop measure opportunities as it begins to move away from lighting due to the anticipated EISA baseline changes. CEI and Retro-Commissioning ("RCx") channels were added to the CEEP Program.

Table 1-1 below summarizes historical annual incremental EE savings achieved by OG&E's previous efforts:

Table 1-1 Historical Annual Incremental EE Savings Achieved

Program Year	Energy (kWh)	% Increase from Prior Year	Demand (kW)	% Increase from Prior Year
2008	2,434,738		666	
2009	5,607,951	130%	921	38%
2010	4,143,096	-26%	1,317	43%
2011	4,985,328	20%	1,520	15%
2012	7,595,741	52%	1,840	21%
2013	13,410,729	77%	2,797	52%
2014	13,794,070	3%	2,883	3%
2015	20,543,040	49%	3,115	8%
2016	23,257,181	13%	3,434	10%
2017	21,130,663	-9%	3,396	-1%
2018	22,556,832	7%	3,974	17%
2019	26,071,158	16%	4,591	16%
2020	28,050,242	8%	4,878	6%

GOALS AND OBJECTIVES:

Order No. 15 in Docket 08-137-U established default energy savings target as percentage of

2010 energy sales. In 2020, the energy savings target increased to 1.20 percent of 2018 energy sales, adjusted for self-direct customers per Order No. 43 in Docket 13-002-U.

The annual energy savings targets as a percentage of baseline sales and the corresponding filed energy savings targets and goals are shown in Table 1-2 below.

Table 1-2 Annual Energy Savings Targets and Goals

Program Year	Baseline Sales Year	Percent of Sales	Energy Savings Targets (MWh)	Filed Energy Savings Goals (MWh)
2011	2010	0.25%	6,752	6,753
2012	2010	0.50%	11,364	11,364
2013	2010	0.75%	16,844	16,844
2014	2010	0.75%	16,288	16,288
2015	2013	0.90%	18,904	19,879
2016	2014	0.90%	18,623	19,328
2017	2015	0.90%	18,058	18,063
2018	2015	0.90%	18,058	18,063
2019	2015	1.00%	20,531	20,136
2020	2018	1.20%	25,909	24,675

OG&E's filed energy savings goal for 2020 was 24,675,000 kWh. After adjusting for self-direct customers from the baseline year, the baseline target was 25,909,468 kWh. The 2020 EE portfolio actual achieved energy savings were 28,050,242 kWh.

MAJOR ACCOMPLISHMENTS:

OG&E continued its success in 2020 by exceeding both the targeted and filed energy savings goals, reaching 114% of the filed goal while spending 75% of the planned budget.

PROGRESS ACHIEVED:

The program portfolio has demonstrated continued success by consistently outperforming savings goals over the past five years. The historical annual energy savings to goal achievements is illustrated in Table 1-3 below. Table 1-4 below depicts the growth in year over year kWh achieved savings and improved cost per kWh success.

Table 1-3 Historical Annual Energy Savings to Goal Achievement

Program Year	Energy Savings Goal (kWh)	Energy Savings Achieved (kWh)	% of Goal Achieved
2011	6,752,758	4,985,328	74%
2012	11,363,560	7,595,741	67%
2013	16,843,560	13,410,729	80%
2014	16,287,689	13,794,070	85%
2015	19,879,081	20,543,040	103%
2016	19,328,413	23,257,180	120%
2017	18,062,811	21,130,663	117%
2018	18,062,811	22,556,832	125%
2019	20,136,187	26,071,158	129%
2020	24,675,000	28,050,242	114%

Table 1-4 Historic kWh savings and costs per kWh achievement

Program Year	Energy (kWh)	Demand (kW)	Total Portfolio Costs	$/kWh	$/kW
2011	4,985,328	1,520	$2,071,159	$0.42	$1,363
2012	7,595,741	1,840	$3,149,264	$0.41	$1,712
2013	13,410,729	2,797	$3,714,378	$0.28	$1,328
2014	13,794,070	2,883	$4,547,079	$0.33	$1,577
2015	20,543,040	3,115	$6,075,144	$0.30	$1,950
2016	23,257,180	3,434	$6,362,822	$0.27	$1,853
2017	21,130,663	3,396	$6,404,252	$0.30	$1,886
2018	22,556,832	3,974	$6,940,945	$0.31	$1,747
2019	26,071,158	4,591	$7,184,464	$0.28	$1,565
2020	28,050,242	4,878	$6,866,723	$0.24	$1,408

HIGH-LEVEL RECAP:

The 2020 portfolio produced 28,050,242 kWh exceeding OG&E's savings goal. These ongoing energy savings will accumulate over the life of the EE measures. The EE portfolio recoverable expenses of $6,866,723 for 2020 were 75% of the approved annual budget of $9,131,857. Customer incentives and rebates account for 64% of the total portfolio expenses.

HIGHLIGHTS OF WELL-PERFORMING PROGRAMS:

The Commercial & Industrial program offerings demonstrated continued success in 2020 under the CEEP umbrella, achieving 120% of the planned savings goal while spending 85% of the budget. This accounted for 72% of the total Portfolio energy savings.

There are four residential channel offerings under the HEEP umbrella. The combined channels achieved 125% of the HEEP savings goal while spending only 84% of the planned budget. HEEP accounted for 15% of OG&E's residential portfolio energy savings and penetrates a hard to reach customer segment allowing for more customers to participate and be further educated in the energy management of their home.

WHAT'S WORKING AND WHAT'S NOT:

The residential portfolio of EE programs is working well. The HEEP Program portion of the residential portfolio achieved 125% of energy savings goals while spending 84% of the total HEEP residential filed budget. The current EM&V reports validate the impact and process success of OG&E's residential programs. The CWA achieved 81% of energy its energy savings goal while spending 59% of its budget. For the safety of customers and OG&E staff and contractors, this program was put on pause for three months during the height of the COVID-19 pandemic which led to lower than anticipated savings and budget spend in the CWA.

The commercial portfolio of EE programs achieved 120% of energy savings goals while spending 85% of the revised budget under the CEEP program.

TRAINING ACHIEVEMENTS:

OG&E provided in person and virtual educational sessions with commercial and industrial customers on the benefits of energy efficiency.

EM&V ACTIVITIES:

ADM and Associates, Inc. was selected to perform the evaluation, measurement, and verification ("EM&V") for the entire EE program portfolio for PY 2020. EM&V activities were performed in accordance with the Arkansas Technical Reference Manual ("TRM") Version 8.1. The EM&V report details the findings and are included in Appendix A of this annual report.

LONG-TERM ENERGY SAVINGS:

The current program portfolio was developed to meet the energy efficiency targets established by the APSC in Order No.31 in Docket 13-002-U. The expected kW and kWh savings delivered by this portfolio, estimated kW and kWh savings from future portfolios, and the cumulative kW and kWh savings from previous portfolios are included in the Company's load forecast. The Integrated Resource Plan incorporates this information in its planning report.

EE OVERVIEW:
The following three tables provide an overview of the EE portfolio results for PY2020:

Table 1-6 Portfolio Summary

2020 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 (%)
5	28,050	$ 6,866,723	$ -	$ 620,966	$ 12,567,109	2.48	2.77	1.20%	1.30%	108%

Table 1-7 Portfolio Costs by Program Summary

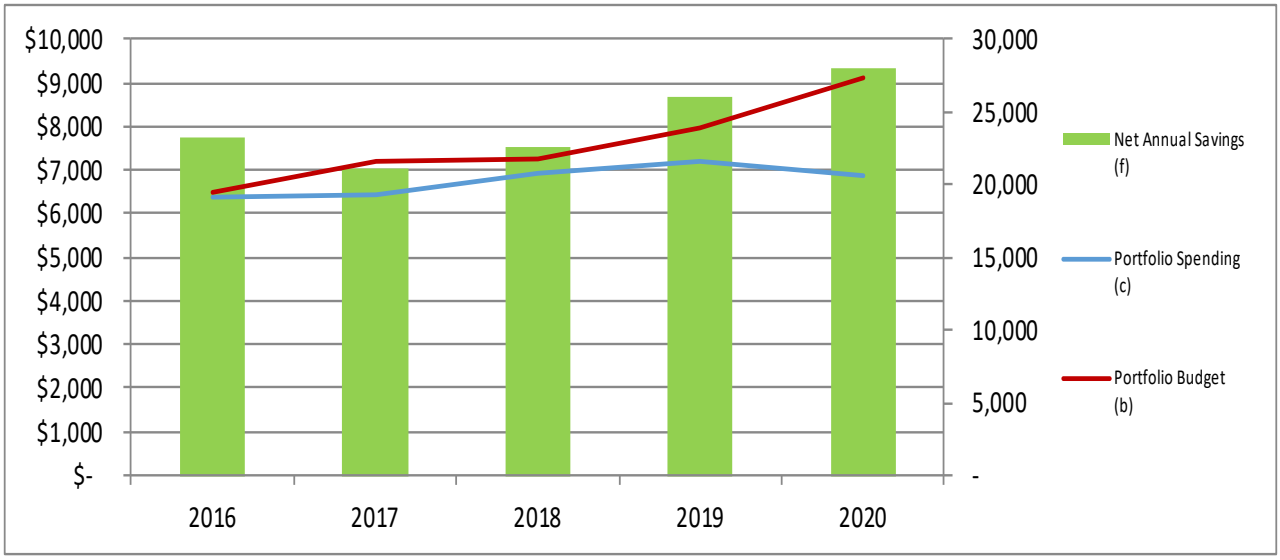
Program Name	Target Sector	Program Type	2020 Budget ($)	2020 Actual ($)	% of Budget
Consistent Weatherization Approach_CWA	Residential	Whole Home	$ 3,381,858	$ 2,003,327	59%
Home Energy Efficiency Program	Residential	Other	$ 1,034,342	$ 864,631	84%
Commercial Energy Efficiency Program	Small Business/C&I	Custom	$ 4,668,575	$ 3,976,594	85%
Energy Efficiency Arkansas	All Classes	Behavior/Education	$ 22,082	$ 22,170	100%
Planning	All Classes	Other	$ -	$ -	-
Regulatory	-	-	$ 25,000	$ -	0%
		Total	**$ 9,131,857**	**$ 6,866,723**	**75%**

Table 1-8 Portfolio Costs by Type Summary

Cost Type	2020 Total Expenditures % of Total	Budget ($)	Actual ($)	% of Total
Planning / Design	0%	$ -	$ -	0%
Marketing & Delivery	34%	$ 3,078,170	$ 1,917,539	28%
Incentives / Direct Install Costs	55%	$ 4,991,605	$ 4,420,048	64%
EM&V	3%	$ 295,000	$ 187,100	3%
Administration	8%	$ 742,082	$ 342,036	5%
Regulatory	0%	$ 25,000	$ -	0%
	100%	**$ 9,131,857**	**$ 6,866,723**	100%

Table 1-9 Company Statistics[1]

Company Statistics										
	Revenue and Expenditures					Energy				
		Budget		Actual			Plan		Evaluated	
Program Year	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) (MWh)	Net Annual Savings (e) (MWh)	% of Energy Sales (%=e/d)	Net Annual Savings (f) (MWh)	% of Energy Sales (%=f/d)
2016	$ 177,656	$ 6,471	3.6%	$ 6,363	3.6%	2,608,378	19,328	0.74%	23,257	0.89%
2017	$ 180,679	$ 7,182	4.0%	$ 6,404	3.5%	2,547,850	18,063	0.71%	21,131	0.83%
2018	$ 176,781	$ 7,266	4.1%	$ 6,941	3.9%	2,670,588	18,063	0.68%	22,557	0.84%
2019	$ 166,642	$ 7,949	4.8%	$ 7,184	4.3%	2,566,880	20,136	0.78%	26,071	1.02%
2020	$ 162,230	$ 9,132	5.6%	$ 6,867	4.2%	2,440,096	24,675	1.01%	28,050	1.15%



[1] Total annual energy sales include self-direct customer sales.

2.0 Portfolio Programs

2.1 Consistent Weatherization Approach

2.1.1 Program Description

This program in previous portfolios was referred to as the Unified Weatherization Program (UWP). It is designed to target residential customers and allow them to participate in the program with no out-of-pocket expense, this program provides customers the opportunity to actively manage their energy costs. The program targets residential single-family homes occupied in the past 12 months, which were built 10 or more years ago, or those that are severely energy inefficient with an electricity cost per square foot of more than 10 cents. Homes that meet these criteria begin with an energy audit utilizing blower door technology on the structure to capitalize on specific weatherization techniques. The program is designed to upgrade and improve the thermal envelope of the dwelling.

OG&E serves more than 56,000 residential customers in its Arkansas service territory and has estimated there are as many as 30,000 homes in need of weatherization improvements. OG&E views the weatherization program as a key component in its EE portfolio and uses three independent contractors: DK Construction, based in Van Buren (Crawford County), as well as Total Home Efficiency and Williams Energy, both based in south Fort Smith (Sebastian County). Each contractor is Building Performance Institute ("BPI"), Residential Energy Services Network ("RESNET"), and ISNetworld certified. OG&E personnel arrange training sessions to maintain consistent implementation practices across the weatherization program. Contractors are encouraged to attend these sessions and receive additional education on weatherization of homes, both online and in classrooms, for improvement in proper home weatherization techniques.

Energy-saving equipment or other in-home improvements include: replacement of glass and/or doors, LEDs, return air cavity sealing, CO detectors, smoke detectors, attic insulation, air infiltration, duct sealing, water heater pipe wrap, low flow shower heads, faucet aerators, water heater jackets, and advanced power strips. Utilizing blower door and duct blaster technology, the contractors can locate and seal larger areas of air infiltration in the homes.

OG&E and AOG continue to work together with contractors to ensure program success. The partnership with AOG has proven to be a successful collaboration for the joint weatherization program. The ability to work together with other utilities is an ongoing effort to combine resources as well as to reach more customers in overlapping service territories.

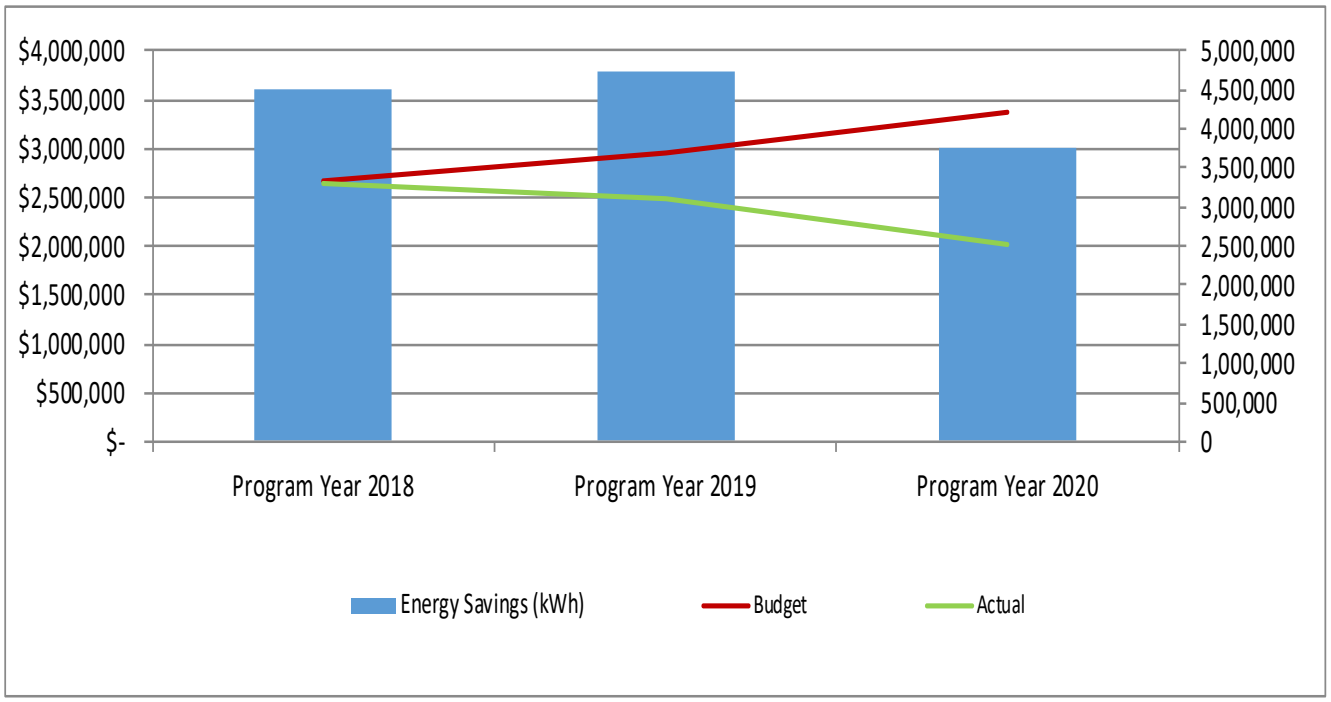
2.1.2 Program Highlights

- OG&E weatherized 1,184 homes in 2020.
- The CWA meets the requirements for the Arkansas Consistent Weatherization Approach.

2.1.3 Program Budget, Savings, and Number of Measures

Table 2-1 Consistent Weatherization Approach

Consistent Weatherization Approach												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2018	$ 2,655,440	$ 2,641,047	99%	4,230,489	4,494,838	106%	956	1,151	120%	1,600	1,506	94%
Program Year 2019	$ 2,947,890	$ 2,492,862	85%	4,671,768	4,732,484	101%	1,050	1,163	111%	1,600	1,339	84%
Program Year 2020	**$ 3,381,858**	**$ 2,003,327**	**59%**	**4,634,094**	**3,758,670**	**81%**	**1,052**	**919**	**87%**	**1,945**	**1,134**	**58%**



2.1.4 Description of Participants

Participants of this program must meet the following criteria:

- The home is 10 or more years old.
- Electricity cost exceeds 10 cents per square foot.

2.1.5 Challenges and Opportunities

- OG&E has maintained a steady pace in obtaining and qualifying customers' homes in a timely manner for weatherization.
- As this program has matured through the 2020 program year, long-term lead generation has been necessary for sustained success and is a concern moving forward, based on the state's requirements: if OG&E can continue to generate leads that fit the criteria as required by the state.

2.1.6 Planned or Proposed Changes to Program and Budget

- The CWA remains a standalone program in the new triennial 2020-2022 portfolio. To comply with Act 1102, OG&E proposed a low-income pilot program that is very similar to the Gas Utility proposal. To fund this pilot, 5% of the current CWA budget was carved out to address Act 1102. The participation goal was 80 homes. 249 homes qualified under Act 1102 in 2020 alone. A soft cap will be used for installing measures with a maximum of $3,800 per home.
- For 2021-2022 OG&E has contracted with CLEAResult to manage the CWA program.
- OG&E's budget for PY 2021 is $3,459,787.

2.2 Home Energy Efficiency Program

2.2.1 Program Description

HEEP identifies and serves single and multi-family property owners or managers who seek assistance in improving the efficiency of energy-consuming systems and components. The program provides energy-saving measures at reduced or no out-of-pocket cost for residential customers through several participation channels including Residential Solutions, Schools Outreach, HVAC Replacement and Tune-up, and Consumer Product Solutions. Upgrade measures include, but are not limited to: LED light bulbs, Advanced Power Strips (APS), low-flow showerheads, low-flow faucet aerators, duct sealing, air sealing, attic insulation, wall insulation, and ENERGY STAR® rated windows and pool pumps.

The LivingWise® Schools Outreach channel targeted sixth grade students and is designed to provide an educational opportunity to learn about energy-efficient prospects in their homes. This approach includes an established curriculum that teachers use to review and educate their students regarding activities that can help them save energy. The students are given an energy efficiency kit with easy-to-install measures (e.g., LEDs, aerators, and showerheads) that they take home to have their parents or guardians help them install.

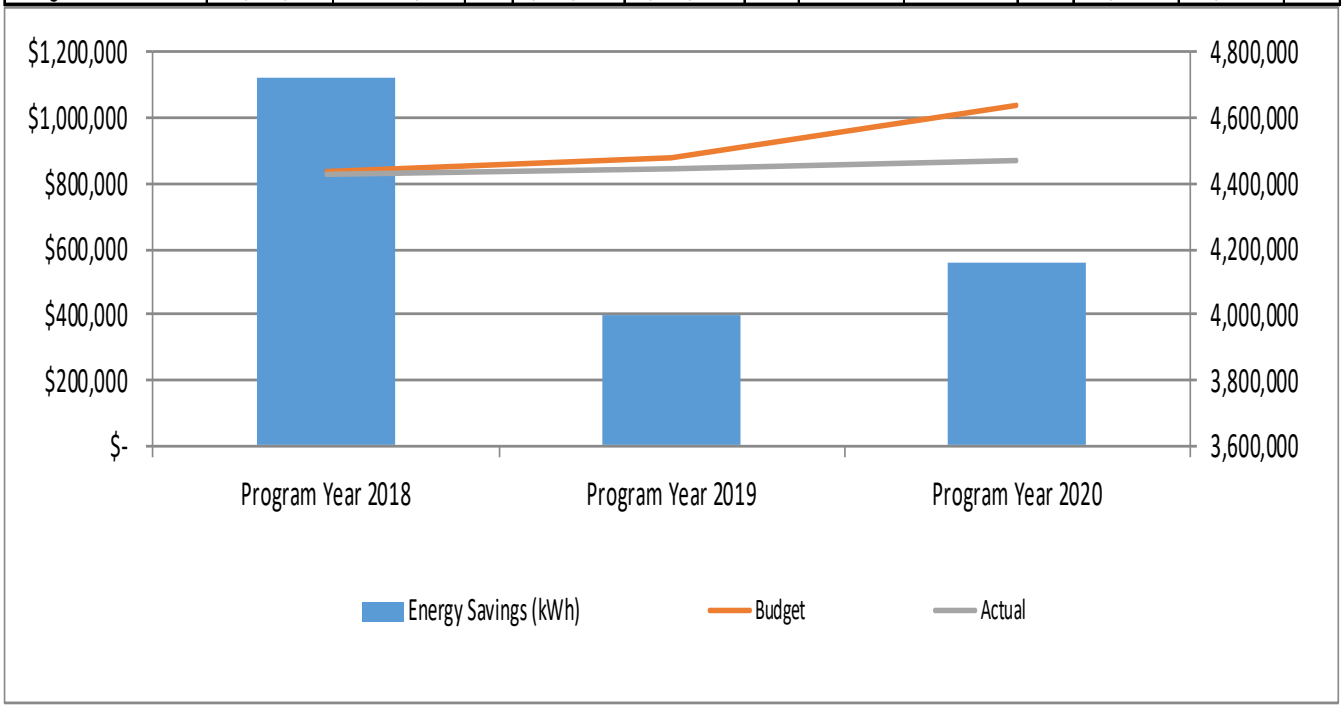
2.2.2 Program Highlights

- The PY 2020 program achieved 125% of the energy savings goal.
- The Consumer Products team activated 4-pack LED's at both Sam's Club and Walmart in the Fort Smith markets combined with channeling more funding to this particular program to account for the additional savings and to help aid in the deficiency in weatherization.
- The program reached 234 new participants in the HVAC Replacement and Tune-up channel which accounted for 122,384 gross kWh.
- The program team developed an In-home Energy Assessment model and successfully field-tested the process. The Assessment enabled the program to identify additional measures that participants with nontraditional dwellings qualified for that complement the CWA program. The coordinated effort between HEEP and CWA allowed for implementation of those identified measures.

2.2.3 Program Budget, Savings and Number of Measures

Table 2-2 Home Energy Efficiency Program Summary

Home Energy Efficiency Program												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2018	$ 832,464	$ 826,686	99%	1,880,716	4,723,382	251%	495	759	153%	39,328	139,690	355%
Program Year 2019	$ 873,627	$ 842,849	96%	1,879,206	3,995,618	213%	524	767	146%	34,891	98,690	283%
Program Year 2020	**$ 1,034,342**	**$ 864,631**	**84%**	**3,322,845**	**4,156,673**	**125%**	**590**	**714**	**121%**	**3,509**	**6,927**	**197%**



2.2.4 Description of Participants

- Participants within the HEEP Program include:
  - Multi-family residence – two or more storied structures where multiple families reside in multiple units under a single, contiguous roof most often described as apartments, duplexes, triplexes, condominiums, or townhomes.

        - Participants residing in apartment complexes or other multi-family units typically rent rather than own their housing. This arrangement requires OG&E to receive permission from the owner of the properties before EE measures are installed. Because of this arrangement, multi-family customers may be considered hard-to-reach when providing education and opportunities for managing energy use.

    - Single-family residence – one story structures where a single-family group resides in a standalone structure under a single contiguous roof.
        - This channel includes structures traditionally "stick-built" or with wooden framing.

- LivingWise® Student Energy Education - this channel focuses on sixth grade students in the public-school system. The kit provides several easily installed EE products for the home, allowing students and parents or guardians to have conversations about using energy efficiently. This program promotes EE education to the future homeowners, so they will understand the impacts of energy conservation and adopt a culture of energy efficiency.

2.2.5 Challenges and Opportunities

- The HVAC Replacement and Tune-up channel included a bill insert promoting a no-cost A/C system tune-up for eligible customers. Even with placing the bill inserts, there were challenges experienced due to COVID-19. Many customers were hesitant to have unknown individuals in their homes which resulted in lower than anticipated participation numbers.

- The program team is recruiting additional contractors to participate in the A/C Tune-up measures. By expanding this base, additional residential customers could be reached.

- The Consumer Products offering was expanded to include instant rebates for customers in select retail establishments that purchased qualified window A/C units. While the instant rebates were still offered on LEDs; by adding the window A/C units, there were 132 additional customers reached resulting in 34,306 kWh savings. This channel also offered instant rebates on advanced power strips (APS) in select retail locations which were well received by consumers. The rebate resulted in 1,805 APS installations in homes and saved a combined 302,157 kWh.

- LivingWise® Schools Outreach will transition to using an Advanced Power Strip (APS) in place of LED bulbs in 2021.

2.2.6 Planned or Proposed Changes to Program and Budget

- In 2021, the Consumer Products channel will expand by including energy efficient water coolers and bathroom vents at select retail locations. An in-store virtual/video option has been created and will be displayed at select retail locations to promote all instant rebate opportunities available to OG&E's residential customers.

- OG&E's proposed budget for PY 2021 is $1,075,755.

2.3 Commercial Energy Efficiency Program

2.3.1 CEEP Program Description

CEEP provides incentives to OG&E commercial customers in the Arkansas service territory, encouraging the installation or upgrade of more efficient equipment in energy consuming systems. The program is aligned toward commercial, industrial, public authority, schools, and small business facilities of all sizes. CEEP measures include but are not limited to; LED lighting and fixtures, compressors, variable speed fans, HVAC upgrades, weather stripping, occupancy-based technology, gaskets, strip curtains, refrigeration upgrades, and pre-rinse spray valves.

CEEP recruits and educates customers on the advantages of upgrading their energy systems through direct outreach, educational contacts, and booth displays at local vendor open houses. Many different avenues and strategies are used to encourage customers to upgrade energy consuming systems in each facility. CEEP works with lighting manufacturer representatives, conducting walkthrough audits and performing detailed, custom audits unique to the facilities. Commercial customers benefit from financial incentives, bill savings, and the energy management education the program provides.

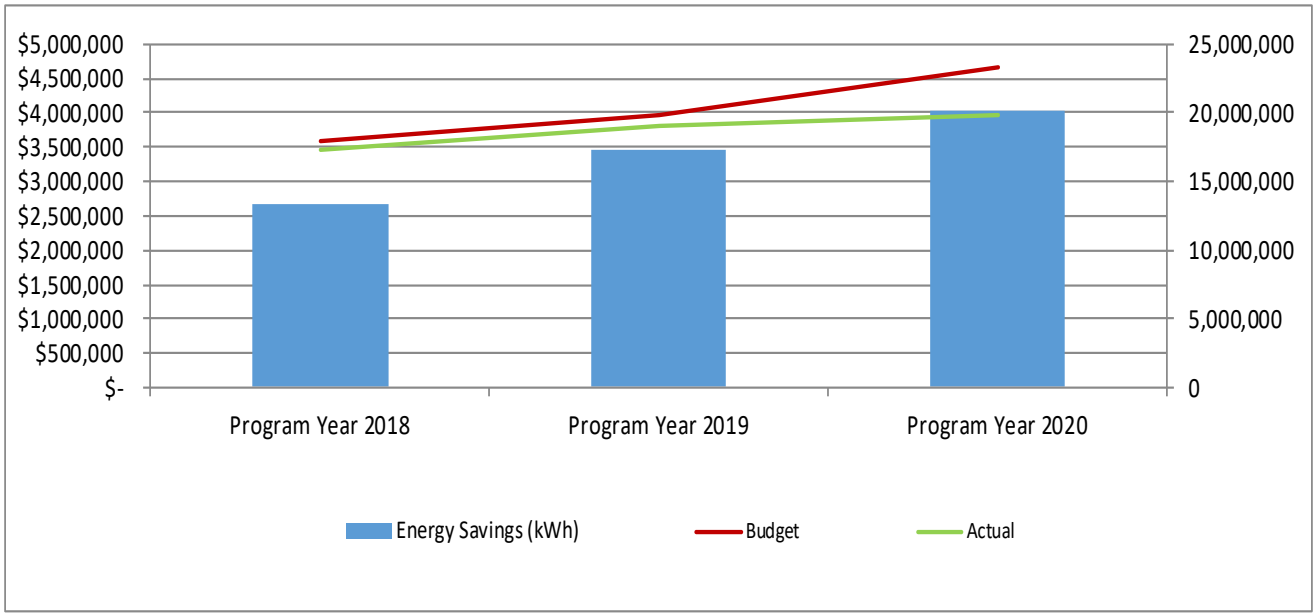
2.3.2 Program Highlights

- The CEEP program successfully reached business customers across the service territory. 245 projects were completed in 2020.
- PY 2020 was the first year commercial AC tune-ups were introduced. Many were performed at local schools.
- The Schools and Government Entities (SAGE) channel finished the year at 114% of goal helping carry the C&I portfolio. This is highlighted by the Fort Smith Convention Center's LED project.
- CEI finished 2020 at 117% of goal highlighted by Hiland Dairy's savings of 155,523 annual kWh.

2.3.3 Program Budget, Savings and Number of Measures

Table 2-3 – CEEP Program Summary

Commercial Energy Efficiency Program												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2018	$3,590,755	$3,451,254	96%	11,951,606	13,338,612	112%	2,014	2,064	102%	30,373	58,286	192%
Program Year 2019	$3,982,185	$3,816,677	96%	13,585,213	17,343,056	128%	2,343	2,661	114%	37,114	32,368	87%
Program Year 2020	**$4,668,575**	**$3,976,594**	**85%**	**16,718,061**	**20,134,899**	**120%**	**3,278**	**3,245**	**99%**	**503**	**245**	**49%**



2.3.4 Description of Participants

Participants in the program included large commercial, industrial, small business, schools, government and lighting distributor customers.

2.3.5 Challenges and Opportunities

- Significant customer demand for the Large Commercial and Industrial and Schools and Government channels created a backlog of potential projects. These projects were reviewed and placed in queue for PY 2021 incentive funding.

- While Commercial A/C Tune-Ups have been available to customers, in 2020 the HVAC contractors took advantage of this opportunity in earnest. With a decline in residential opportunities, they switched their focus to completing A/C tune-ups for many schools that were closed due to COVID-19. The participating schools will realize significant savings as a result of this completed work.

- The CEI Channel faced significant opposition in 2020. The amount of work required by the CEI participants, to be successful in the program, is challenging. This does hinder some customers' participation. Most industrial and commercial facilities (specifically school districts) are understaffed.

2.3.6 Planned or Proposed Changes to Program and Budget

- In PY 2021, A/C Tune-Up contractors plan to continue efforts with the schools and complete A/C Tune-Ups on larger units as opposed to the smaller units completed in PY 2020 to produce larger energy savings impacts for those customers.

- OG&E's proposed budget for PY 2021 is $4,869,415.

2.4 Energy Efficiency Arkansas Program

2.4.1 Program Description

The EEA Program provides information to all customers, of all classes, allowing them to make informed decisions about how they use energy and to consider alternatives to reduce their consumption rates, thereby decreasing demand and energy usage.

OG&E has continued its support of the EEA Comprehensive plan, provided by the Arkansas Energy Office ("AEO"), through three components: (1) residential education and information outreach, (2) media promotion, and (3) commercial and industrial education and outreach.

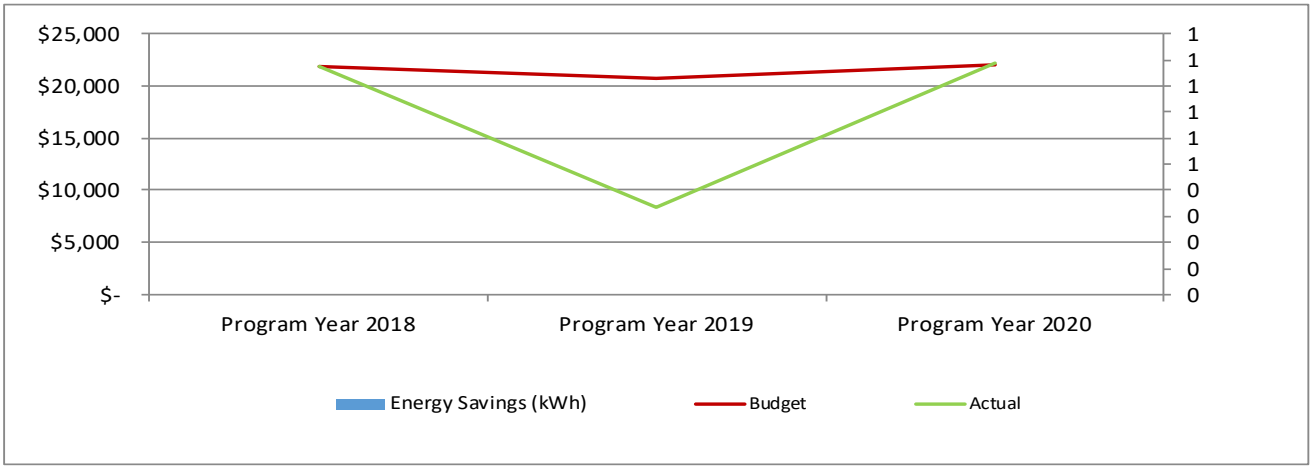
2.4.2 Program Highlights

EEA outreach events and training in the OG&E service territory did not occur in 2020 due to COVID-19. However, the EEA provided 13 online virtual webinar training events.
See section 4.1 Training in the EEA Annual Report 2020.

2.4.3 Program Budget, Savings and Participants

Table 2-4 –Energy Efficiency Arkansas Program Summary

Energy Efficiency Arkansas												
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2018	$ 21,958	$ 21,958	100%	0	0	-	0	0	-	0	0	-
Program Year 2019	$ 20,731	$ 8,292	40%	0	0	-	0	0	-	0	0	-
Program Year 2020	**$ 22,082**	**$ 22,170**	**100%**	**0**	**0**	**-**	**0**	**0**	**-**	**0**	**0**	**-**



2.4.4 Description of Participants

- Residential and C&I customers in Arkansas.

2.4.5 Challenges and Opportunities

- OG&E, along with the EEA, has continued to provide updated material to all classifications of consumers throughout the OG&E Arkansas service territory. Cost-effective measures should be implemented in a timely manner to lower utility costs. Educating the customer is essential in stressing the importance of EE in all applications.

  According to the EEA Annual Report 2020, the EEA will continue to monitor and maintain adequate supplies of energy savings materials for Arkansas ratepayers, participate in 40 events in 2021, monitor, modify and improve website navigation for media promotions, and sponsor various energy efficiency training opportunities.

2.4.6 Planned or Proposed Changes to Program and Budget

- OG&E will continue its support of the EEA Program throughout the next triennial 2020-2022 Portfolio Plan.

- OG&E's proposed budget for PYs 2021 is $20,760.

3.0 Supplemental Requirements

3.1 Staffing

In 2020, OG&E had a total of 3 Full-Time Equivalents ("FTEs"); 2 FTEs managing its EE programs, and EM&V and Administrative support make up the remaining FTE.

For 2021, OG&E's staffing changes are as follows:

> Due to retirements at the end of 2020, one Program Manager is now handling all Arkansas programs, and one Senior Manager is over the corporate energy efficiency department instead of two.

3.2 Stakeholders Activities

During 2020, the PWC members continued to be active and engaged participants in matters pertaining to energy efficiency program evaluation and related issues, as directed by Staff. In 2020, the PWC mainly discussed updates to the Technical Reference Manual ("TRM"). Topics included the effects in lighting market changes, impacts of COVID-19, the National Standard Practice Manual (NSPM"), the SARP Workbooks, and the Carbon Calculator.

The PWC conducted 15 virtual meetings during 2020.

Table 1: Summary of PWC Activities in 2020

Date	Title	Topics
2/11/2020	**PWC ACT 1102 Working Group**	• Recap of Outstanding Items/Next Steps • Discussion of Metrics Collected for Low-Income Programs • Action Items and Next Steps
2/13/2020	**PWC NSPM Working Group**	• Recap and Address Outstanding Items with the Clarification Memo • Update on the SARP Workbook Template • Discussion of Carbon Calculator Status/Concerns • Next Steps
4/21/2020	**PWC Discussion**	COVID-19
5/6/2020	**TRM Update Meeting**	• TRM Update Schedule • TRM Update Protocol • TRM Meeting Schedule • Version 8.2 Criteria, Considerations, & Topics • Codes and Standards Changes
5/20/2020	**TRM Update Discussion**	•Behavioral Protocol Review •Additional Topics for Later Discussion •Identification of new measures •Clarification for Protocol D
6/2/2020	**TRM Update Discussion**	•COVID
6/3/2020	**TRM Update Discussion**	•Proposed New Gas Measures •Steam Leak Repair •Gravity Wall Furnace •High Efficiency Gas Fireplace

6/21/2020	**PWC Meeting TRM Update and Planning**	•Discuss of Proposed TRM Updating Plans •Schedule for PWC Updating Meetings •Additional Areas for Consideration •Discussion of Impact on EE Programs •During COVID-19 Pandemic •Current status of EE Programs •Potential impacts on EE Activities in 2020 •Scheduling Adjustments for PY2020 filings
7/15/2020	**TRM Update Discussion**	
7/16/2020	**PWC EISA Lighting Discussion**	
7/29/2020	**TRM Update Discussion**	
8/4/2020	**TRM Update Discussion**	
8/12/2020	**PWC Technical Forum**	• Volume 1 Edits/Clarifications • Volume 3 Edits/Clarifications • Volume 2 Discussion of Electric Measures • Volume 2 Discussion of Gas Measures
9/15/2020	**PWC Webinar Call for September**	• Address AG's comments • Review Proposed AG/Staff Reporting Worksheet • Review SARP Workbook Regarding Using TRC vs. PAC Tests • Address Commission Request regarding PWC guidance for EAL's Docket No. 19-042-TF pertaining to a solar offering • Discuss Status of EM&V Activities including Updates on Shelf Stocking Studies in Arkansas • Identify Updates for TRM 9.0 and Proposed Schedule
10/14/2020	**PWC Webinar Call for October**	• AG Template Discussion • TRM Clarifications • Evaluation Status Reports • Clarification of Evaluation Terms

3.3 Information provided to Customer to Promote EE

Please see Appendix B for samples of promotional and educational materials used in the program year.

Appendices to be added in pdf format.

4.0 EM&V Contractor Reports

ADM & Associates, Inc. provided outcomes for the EM&V results and Cost Benefit Analysis for OG&E's PY 2020 Portfolio. OG&E is providing the report in the attached exhibits.

Attachments:

- Attachment A) contains ADM's Evaluation of OG&E's Energy Efficiency Programs and Cost Benefit Analysis

Attachment A: Evaluation of OG&E's Energy Efficiency Programs and Cost Benefit Analysis

Oklahoma Gas & Electric (OG&E) Arkansas Energy Efficiency (EE) Portfolio Evaluation Report for Program Year (PY) 2020

Pursuant to Section 9 the Rules for Conservation and Energy Efficiency Programs:

Annual Reporting Requirements, Order No. 29, Docket No. 06-004-R, May 20, 2014

April 12, 2021

PREPARED BY ADM Associates, Inc.

PREPARED FOR Oklahoma Gas & Electric (OG&E), Arkansas

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1 Introduction

1.1 Acknowledgements

ADM Associates, Inc. (ADM) would like to acknowledge the many talented individuals who contributed to this evaluation, measurement, and verification (EM&V) report for the program year 2020 (PY2020).

Oklahoma Gas and Electric (OG&E) staff participated in ongoing evaluation deliverable reviews and discussions, attended regular meetings, and responded to follow-up questions, data requests and document requests. They are an ongoing partner in our evaluation efforts.

The Independent Evaluation Monitor (IEM) led by Dr. Katherine Johnson also provided guidance and input throughout the evaluation process.

We also wish to thank CLEAResult Consulting (CLEAResult) and AM Conservation Group, the implementers, and their staff for their insights and information.

Additionally, the following evaluation staff supported the creation of this report.

ADM Staff

Joe Marquez | Analyst II

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Michael Nicholson | Engineer II

Melissa Culbertson | Director

Adam Thomas, PMP | Principal

1.2 Acronyms and Abbreviations

Table 1-1 Commonly Used Acronyms and Abbreviations

Acronym	Term
AC	Air conditioner
AOH	Annual operating hours
APS	Advanced Power Strip
APSC	Arkansas Public Service Commission
BSP	Business Solutions Program
CEEP	Commercial Energy Efficiency Program
CWA	Consistent Weatherization Approach
C&EE	Conservation and energy efficiency
C&I	Commercial and Industrial
CEE	Consortium for Energy Efficiency
CF	Coincidence factor
CFL	Compact fluorescent lamp (bulb)
CFM	Cubic feet per minute
DI	Direct install
DLC	Design Lights Consortium
EEA	Energy Efficiency Arkansas
EER	Energy efficiency ratio
EFLH	Equivalent full-load hours
EISA	Energy Independence and Security Act
EL	Efficiency loss
EM&V	Evaluation, measurement, and verification
EPP	Efficient Products Pathway
EUL	Estimated Useful Life
ES	ENERGY STAR®
FR	Free-rider
FVR	Field Verification Rate
GPM	Gallons per minute
HDD	Heating degree days
HEEP	Home Energy Efficiency Program
HID	High intensity discharge
HOU	Hours of use
HP	Heat pump
HSP	Home Solutions Program
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

Acronym	Term
IQ	Income Qualified
ISR	In-service rate
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light emitting diode
M&V	Measurement and verification
NC	New construction
NEB	Non-energy benefit
MW	Megawatt
MWh	Megawatt-hour
NTG	Net-to-Gross
PCT	Participant Cost Test
PY	Program year
QA	Quality assurance
QC	Quality control
RCA	Refrigerant charge adjustment
RIM	Ratepayer impact measure
ROB	Replace on burnout
SEER	Seasonal energy efficiency ratio
SO	Spillover
TRM	Technical reference manual
TU	Tune-up
UCT	Utility cost test
UWP	OG&E and AOG Unified Weatherization Program (Prior to 2020)
VFD	Variable frequency drive

1.3 Savings Types

Table 1-2 Commonly Used Savings Types

Term	Definition
Energy Savings (kWh)[1]	The change in energy (kWh) consumption that results directly from program-related actions taken by participants in a program.
Demand Reductions (kW)	The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr., kBtu/hr., therms/day, etc.
Other Fuels (Natural Gas & Propane)	Other fuel savings, such as propane and natural gas, which are estimated based on dual-fuel savings that are not incentivized by both of the utilities that participated in the project.
Water (Gallons)	Water savings that are reported in association with the installation of water saving devices.
Ex ante Gross	The change in energy consumption and/or peak demand that results directly from program-related actions taken by participants in a program, regardless of why they participated.
Ex post Gross	Latin for "from something done afterward" gross savings. The energy and peak demand savings estimates reported by the evaluators after the gross impact evaluation and associated M&V efforts have been completed.
Ex post Net	The energy and peak demand savings estimates reported by the evaluators after application of the results of the net impact evaluation. Typically calculated by multiplying the *ex post* gross savings by a NTG ratio.
Annual Savings	Energy and demand savings expressed on an annual basis, or the amount of energy and/or peak demand a measure or program can be expected to save over the course of a typical year. The AR TRM v8.1 provides algorithms and assumptions to calculate annual savings and are based on the sum of the annual savings estimates of installed measures or behavior change.
Lifetime Savings	Energy savings expressed in terms of the total expected savings over the useful life of the measure. Typically calculated by multiplying the annual savings of a measure by its EUL. The TRC test uses savings from the full lifetime of a measure to calculate the cost-effectiveness of programs.

[1] Definitions are from the Glossary in AR TRM v8.1, page 98.

2 Executive Summary

2.1 Introduction

On March 15, 2019 OG&E filed its triennial plan for Program Years 2020 to 2022 (PY2020 to PY2022) in compliance with Order No. 41 Docket No. 13-002-U, which set the time for the next three-year Portfolio to be filed, and Order No. 43 of Docket No. 13-002-U, which set the targets requiring electric investor-owned utilities (IOU) to capture energy savings in the amount of 1.2% of their 2018 sales. OG&E's Portfolio was approved by the Arkansas Public Service Commission (APSC) on June 17, 2019, with Order No. 88.

OG&E's 2020 budgets, energy savings and demand reduction goals serve as the basis against which its portfolio of programs were evaluated in 2020.

OG&E's 2020 to 2022 Plan includes a portfolio of programs designed to facilitate reductions in electricity and peak demand in every customer class. OG&E offers retail electric service in Oklahoma and Arkansas, servicing approximately 68,000 customers in Arkansas. OG&E's Arkansas service territory encompasses the City of Fort Smith and several nearby municipalities.

In accordance with APSC Rules for Conservation and Energy Efficiency Programs (C&EE Rules), OG&E engaged ADM Associates, Inc., (ADM) to conduct the evaluation, measurement, and verification (EM&V) of its portfolio. The ADM staff, collectively referred to as the Evaluators, evaluated the OG&E portfolio.

2.2 Summary of OG&E's Energy Efficiency Portfolio

In 2020, OG&E offered a portfolio of three energy efficiency programs, which provided a comprehensive range of customer options focused on energy efficiency and educational options. At a high-level, OG&E designed its programs to achieve the following objectives:

- PY2020 net energy-savings goal[2] of 24,675,000 kWh and demand reduction target of 4,920 kW;[3]
- Significant energy-savings opportunities for all customers and market segments;
- Broad ratepayer benefits; and
- Comprehensiveness in seven areas (i.e., comprehensiveness factors) defined by the APSC.[4]

[2] This value was based on the Commission approved target of 1.20% of 2018 sales as set forth by the APSC and includes a reduction from target to account for commercial and industrial customers opting to self-direct.

[3] These targets represent first-year net energy and demand savings at the meter.

[4] As defined by the APSC in the C&EE Rules of Order No. 17 in Docket 08-144-U.

The Evaluators evaluated the results for the PY2020 for two residential programs and one commercial and industrial (C&I) program. The Home Energy Efficiency Program (HEEP), the Consistent Weatherization Approach (CWA) program, and the Commercial Energy Efficiency Program (CEEP) were all existing programs at the onset of PY2020.

Table 2-1 PY2020 OG&E Energy Efficiency Portfolio Overview

Program	Channel	Sector	PY2020 *Ex post* Net kWh Target	PY2020 *Ex post* Net kW Target
Home Energy Efficiency Program ("HEEP")	Residential Solutions (RSOL)	Residential	3,322,845	590
	LivingWise® Schools Outreach			
	HVAC Replacement & Tune-up (HVAC)			
	Consumer Product Solutions (CPS)			
Consistent Weatherization Approach (CWA)		Residential	4,634,094	1,052
Commercial Energy Efficiency Program ("CEEP")	C&I Solutions	C&I	16,718,061	3,278
	Small Business Solutions (SBS)			
	Schools and Government Entities (SAGE)			
	Continuous Energy Improvement (CEI)			
	Retro-commissioning Solutions (RCx)			
Total			**24,675,000**	**4,920**

2.3 Overview of Program Offerings

2.3.1 Residential Programs

- **Home Energy Efficiency Program (HEEP):** This program is a multipronged residential offering designed to incentivize OG&E's Arkansas customers to reduce their energy consumption by performing energy efficient upgrades to their homes. Designed to provide homeowners with multiple options, the proposed program combines Residential Solutions, Heating, Ventilation, and Air Conditioning (HVAC), and Consumer Products components. Providing homeowners with increased choices to participate is expected to result in increased customer engagement, greater measure adoption, and increased program savings.
    - Residential Solutions (RSOL): The Residential Solutions component of the HEEP program is a market-driven approach that promotes EE by providing homeowners with low-cost in-home assessments, direct install measures, community educational outreach, and incentives on home retrofits.
    - (RSOL cont.) Incentives are provided to encourage participation and decrease the upfront costs of energy efficient upgrades.

- LivingWise® Schools Outreach provides 6th grade students an educational opportunity to learn about how they can affect the EE of their home. Teachers will work directly with the program team to obtain materials.
- HVAC Replacement & Tune-up (HVAC): The air conditioner (A/C) tune-up and HVAC replacement component of HEEP focuses on improving the EE of the HVAC systems of residences. It provides incentives to improve operating efficiency of the existing HVAC unit or to replace it with a higher efficiency unit, through a program-approved Trade Ally network.
- Consumer Product Solutions (CPS): The lighting and appliances component promotes the purchase of energy efficient lighting and products including, but not limited to, LED lighting. There is also a food bank component to this channel, which gives LED lighting to food banks for inclusion in their food boxes to income qualified (IQ) customers. To help customers offset a portion of the incremental cost associated with higher efficiency appliances and products, the program uses upstream, midstream, and downstream incentives.

- **Consistent Weatherization Approach (CWA):** The CWA has been designed to align with the Consistent Weatherization Approach (CWA) for weatherization programs across Arkansas and will be delivered through approved OG&E contractors. Participation is available to all OG&E residential customers who live in single family (SF) or individually metered multi-family (MF) homes that are 10 years or older or meet the $0.10 per square foot criteria. The program focuses on educating the customer on the efficiency of their home and developing an implementation plan to provide energy upgrades that align with the customer's needs and available program offerings.
  Where possible, the program will work to align measure offerings and incentive packages with Arkansas Oklahoma Gas (AOG) Weatherization Program, for dual fuel customers.

2.3.2 Commercial and Industrial (C&I) Programs

- **The Commercial Energy Efficiency Program (CEEP):** This is a portfolio-style program approach designed to address the needs of OG&E's commercial and industrial (C&I) customer base. Specifically, the program provides an umbrella for all C&I customers to participate through either prescriptive or custom channels, each specialized for a particular market segment or delivery channel.
  - C&I Solutions: C&I Solutions will offer direct installation of low-cost measures and both a performance and custom participation path for customers to perform

energy upgrades. Technical support will also be provided to assist in project identification and development.

- *Prescriptive:* The performance path will provide incentives on a per unit basis for deemed savings measures installed by qualified contractors as defined by the current TRM.
- *Custom:* The custom path gives participants an opportunity to achieve their specific EE goals by proposing measures that may be outside of the scope of the current TRM. Proposed measures are evaluated for savings and costs, and an appropriate incentive amount is approved if the project is deemed cost-effective.

- Schools & Governmental Entities (SAGE): This channel offers assistance to the institutional customer segments to overcome barriers to energy improvement that are unique to their market segment, such as conflicting organizational goals, outdated specifications, limited technical knowledge, and counterproductive energy budgeting. The program will also provide benchmarking services to qualifying customers.
- Small Business Solutions: Small Business Solutions will offer direct installation of low-cost EE measures, facility walk-throughs and incentives for a suite of EE measures. This offer is targeted at business customers with peak demand less than 100 kW. Direct install measures include LEDs and other low-cost lighting, low flow devices for electric water heating, HVAC upgrades, vending misers and low-cost refrigeration measures. This targeted channel is also eligible to participate in the larger C&I performance or custom pathways if the customer's needs are beyond the scope of services outlined within this outreach approach.
- Midstream: This channel encourages customers to participate by providing point of sale (POS) discounts on selected products through local lighting distributors. The financial incentives are paid to the lighting distributors to allow reduced costs for the end customer.
- Continuous Energy Improvement (CEI): The CEI channel provides energy conservation training to all levels of employees within a customer's organization with a focus on low or no cost savings opportunities. This channel also offers a facility-wide assessment of energy usage and provides customers with continuous energy usage monitoring and feedback.
- Retro-commissioning (RCx): The RCx channel is to provide a non-capital-intensive approach to energy efficiency engagement. Additionally, capital projects that are identified through the retro-commissioning process, can be rebated through other programs channels.

Through its energy efficiency portfolio, OG&E also 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 reduction. Refer to Table 2-2 for a list of the OG&E programs and targeted customer segments.

Table 2-2 OG&E PY2020 Energy Efficiency Portfolio

Program	Residential	Multi-family[5]	Small Business	C&I	Institutional & Municipal	Agricultural
HEEP	X	X				
CWA	X					
CEEP			X	X	X	X

This report presents the results of the evaluation of these programs.

2.4 Evaluation Objectives

The following activities were performed through the PY2020 EM&V effort:

- Verify program tracking data and correctly apply the Arkansas Technical Reference Manual Version 8.1[6] (AR TRM v8.1)[7] to calculate savings following AR TRM v8.1 Volume 1 Protocol A and estimate PY2020 gross and net energy (kWh) and demand (kW) impacts at the high impact measure, program, and portfolio levels;
- Adjust *ex ante* gross savings using the results of evaluation research, relying primarily on tracking system and engineering desk reviews/metered data analysis [8] and achieve a minimum precision of ±10% of the gross realized savings estimate with 90% confidence;
- In consultation with the IEM, estimated net-to-gross (NTG) values, which was performed following AR TRM v8.1 Volume 1 Protocol H[9] and provide complete documentation and transparency of all evaluated savings estimates, and where relevant, compare with AR TRM v8.1 calculation, as recommended in the IEM's PY2019 EM&V Annual Summary Report;

[5] All multifamily are duplexes that are single-metered, with more than four (4) units.

[6] For PY2020, this also includes a memo titled, "TRM Clarification Memo for Residential Lighting October 2020 REVISED" distributed by the Independent Evaluation Monitor (IEM) in October of 2020.

[7] AR TRM v8.1 can be found here: http://www.apscservices.info/EEInfo/TRMV8.1.pdf

[8] Typically, this list would include site visits, however, due to the COVID-19 pandemic (pandemic), these were not performed in PY2020. Researched values, using years of site visit results, were applied in the PY2020 evaluation. See additional details in the program chapters.

[9] See additional details in each program chapter, as well as Appendix C. Net-to-Gross Approaches and Outcomes.

- Provide ongoing technical reviews and guidance to implementers and OG&E throughout the evaluation cycle and review tracking system data to assess data captured for new measure offerings following AR TRM v8.1 Volume 1 Protocol A;
- Support the calculation of portfolio non-energy benefits (NEBs) in accordance with AR TRM v8.1 Volume 1 Protocol L;
- Conduct EM&V research to support possible updates for the next version of the TRM, which may include information on commercial and residential envelope measures, business type lighting hours of use, and persistence of behavioral savings.[10]
- Gain an understanding of program operations, challenges and evaluation needs through OG&E and implementation contractor key staff interviews, complemented with communication and program documentation review including monthly status meetings.
- Conduct a full process evaluation for every program once over the three-year 2020–2022 program cycle and assess other process evaluation needs annually, document progress in incorporating recommendations identified during the prior year evaluation; and
- Update the assessment of OG&E's success in achieving the goals and objectives established in the Commissions Comprehensiveness Checklist.[11]

2.5 Evaluation Findings

2.5.1 Specify Method of Gross Impact Evaluation

OG&E's portfolio was successful in PY2020, achieving 114% of planned net energy savings (kWh) and 99% of planned net demand reduction (kW). In addition to verifying the savings reported by OG&E, the Evaluators calculated lifetime impacts for the programs and measures. As part of this process, in the body of the report we refer to the impacts (energy savings or peak demand reduction) accrued during the program year being evaluated (PY2020) as "first year" impacts.

Table 2-3 shows the OG&E goals, reported gross impacts, the Evaluators evaluated first year *ex post* gross energy savings (29,401,767 kWh) and demand reductions (5,139 kW), gross realization rates (102% for kWh, 105% for kW), net impacts (28,050,242 kWh and 4,878 kW),

[10] This was very limited in PY2020 due to the pandemic.

[11] As defined by the APSC in the C&EE Rules of Order No. 17 in Docket 08-144-U.

NTG ratios, and *ex post* net lifetime impacts (430,690,325 kWh).[12] The levelized cost of energy savings (kWh) for the PY2020 portfolio is $0.030 ($/kWh).

Table 2-3 PY2020 OG&E Portfolio Evaluation Impacts

Impact	Metric	HEEP	CWA	CEEP	Total
Energy Savings (kWh)	Goals (Net)	3,322,845	4,634,094	16,718,061	**24,675,000**
	Ex ante (Gross)	4,617,956	4,165,639	19,975,055	**28,758,650**
	Ex post (Gross)	4,987,552	4,279,317	20,134,899	**29,401,767**
	Realization Rate	108%	103%	101%	**102%**
	Ex post (Net)	4,156,673	3,758,670	20,134,899	**28,050,242**
	NTG Ratio	83%	88%	100%	**95%**
	% of Goal (Net)	125%	81%	120%	**114%**
	Lifetime (Net)	74,468,878	66,143,587	290,077,860	**430,690,325**
Annual Demand Reduction (kW)	Goals (Net)	590	1,052	3,278	**4,920**
	Ex ante (Gross)	762	986	3,170	**4,917**
	Ex post (Gross)	887	1,007	3,245	**5,139**
	Realization Rate	117%	102%	102%	**105%**
	Ex post (Net)	714	919	3,245	**4,878**
	NTG Ratio	80%	91%	100%	**95%**
	% of Goal (Net)	121%	87%	99%	**99%**

The contribution to portfolio energy (kWh) savings by program is summarized in Figure 2-1.

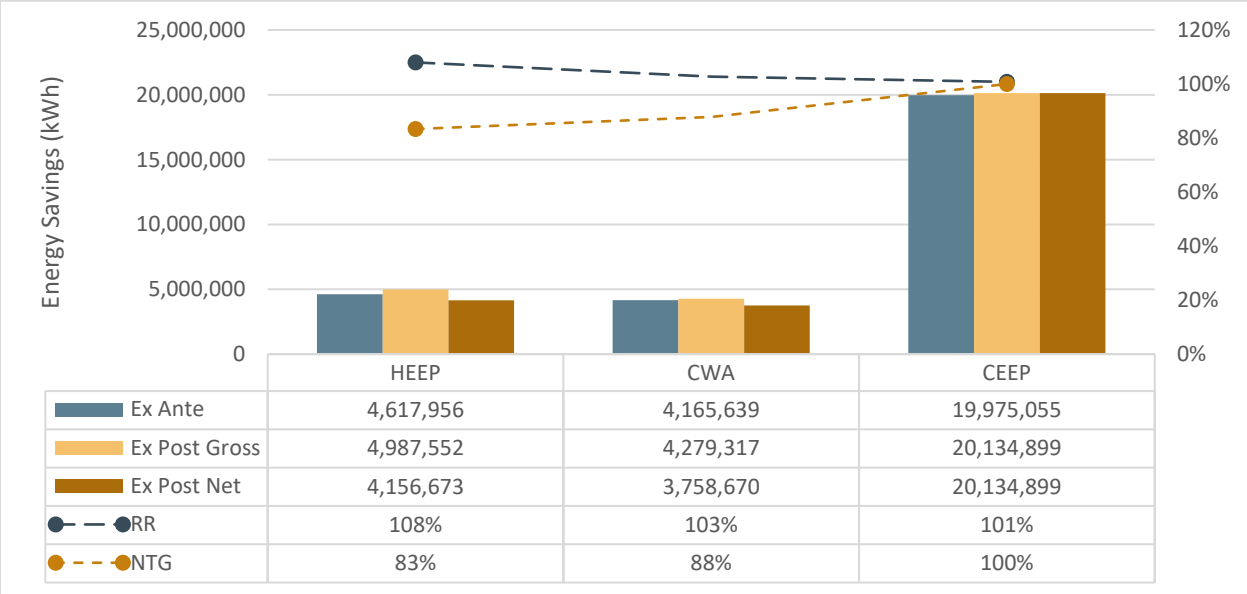


Figure 2-1 PY2020 Contribution to Portfolio Net Energy (kWh) Savings

[12] Lifetime impacts are the sum of energy savings over the course of the measure's estimated useful life (EUL) and the weighted average demand reduction across the lifetime of the measure divided by the EUL (in years).

The figure below represents *ex ante* gross energy savings (kWh), by end use and sector, in the PY2020 OG&E portfolio.

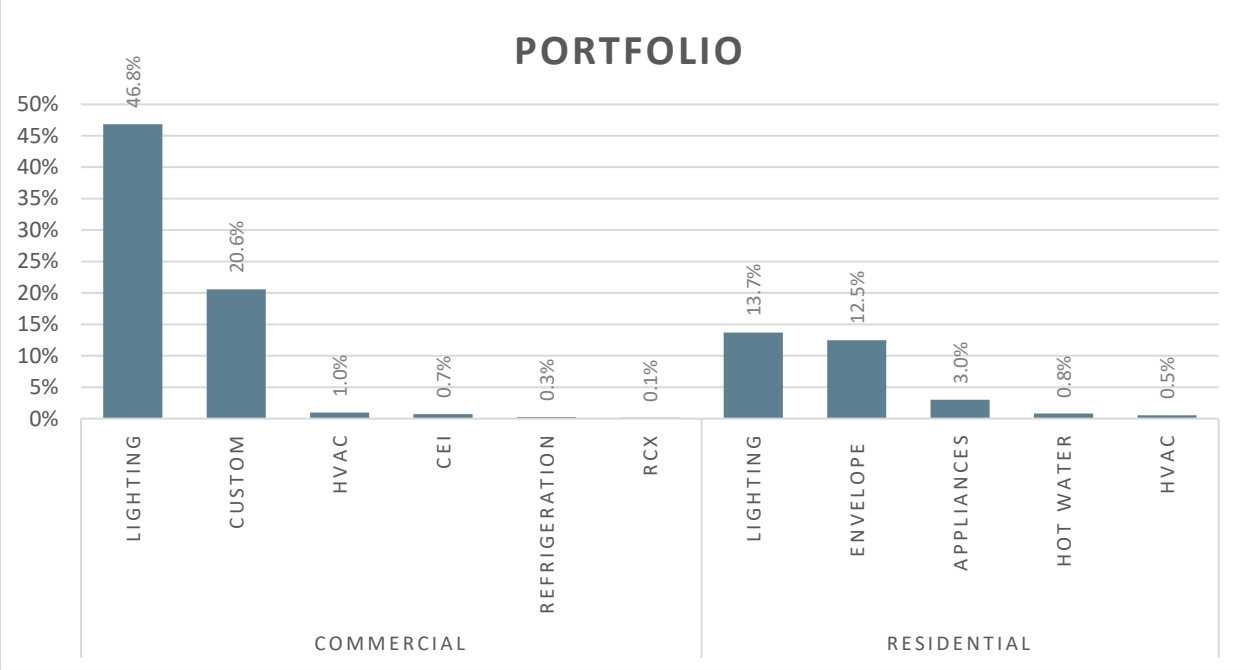


Figure 2-2 Percentage of *Ex ante* Energy Savings (kWh) for the PY2020 Portfolio

Each bar in Figure 2-3 shows the percentage of savings for each measure type, for each program in the residential sector. Ceiling insulation (20%), Duct Sealing (12%), and LEDs (41%) are the high impact measures (HIMs)[13] in the residential sector, and equal 24% of portfolio *ex ante* energy savings (kWh).

[13] A High Impact Measure (HIM) is an energy efficiency measure that accounts for at least 5% of total portfolio gross kilowatt hour, kilowatt, and/or therm savings in one or more of the utility's energy efficiency programs. This is per Protocol E1 of the AR TRM v8.1, page 46.

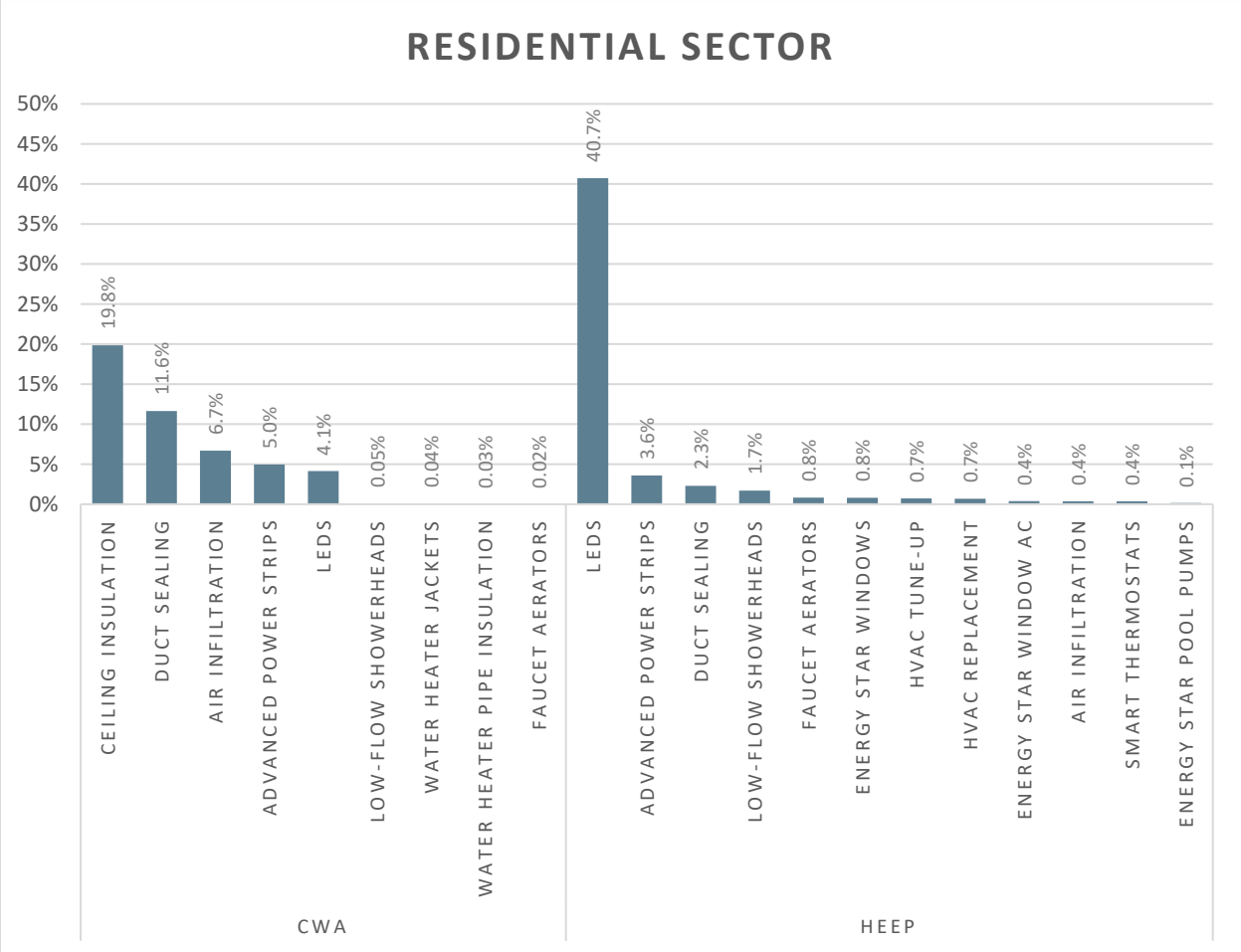


Figure 2-3 *Ex ante* Energy Savings (kWh), by Measure, for the Residential Sector

Each bar in Figure 2-4 below shows the contributions to *ex ante* gross energy savings (kWh) for each measure in the commercial sector. Linear LED lamps, LED high bay, exterior LED, and LED troffers lighting measures (61%) and custom VFD (23%) were the HIMs for the commercial sector, and equal to 56% of portfolio *ex ante* energy savings (kWh). Custom projects included lighting, refrigeration, refrigeration gasket, and HVAC.

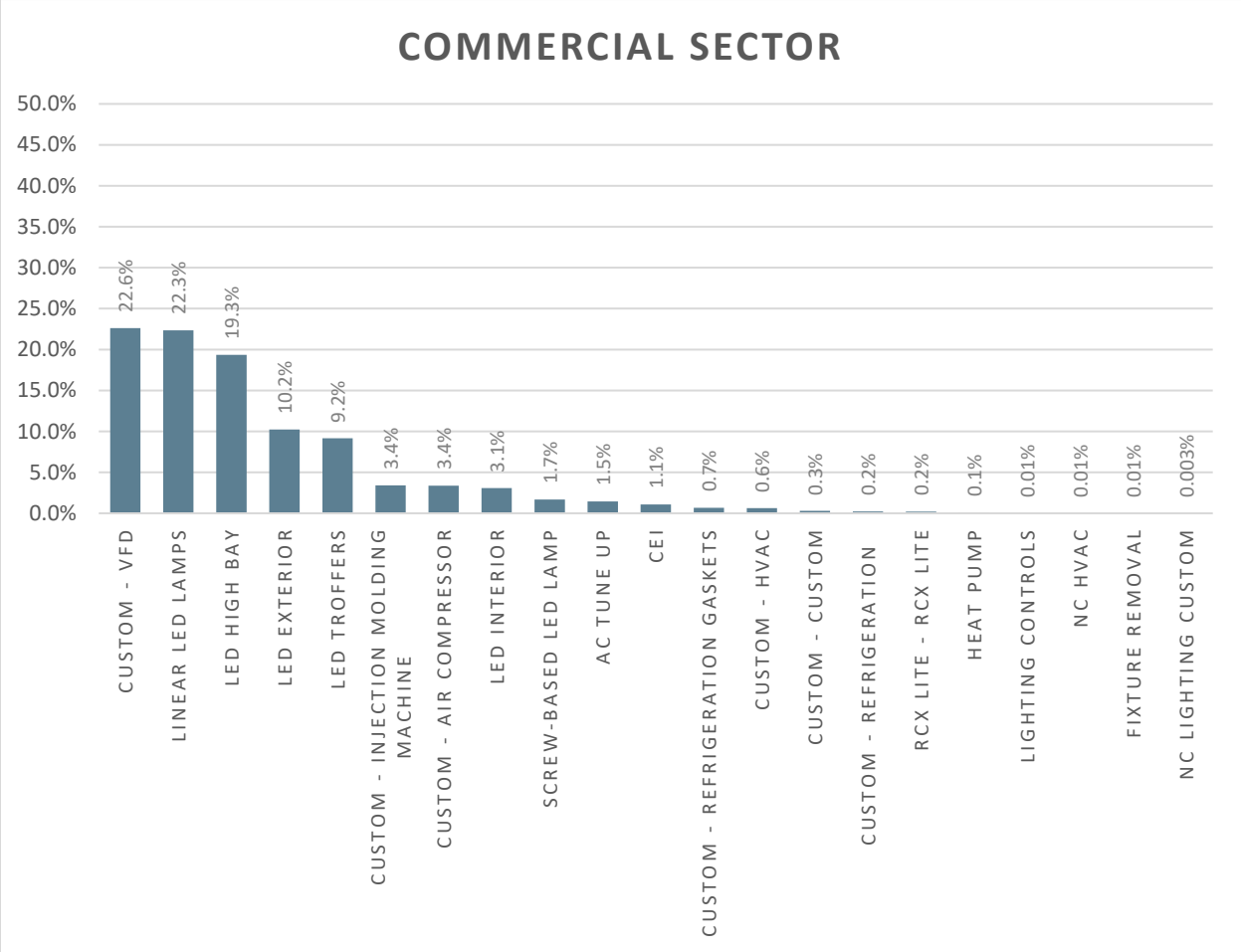


Figure 2-4 *Ex ante* Energy Savings (kWh), by Measure, for the C&I Sector

Further, the Evaluators put the net savings into the context of OG&E's PY2020 goal. Table 2-4 summarizes the performance against goals of programs evaluated in this report.

Table 2-4 OG&E PY2020 Performance Against Energy Savings (kWh) Goals

Program	2020 Net Energy (kWh) Savings Goal	2020 *Ex post* Net Energy (kWh) Savings	% of Goal Attained
HEEP	3,322,845	4,156,673	125%
CWA	4,634,094	3,758,670	81%
CEEP	16,718,061	20,134,899	120%
Total	**24,675,000**	**28,050,242**	**114%**
Sums may differ due to rounding.			

The PY2020 budgets and actual spend are summarized in Table 2-5 below.

Table 2-5 Summary of Budgets and Actual Spend in PY2020

Program	PY2020 Budgeted Expenditures[14]	PY2020 Actual Expenditures	Percent of Budget Expended
HEEP	$ 1,034,342	$ 864,631	84%
CWA	$ 3,381,858	$ 2,003,327	59%
CEEP	$ 4,668,575	$ 3,976,594	85%
EEA	$ 22,082	$ 22,170	100%
Regulatory	$ 25,000	$ -	0%
Total	**$ 9,131,857**	**$ 6,866,723**	75%
Sums may differ due to rounding.			

2.6 Summary of Evaluation Findings

Following a review of present program offerings and interviews with utility and third-party implementation (TPI) staff, the Evaluators found the following.

2.6.1 HEEP

- **Micro-level Database Quality:** The Evaluators found the *ex ante* savings values within the database to be accurate for most measures. Additionally, CLEAResult was very consistent in responding to data requests and correcting errors when necessary.
- **Macro-level database inconsistency:** The datasets for the various program channels often have inconsistent heading titles for the same datapoint. Additionally, each channel is provided in unique and separate tabs. This is attributable to having multiple implementers in one program.
- **Successful outreach to multi-family customers:** Multi-family projects represented a significant volume of participation in PY2020, accounting for (53%) of HEEP savings where housing type is known. There is no housing type information for Schools Outreach or the upstream component of CPS.
- **Projects from the previous program year:** In PY2020, a few Trade Allies were delayed in their rebate submission from PY2019. The rebate submissions were accepted by OG&E to best manage Trade Ally and customer satisfaction. Typically, rebate submissions from the previous calendar are to be submitted within 90 days of the first day of the program year. Additionally, the Evaluators reviewed the project data from the previous year and determined that these projects were not submitted in PY2019 and therefore were counted in PY2020.

[14] 2020-2022 Plan found here: http://www.apscservices.info/pdf/07/07-075-tf_393_1.pdf

- **Program success:** The HEEP was very successful in PY2020. The Evaluators identified very few specific, systematic, or persistent issues with program operation and design.

2.6.2 CWA

- **Continued Cross-Fuel Coordination:** OG&E coordinates successfully with AOG, ensuring appropriate co-funding of projects served by both utilities. In prior years, AOG would typically expend their budget by September, with the result being a full quarter of OG&E servicing homes with AOG gas service without AOG funding (resulting in a high degree of cross-fuel NEBs). In PY2020, CWA program budgets for both utilities were under-utilized, and thus projects were jointly funded throughout the entirety of the program year.
- **CWA Low Income Pilot:** OG&E's new pilot targets low-income residents. The Low Income Pilot supplements the CWA program measure offerings with health and safety (H&S) improvements.
- **Targeting of single family and duplexes:** OG&E staff have confirmed that the program presently only targets single family and multi-family up to four units that are separately metered. The program does not service mobile homes or multi-family properties.

2.6.3 CEEP

- **Program design largely unchanged:** The most significant design changes in PY2020 was the addition of the Retro-commissioning (RCx) program and the Continuous Energy Improvement (CEI) program moved out of the pilot phase and began being offered as a full channel.
- **Staff actively engaged with participating Trade Allies:** OG&E staff have regular daily interactions with Trade Allies to answer questions and provide training. CLEAResult staff has regular one-on-one communications with Trade Allies about submitted projects. Information about program changes is generally provided to Trade Allies through the project review process.

2.7 Progress on Previous Recommendations

In PY2019, six program or portfolio level recommendations were provided to OG&E as part of the EM&V of their portfolio.

The Evaluators reviewed OG&E's response to recommendations from the PY2019 EM&V report and categorized them as follows:

1) **Adopted.** This applied to recommendations that pertained to the correction of an issue (such as using an incorrect baseline methodology) or modifications in program outreach that do not require a filing.
    a. Four of the six recommendations were adopted.
    b. Adopted recommendations included tracking baseline fixture type, tracking projects by measures, and utilizing all tracking database columns.
2) **Under consideration.** This applies most typically to larger recommendations that would require APSC approval.
    a. None of the recommendations were under consideration.
3) **Rejected.** This applies to recommendations which are reviewed by OG&E and rejected.
    a. None of the recommendations were rejected.
4) **Not applicable.** This would apply to recommendations which are no longer applicable to the OG&E's portfolio.
    a. One of the recommendations are not applicable. This includes requests analyze evaluation results to identify trends among Act 1102 customers.
5) **In Progress.** This applies to recommendations which were included in the PY2019 EM&V report but have either not yet been adopted or have been explicitly rejected by OG&E.
    a. One of the six recommendation is in progress. This includes improvement of CEEP incremental cost calculations.

Figure 2-5 below outlines the status of PY2019 recommendations.

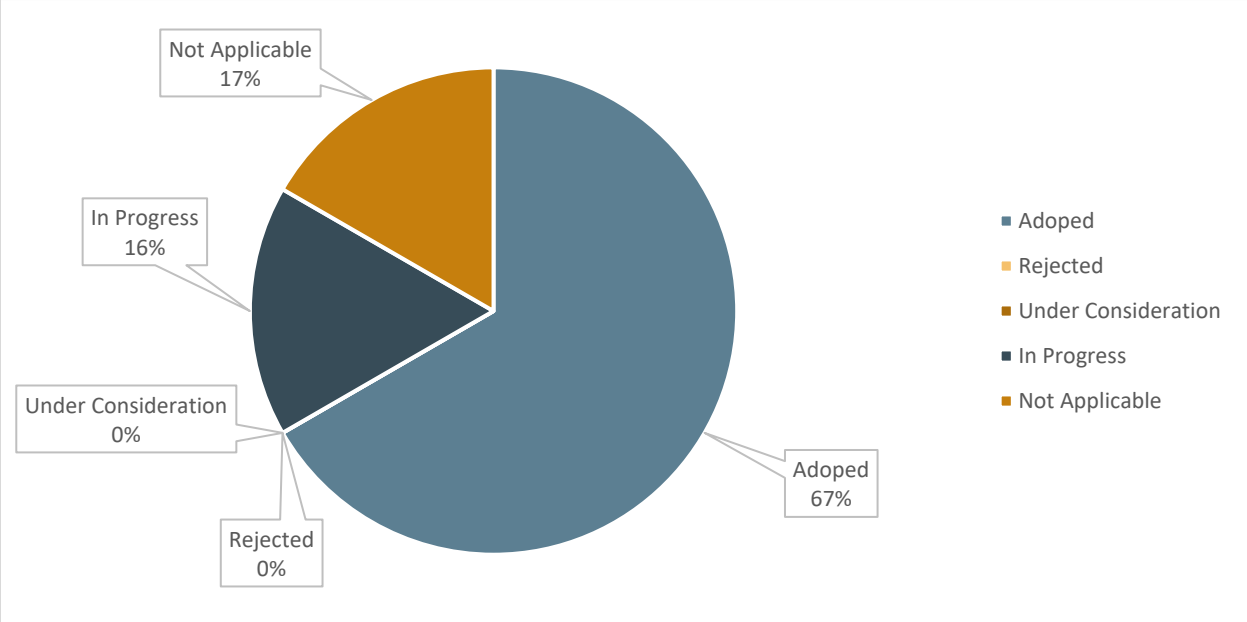


Figure 2-5 Summary of Status of PY2019 Recommendations

2.8 Structure of the Report

This report is structured as shown below:

- Section 1 Executive Summary;
- Section 2 General Methodology;
- Section 3 Portfolio-level Findings;
- Section 4 HEEP Findings;
- Section 5 CWA Findings;
- Section 6 CEEP Findings;
- Appendix A – Portfolio Cost-Effectiveness;
- Appendix B – CEEP Custom Project Site-level Reports; and
- Appendix C – Net-to-Gross Approach and Outcomes.

3 General Methodology

3.1 Introduction

This section details general impact evaluation methods by program-type as well as data collection methods.

This section will present full descriptions of the following:

- Gross Savings Estimation;
- Sampling Methodologies;
- Free-Ridership and Spillover Determination;
- Process Evaluation Methodologies; and
- Data Collection Procedures.

The Evaluators would like to note that in several cases in this report, the summation of total savings, expenditures and other tracked metrics may be off by one due to rounding.

3.2 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluators have provided a glossary of terms[15] to follow:

- **Deemed Savings** – An estimate of an energy savings or energy demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) is applicable to the situation being evaluated.
- **Free-rider** – A program participant who would have implemented the program measure or practice in the absence of the program. Free-riders can be total, partial, or deferred. However, per the Arkansas TRM v8.1 Protocol F, "participants who would have installed the equipment within one year will be considered full free riders; participants who would have installed the equipment later than one year will not be considered to be free riders (thus no partial free riders will be allowed)."
- **Gross Realization Rate** – The ratio of *Ex post* Gross Savings and *Ex ante* Gross Savings.
- **Participant** – A consumer who received a service offered through the subject efficiency program in each program year.

[15] This is in addition to sections 1.2 Acronyms and Abbreviations and 1.3 Savings Types.

- **Net-to-Gross (NTG)** – A factor representing net program savings divided by gross program savings that is applied to gross program impacts, converting them into net program load impacts after adjustments for free ridership and spillover. (1 – Free-ridership % + Spillover %).
- **Spillover** – Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program that exceeded the program-related gross savings of the participants. There can be participant and/or non-participant spillover rates depending on the rate at which participants (and non-participants) adopt energy efficiency measures or take other types of efficiency actions on their own (i.e., without an incentive being offered).
- **Stipulated Values** – See "deemed savings."

This glossary was drawn from several evaluation reference documents, such as the 2007 International Performance Measurement & Verification Protocol (IPMVP),[16] 2004 California Evaluation Framework,[17] 2006 Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE) Guide for Managing General Program Evaluation Studies[18] and the AR TRM v8.1.

3.3 Overview of Methods

The evaluation of the PY2020 OG&E portfolio is intended to provide:

- Net impact results;
- Gross impact results; and
- Program feedback and recommendations via a process evaluation.

In doing so, this evaluation provides verified gross savings results, recommendations for program improvement, and ensures cost-effective use of ratepayer funds. Leveraging experience and lessons learned from this impact evaluation can provide guidance to improve both the programs and portfolio in the future.

3.4 Sampling

Sampling is necessary to evaluate savings for the portfolio insomuch as verification of a census of program participants is typically cost-prohibitive. As per evaluation requirements set forth by the Independent Evaluation Monitor (IEM), samples were drawn to ensure 90% confidence at the +/- 10% precision level.

Programs were evaluated on one of three bases:

[16] https://www.nrel.gov/docs/fy02osti/31505.pdf
[17] http://www.calmac.org/publications/California_Evaluation_Framework_June_2004.pdf
[18] http://energy.gov/sites/prod/files/2013/11/f4/pmguide_chapter_7.pdf

- Census of all participants;
- Simple random sample; or
- Stratified random sample.

3.4.1 Census

A census of participant data was used for the HEEP CPS channel where such review was feasible. All program measures were evaluated. In PY2020, the HEEP CPS channel was an incentive-based program that was analyzed using a census of all measures sold in the program.

3.4.2 COVID-19 Field Verification Rate Alternative Approach

Due to COVID-19, the Evaluators were unable to perform verification site for projects in PY2020. As a result, the Evaluators have reviewed the site visits from PY2017, PY2018, and PY2019 (160 total sites) and will apply the average of the three years to result in measure-level field verification rates (FVR).

3.4.3 Simple Random Sampling

For programs with relatively homogenous measures, the Evaluators conducted a simple random sample of survey participants. In PY2020 this applied to HEEP RSOL and HVAC channels, and the CWA. The sample size for verification surveys was calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirement was calculated based on the coefficient of variation of savings for program participants, defined as:

$$CV = \frac{Standard\ Deviation_x}{Mean_x}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of 0.5 in residential program evaluations. The resulting sample size is estimated with the following:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where:

1.645 = Z score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

3.4.4 Stratified Sampling

For the CEEP program, Simple Random Sampling was not an effective sampling strategy. The CV values observed in business programs are typically very high because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

Instead, we used a sample approach designed to select projects for the M&V sample that considers skewed data. With this approach, we selected several sites with large savings for the sample with certainty and then took a systematic random sample of the remaining sites. Once the certainty sites had been selected, the remaining sites were ordered according to the magnitude of their savings and then systematically random sampled. This ensured that any sample selected had some units with high savings, some with moderate savings, and some with low savings. The sampling approach was designed to avoid sites with atypically high or atypically low savings.

3.5 Impact Evaluation Activities by Program

The Evaluators used established, industry-standard approaches to estimate energy savings and demand reductions at the measure, program, and portfolio levels. We followed all applicable measure- and program-level guidelines and protocols from the AR TRM v8.1.

To evaluate gross program impacts, the Evaluators adjusted program-reported gross savings using the results of our research, relying primarily on engineering desk reviews, AR TRM v8.1 deemed savings calculation and on-site verification and metering for applicable programs. To calculate deemed savings, we verified the appropriateness of savings algorithms and values in program tracking data as compared to guidelines in the AR TRM v8.1. Where sampling was used (for surveys and site visits), we designed a sampling plan to achieve a minimum precision of ±10% of the gross realized savings estimate with 90% confidence.

For each program and measure category, the Evaluators estimated energy savings and demand reduction by applying a verified gross savings adjustment to program-reported savings. Table 3-1 lists the impact analysis activities the Evaluators performed for the PY2020 EM&V.

Table 3-1 PY2020 Impact Evaluation Activities by Program

Program	CEEP	CWA	HEEP
Database and Document Review	X	X	X
Engineering Desk Review	X	X	X
Deemed Savings Review per the AR TRM	X	X	X
Leakage Analysis			X
Modeling			X
Load Data Analysis & Baseline Estimation	X		

Where applicable, more detailed engineering and econometric approaches are provided in the program chapter.

3.6 Estimation of Net Savings

Table 3-2 below summarizes the *ex post* net savings approach used in the PY2020 evaluations. Additional details and the reasons for taking the stated approach, survey administration procedures, and weighting approaches used for developing program-level net savings impacts are discussed in the program chapters.

Table 3-2 PY2020 *Ex post* Net Savings Approach

Program	Literature Reviews	Self-Report Surveys	Econometric Model	Not Applicable
HEEP	X	X	X	
CWA		X		
CEEP		X		

3.6.1 Residential Programs Net Savings Estimation Methodology

Aside from the econometric modeling approach used for HEEP CPS, the net savings approach for PY2020 residential programs was based on primary data collection (i.e., participant surveys) or to apply values developed through literature reviews.

3.6.2 Econometric Modeling Approach for HEEP CPS Channel

This method of free ridership was developed through the estimation of a price response model which will be used to predict sales levels in the absence of the program.

The premise of the price response model is that the quantity of the subsidized product will vary based on the price of the product and how well they are promoted. The program tracking data includes sales for each retailer, by model number and week. For each retailer and model

number combination, original retail price and program price data will be available. As program price discounts and/or retailer original pricing change throughout the year, the tracking data is updated, allowing for the comparison of same-model sales under slightly different pricing conditions. Price effects are the main program tool for encouraging the purchase of high efficiency lighting choices. Due to the inability to observe price effects for other program offerings, this approach will be used only for the lighting portion of the program.

The final price response model is used to estimate a free ridership as described in the equation below:

$$Free\ ridership\ ratio = \frac{\sum_i^n (E\left[Product_{NoProgram_i}\right] * kWh_i)}{\sum_i^n (E\left[Product_{Program_i}\right] * kWh_i)}$$

Where:

$E\left[Product_{NoProgram_i}\right]$ = the expected number of products, i, purchased given original retail pricing (as predicted by the model).

$E\left[Product_{Program_i}\right]$ = the expected number of products, i, given program discounted pricing (as predicted by the model).

kWhi = the average kWh savings for product, i.

The price response modeling approach is advantageous in that it is built upon actual sales data from participating retailers (as opposed to relying solely on consumer self-report surveys). There are, however, many limitations for the approach. Most importantly, non-program sales data is not available for inclusion in the model. As a result, the modeling of price impacts fits program sales data well, but it is uncertain whether those price effects apply well to prices outside of program ranges. Additionally, the lack of non-program sales data means that for many product types and time ranges, the available sales data lists zero sales. These “zeroes” in most cases do not actually represent zero sales, but rather a lack of information because program pricing is not in effect for a given product during a given week, presenting a challenge in modeling the sales data using typical time-series or panel data methods. Finally, there are likely variables that affect sales levels for products that are not captured by the program tracking data; thus, there is a risk of omitted variable bias in addition to the inherent amount of error from statistical modeling.

3.6.3 Commercial & Industrial (C&I) Programs

The Evaluators conducted primary research in the form of participant self-report to estimate the *ex post* net impacts of the CEEP downstream channels and applied the applied downstream NTG ratio to the midstream channel.

3.6.4 Free-ridership Approach

The net savings approach used in PY2020 applied several criteria to determine which portion of a participant's savings should be attributed to free ridership. The first criterion comes from the response to the following questions:

- "Would you have been financially able to install the equipment or measures without the financial incentive from the Program?"
- "To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?"

If a customer answered "No" to the first question and confirms the response by saying yes to the second question, a free ridership score of 0 was assigned to the project. That is, if a customer required financial assistance from the program to undertake a project, that customer was not deemed a free rider.

For decision makers who indicated they could undertake energy efficiency projects without financial assistance from the program, three additional factors determine what percentage of savings is attributable to free ridership. The three factors were:

- Plans and intentions of the firm to install a measure even without support from the program;
- Influence that the program had on the decision to install a measure; and
- A firm's previous experience with a measure installed under the program.

For each of these factors, rules were applied to the decision-maker survey responses to develop binary variables indicating whether a participant showed free ridership behavior. The first required step is to determine if a participant stated that his or her intention was to install an energy efficiency measure without program assistance by applying a set of rules to the decision-makers survey response. Two binary variables were constructed to account for customer plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria (Definition 1) indicating customer plans and intentions that likely signify free ridership were as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the Program?"

- The respondent answered, "definitely would have installed" to the following question: "If the financial incentive from the Program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?"
- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the Program affect the level of energy efficiency you chose for [Equipment/Measure]?"

The second, less restrictive criteria (Definition 2) indicating customer plans and intentions that likely signify free ridership were as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the Program?"
- Either the respondent answered, "definitely would have installed" or "probably would have installed" to the following question: "Would you have completed the [Equipment/Measure] project even if you had not participated in the program?"
- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the Program affect the level of energy efficiency you chose for [Equipment/Measure]?"

The second required factor is determining if a customer reported that a recommendation from a program representative or experience with the program was influential in the decision to install a piece of equipment or measure. This criterion indicates that the program's influence may lower the likelihood of free ridership when either of the following conditions were true:

- The respondent answered, "very important" to the following question: "How important was previous experience with the Program in making your decision to install [Equipment/Measure]?"
- The respondent answered, "definitely not would have" or "probably not would have" to the following question: "If the Program representative had not recommended implementing the [Equipment/Measure], how likely is it that you would have implemented it anyway?"
- The third required factor is determining if a participant in the program indicated that he or she had previously installed an energy efficiency measure similar to one that they installed under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had installed a similar measure is

considered to have a higher likelihood of free ridership. The criteria indicating that previous experience may signify a higher likelihood of free ridership were as follows:

- The respondent answered "yes" to the following question: "Not including the project that your organization received an incentive for in [PROGRAM YEAR], has your organization completed any significant energy efficiency projects in the last three years?" and the respondent states that they completed some of those projects without a program incentive.
- The respondent answered "yes" to the following question: "Thinking about all of the projects you completed in the last three years, did you implement any energy efficient equipment or projects similar to the [Equipment/Measure] that you implemented at your facility located at [LOCATION] as part of any of those projects?"

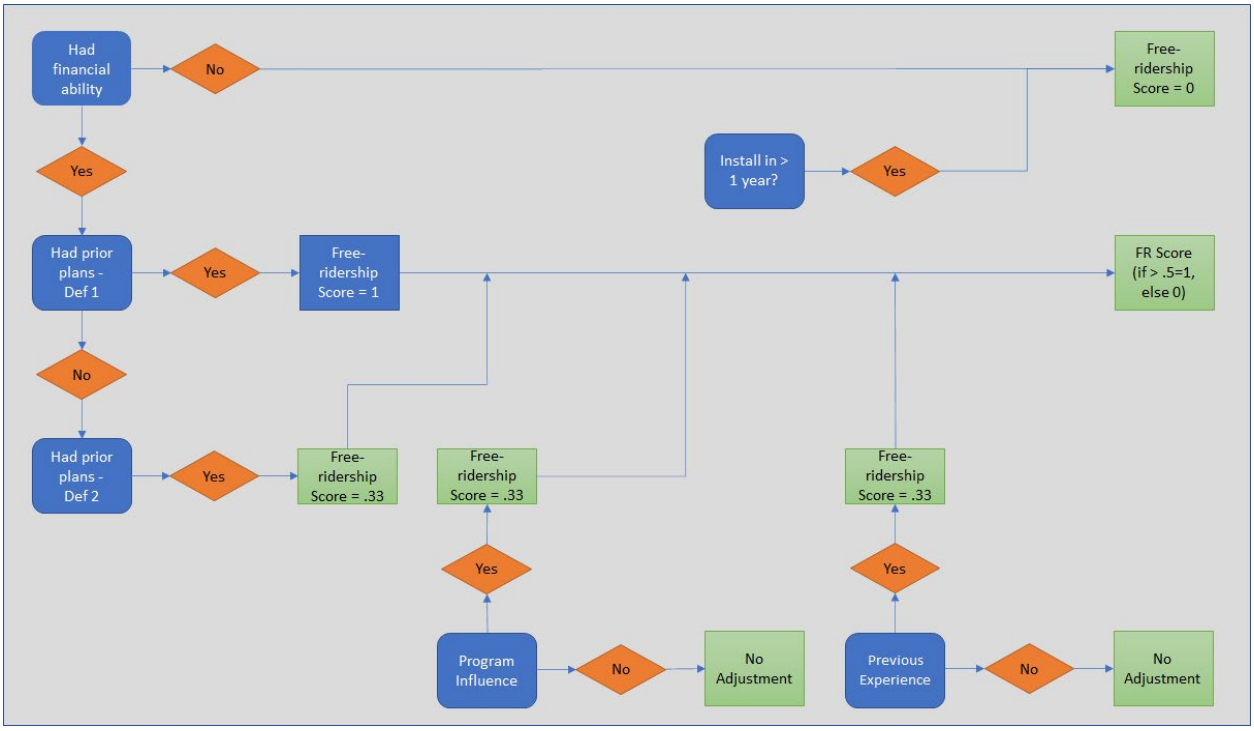


Figure 3-1 Non-residential Free-ridership Scoring Flow Chart

3.6.4.1 Participant Spillover Approach

To assess participant spillover savings, survey respondents were asked whether they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents were also asked to provide information on the measures implemented for use in estimating the associated energy savings.

To determine if the savings from the reported measures were attributable to the program, survey respondents are asked questions about the degree to which their experience with the program influenced them to implement the measures and the likelihood of implementing the measures in the absence of the program.

Specifically, respondents were asked the following questions:

- SO1: How important was your experience with the [PROGRAM] in your decision to install this equipment?
- SO2: If you had NOT participated in the [PROGRAM], how likely is it that your organization would still have installed this equipment?

The responses to these questions were used to develop a spillover score as follows: Spillover = Average (SO1, 10 – SO2)

Savings from measures associated with a spillover score of 7 or greater were considered attributable to the program.

The final NTG estimate for the program is calculated as: NTG = 1 – free ridership + participant spillover

3.7 Deviation from the PY2020 EM&V Plans

There are no other deviations from the EM&V Plan in PY2020.

3.8 Deviations from the AR TRM v8.1

The sections below outline where the Evaluators deviated from the AR TRM v8.1 in PY2020.

- CEEP: CoolSaver, the CLEAResult Work Paper[19] was used for these projects.
- HEEP: CoolSaver, the CLEAResult Work Paper was used for these projects.

3.9 Cost-Effectiveness Approach

The cost-effectiveness of OG&E's programs was calculated based on reported total spending, energy savings (kWh), and demand reduction (kW) for each of the energy efficiency programs. All spending estimates were provided by OG&E. The methods used to calculate cost-effectiveness are informed by the California Standard Practice Manual.[20]

Additional information can be found in Appendix A: Portfolio Cost-Effectiveness.

[19] The CLEAResult CoolSaver work paper is updated annually and provided to the Evaluator by the Implementer.

[20] California Standard Practice Manuel: Economic Analysis of Demand Side Management Programs, October 2001. Available at: http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf

3.10 Non-Energy Benefit (NEB) Approach

Electric energy efficiency programs claimed primary fuel savings after the installation of measures that achieve energy (kWh) savings and demand (kW) reductions. Savings are monetized with the avoided costs. In Arkansas, the IEM, in coordination with investor-owned utilities (IOUs) and other stakeholders through the Parties Working Collaboratively (PWC), has also acknowledged that other NEBs are associated with the implementation of these measures. These other benefits can include reductions in water usage, fossil fuel consumption, and avoided and deferred replacement costs.

These NEBs are an addition to Arkansas programs under the authorization of Arkansas TRM 8.1. Volume 1 - Protocol L. After reviewing the guidance from the PWC, the Arkansas Public Service Commission (Commission) issued Order No. 30 on December 10, 2015, which provided direction and guidance regarding the inclusion of Non-Energy Benefits ("NEBs") in the Technical Reference Forum (p. 21 of 21):[21]

"The Commission therefore directs that the IEM be requested to recommend an approach for quantification of deferred equipment replacement NEBs in individual instances when they are material and quantifiable. Approval of deferred customer equipment NEBs, however, is conditioned as follows: The Commission directs that each recommended approach for customer deferred equipment replacement NEB quantification shall be included within the annual TRM update filing, and that its reasonableness shall be addressed in testimony by the IEM and/or Staff, and may be addressed by other parties, so that the Commission may approve or disapprove such proposed NEB quantifications.

The Commission therefore orders and directs that the following three categories of NEBs be consistently and transparently accounted for in all applications of the TRC test, as it is applied to measures, programs, and portfolios:

- *benefits of electricity, natural gas, and liquid propane energy savings (i.e., other fuels);*
- *benefits of public water and wastewater savings;*
- *benefits of avoided and deferred equipment replacement costs as conditioned herein."*

Per this Protocol[22] the recommended approach to quantify the NEBs will fall within these three categories.

[21] Arkansas TRM v8.1, Protocol L.
[22] Protocol L of the Arkansas TRM v8.1.

3.10.1 Non-Energy Benefit (NEB) Protocols

Per Commission orders, NEBs are concentrated on other fuels, water, and deferred equipment costs. In response to the Commission Order for NEBs, a recent protocol addition is Protocol L, which encompasses NEBs:

- Protocol L1: Non-Energy Benefits for Electricity, Natural gas, and Liquid Propane ("other fuels");
- Protocol L2: Non-Energy Benefits for Water Savings; and
- Protocol L3: Non-Energy Benefits of Avoided and Deferred Equipment Replacement Costs.

OG&E's tracking system captures inputs needed for NEB calculations based on the AR TRM v8.1 algorithm. In reviewing NEBs development in PY2020, the Evaluators review included assessing the consistency of inputs for all assumptions for each measure.

3.11 Overview of Process Evaluation

The Evaluators took the following steps to determine the scope of the process evaluation for the PY2020 programs in OG&E's portfolio.

3.11.1 General Approach

The Evaluators completed limited process evaluations of the following programs:

- Commercial Energy Efficiency Program (CEEP);
- Consistent Weatherization Approach (CWA) Program; and
- Home Energy Efficiency Program (HEEP).

The PY2020 process evaluations included a full process evaluation for the residential sector and limited process evaluation for the commercial sector. In PY2021, the evaluators will include a full process evaluation for the commercial sector and a limited process evaluation for the residential sector. For commercial programs that required participant survey data in the estimation of program impacts, the process evaluation chapters also reported findings related to participant feedback.

3.11.2 Justification for PY2020 Process Evaluation Approach

Process evaluations in general assess organizational and procedural aspects of programs to provide feedback on aspects of programs that are functioning well and contribute recommendations when areas of improvement are identified. The Evaluators have consulted and followed TRM v8.1 Volume 1 Protocol C, to determine whether conducting a process

evaluation is appropriate for a specific program in the portfolio, as well as the appropriate timing for the process evaluation.

Protocol C defines the criteria that require a process evaluation be undertaken as well as criteria justifying conducting a process evaluation. Table 3-3 provides details on specific criteria that must be met prior to proceeding with a process evaluation.

Table 3-3 TRM v8.1 Volume 1 Protocol C: Process Evaluation Guidance

Criteria for Process Evaluations
Process evaluation required if… ▪ Program is new/modified ▪ No process evaluation has been undertaken during current funding cycle ▪ A change in program implementation occurred.
Process evaluation potentially needed if… ▪ Program impacts are lower than expected ▪ Goals (both informational and educational) are not being achieved ▪ Rates of participation are lower/slower than expected ▪ Program's operational system is slow to get up and running ▪ Cost effectiveness of the program is less than expected ▪ Participants (customers & market actors) report problems/low rates of satisfaction with program

After reviewing implementation of programs and process evaluation activities already completed in PY2020, including information provided by implementation contractors at the project kick-off meeting, the EM&V team identified the content in Table 3-4 below.

The table shows the criteria that would indicate that the conditions were appropriate to complete a process evaluation in PY2020.

Table 3-4 Determination of PY2020 Process Evaluation Structure and Timing

Criterion	CEEP	CWA	HEEP
New and innovative components	No	Yes	No
Process evaluation completed during funding cycle	No	No	No
New vendor or implementation Trade Ally	No	No	No
Impact problems	No	No	No
Information/educational objectives not met	No	No	No
Participation problems	No	No	No
Operational challenges	No	No	No
Program is cost effective	Yes	Yes	Yes
Negative feedback	No	No	No
Problems with program or low satisfaction	No	No	No
Level of Effort in PY2020	**Limited**	**Full**	**Full**

4 Evaluation Findings

This chapter provides a summary of the findings and any cross-cutting evaluation activities that occurred over the course of the PY2020 EM&V effort. Specifically, this chapter includes: a summary of program and portfolio performance in PY2020; a summary of EM&V activities and expenditures in PY2020; and high-level findings that cut across programs.

Due to the delayed launch of the of the program year, low survey and interview response rates, and interruptions to customer contact due to the pandemic, the findings of the evaluation should, in many cases, be interpreted as idiosyncratic to PY2020.

4.1 Summary of Evaluation Effort

Table 4-1 summarizes the EM&V expenditures by the Evaluators, total EM&V expenditures by all parties, and total program budgets.

Table 4-1 OG&E Portfolio PY2020 EM&V Expenditures

PY2020 EM&V Expenditures	PY2020 Portfolio Expenditures	EM&V as % of Budget
$ 187,100	$ 6,866,723	2.7%
Sums may differ due to rounding.		

To facilitate a thorough evaluation, the Evaluators conducted several primary research and data collection activities, including interviews with program and implementer staff, customer surveys, property manager interviews, and trade ally interviews. Specific PY2020 activities by program are listed in Table 4-2.

Table 4-2 Summary of PY2020 Data Collection Efforts

Program	Channel	# Site Visits	# Surveys	# Interviews[23]	# Staff Interviews	# Lit. Reviews
HEEP	CPS	0	0	0	4	1
	HVAC	0	0	0	4	0
	RSOL	0	48	2	4	6
	LivingWise® Schools Outreach	0	324	0	3	1
CWA	N/A	0	83	2	1	0
CEEP	C&I Solutions	0	0	0	3	0
	SBS	0	0	0	3	0
	Midstream	0	0	0	3	0
	SAGE	0	0	0	3	0
	RCx	0	0	0	3	0
	CEI	0	0	0	3	0
Total		**0**	**455**	**3**	**7[24]**	**8**

4.2 Summary of Cost-effectiveness Results

Table 4-3 below outlines the results from the cost-effectiveness analysis performed on the PY2020 portfolio, by program, along with the net benefits for the total resource cost (TRC) test.

Table 4-3 Cost-Effectiveness by Program, PY2020

Program	TRC	UCT	RIM	PCT	TRC Net Benefits
HEEP	4.59	3.62	0.54	14.91	$ 2,982,054
CWA	2.12	1.64	0.52	4.39	$ 2,106,886
CEEP	2.30	3.17	0.51	5.47	$ 7,500,340
EEA	0.00	0.00	0.00	0.00	$ (22,170)
Total	**2.48**	**2.77**	**0.52**	**5.81**	**$ 12,567,109**
Sums may differ due to rounding.					

The incorporation of NEBs into cost-effectiveness testing in Arkansas at times leads to what could historically be thought of as atypical results. For example, the HEEP and the CWA have a higher TRC than UCT. Under a narrower approach to TRC (without NEBs), the TRC would always be lower than the UCT under the assumption that incentives are less than or equal to incremental cost. However, with NEBs included the TRC score for this program is greater than the UCT score because the aggregate impact of the NEBs and the penalty to benefits from the

[23] These interviews were performed with property managers, trade allies and other market actors, such as builders.

[24] Interviews were conducted with 4 OG&E and 3 CLEAResult staff. Several staff members participate in more than one program/channel.

negative gas interaction is still a benefit of greater magnitude than the difference between measure incremental costs and incentive levels.

The TRC in PY2020 is lower than it was in PY2019 (2.98) and TRC net benefits are lower than PY2019 ($20,636,128). In PY2020, the Evaluators updated the avoided costs, discount rates, lines losses and customer rates to align with the new triennial planning period of PY2020 to PY2022. The table below outlines the differences year-over-year.

Table 4-4 Cost Effectiveness Analysis: Economic Input Comparison

Discount Rates	PY2019	PY2020
Utility (TRC)	5.42%	5.42%
Utility (UCT)	5.42%	5.42%
Utility (RIM)	5.42%	5.42%
Societal (SCT)	2.91%	1.29%
Participant (PCT)	6.50%	6.04%
Line Losses		
Line Losses (demand)	8.59%	7.83%
Line Losses (energy)	7.76%	7.25%
Line Losses (therm)	1.60%	2.67%
Escalation rate	1.90%	2.20%
Avoided Costs		
Avoided Energy ($/kWh)	$ 0.05	$ 0.03
Avoided Demand ($/kW)	$ 177	$ 95
Avoided Natural Gas ($/therm)	$ 0.607	$ 0.517
Avoided Water ($/gallon)	$ 0.007	$ 0.008
Avoided Propane ($/gallon)	$ 2	$ 2

4.2.1 Cost-effectiveness Methodology

See Appendix A: Portfolio Cost-Effectiveness of this report for additional details on the Evaluators approach.

4.2.1.1 Avoided Costs and Real Economic Carrying Charge (RECC)

The Evaluators used the economic inputs provided by OG&E for the cost benefit analysis, this included avoided costs that were estimated using the Real Economic Carrying Charge (RECC) approach.

4.2.1.2 Marginal Line Losses

The Evaluators used marginal line loss inputs provided by OG&E for the cost benefit analysis.

4.3 Non-Energy Benefits (NEBs)

Below is a summary of the Non-Energy Benefits (NEBs) that were calculated in each program in PY2020.

- **HEEP**: this program captured propane (LivingWise® Schools Outreach), natural gas (Residential Solutions, Consumer Products and LivingWise® Schools Outreach), water (Residential Solutions and LivingWise® Schools Outreach) and ARCs (Residential Solutions, Consumer Products and LivingWise® Schools Outreach).
- **CWA**: this program captured natural gas savings, propane savings, water savings and ARCs.
- **CEEP**: this program captured natural gas (C&I Solutions, SAGE, Midstream and Small Business Solutions) and ARCs (C&I Solutions, SAGE, Midstream and Small Business Solutions).

The tables below outline the potential NEBs for the PY2020 OG&E energy efficiency portfolio.

Table 4-5 PY2020 Residential NEBs by Measure[25]

Measure	Water	Other Fuel	ARCs/ DRCs	AR TRM v8.1 Section
Advanced strips				2.4.4
AC tune-up				2.1.5
Air infiltration		X		2.2.9
Ceiling insulation		X		2.2.2
Duct sealing - AC with resistance heat				2.1.11
Duct sealing - electric cooling		X		2.1.11
Duct sealing - heat pump				2.1.11
Duct sealing electric resistance no cooling				2.1.11
ENERGY STAR® LEDs		X	X	2.5.1
ENERGY STAR® pool pumps				2.4.5
Faucet aerators	X			2.3.4
LED fixtures		X	X	2.5.1
Heat pump or AC Replacements				2.1.5
Low-flow showerheads	X			2.3.5
Smart thermostats		X		2.1.12
Water heater jackets				2.3.2
Water heater pipe insulation				2.3.3

[25] This tables represents potential NEBs for each measure. In some cases, there is either not enough data available to calculate those NEBs, or that NEB was not applicable in that application.

Table 4-6 PY2020 C&I NEBs by Measure

Measure	Water	Other Fuel	ARCs/ DRCs	AR TRM v8.1 Section
Anti-sweat heater controls				3.7.5
Commercial AC/HP tune-up				3.1.7
Commercial door air infiltration		X		3.2.11
Commercial showerheads	X			3.3.5
Computer power management				3.7.3
Custom - heating and cooling				N/A
Custom - non-heating and cooling	X			N/A
Custom - non-heating and cooling (lighting controls)				N/A
Custom controls (dual enthalpy economizer)				N/A
Refrigeration measures				3.4.1
Faucet aerators	X			3.3.2
High efficiency battery chargers		X	X	3.7.14
High intensity discharge (HID) lamps		X	X	3.6.3
Integrated-ballast CFL lamps		X	X	3.6.3
Integrated-ballast LED lamps		X	X	3.6.3
LEDs		X	X	3.6.3
Lighting controls		X	X	3.6.2
Low-flow pre-rinse spray valves	X		X	3.8.11
Magnetic ballast T5 or premium T8 retrofit of T12		X	X	3.6.3
Midstream: exterior fixtures		X	X	3.6.3
Midstream: interior fixtures		X	X	3.6.3
Midstream: interior lamps		X	X	3.6.3
Modular CFLs and CCFLs		X	X	3.6.3
Occupancy based controls (vending misers)				3.7.4
Occupancy-based PTHP/PTAC controls				3.1.14
Other linear fluorescents		X	X	3.6.3
Refrigeration door gaskets				3.7.8
Refrigeration strip curtains				3.7.7
Smart thermostats		X		N/A
Unitary and split system AC/HP equipment				3.1.18
Variable frequency drives				N/A

NEB estimates are found in each of the program chapters within this report.

There are no deferred replacement costs (DRC) estimated for the PY2020 portfolio.

4.4 Tests of Portfolio Comprehensiveness

This section outlines how the OG&E portfolio performed against the seven factors developed by the IEM and the Parties Working Collaboratively (PWC).[26]

The Evaluators reviewed the OG&E programs and portfolio to assess whether it complied with the APSC Comprehensiveness Goals. In assessing these metrics, the Evaluators score them on numerous subcomponents.

The scoring methodology is as follows:

●: Meets all requirements and is in full compliance with this performance indicator;

◒: Meets some requirements and is in partial compliance with this performance indicator;

○: Is not in compliance with this performance indicator; and

NA: Performance indicator is not applicable to this program.

This section will reflect the results for all programs in PY2020.

4.4.1 Factor One: Education, Training, Marketing, and Outreach

> *Whether the programs or portfolio provide, directly or through identification and coordination, the education, training, marketing, or outreach needed to address market barriers to the adoption of cost-effective energy efficiency measures.*

The Evaluators reviewed Factor 1 as three separate components: 1) education, 2) training, and 3) marketing and outreach. Each component is addressed below.

As was the case in PY2020, the Evaluators determined that OG&E met the objectives of Factor 1.

4.4.1.1 OG&E has consistently approached customer education in a comprehensive manner.

- OG&E's programs used a range of channels to provide educational materials to their programs' target markets. The educational materials included brochures, case studies, and presentations to trade & industry groups.

[26] Docket No. 08-144-U, "Order defining "comprehensive" in the planning, approval and implementation of essential energy efficiency services," found here: http://www.apscservices.info/pdf/07/07-085-tf_183_1.pdf

- OG&E's program staff conducts outreach and education through a wide range of potential program partners, including contractors, retailers, home builders, and local governments.
- 34% of CWA customers stated they learned about the program by word-of-mouth instead of program marketing material. This marks a shift to lower-cost marketing, as the program is over-subscribed and does not require significant marketing efforts beyond regular Trade Ally outreach.

The scoring for customer education is in Table 4-7.

Table 4-7 Assessment of Customer Education by Program

Program	Provides Educational Materials	Outreach Through Multiple Channels	Education Targeted to Specific Market Barriers	Coordination of Education by Multiple Entities
HEEP	●	●	●	●
CWA	●	●	●	N/A
CEEP	●	●	●	●

4.4.1.2 OG&E has consistently approached training in a comprehensive manner.

The scoring for Trade Ally training is in the table below. The Evaluators reviewed each OG&E program to assess whether:

- The program is Trade Ally-driven;
- If not, is it a program that could or should be Trade Ally-driven;
- The program provides training classes to support their program offerings; and
- Whether the programs need Trade Ally certification.

All OG&E programs have components that are trade-ally driven. All interviewed Trade Allies indicated satisfaction with the residential programs.

Table 4-8 Assessment of Trade Ally Training

Program	Trade Ally Training Offered	Training Requirements Adhere to Best Practices	Trade Allies Participate in Training
HEEP	●	●	●
CWA	●	●	●
CEEP	●	●	●

4.4.1.3 OG&E consistently approached marketing and outreach in a comprehensive manner.

The Evaluators reviewed the marketing and outreach strategies associated with each of the OG&E programs. These strategies were reviewed to assess whether they adequately addressed the relevant participant barriers, the extent to which Trade Allies were actively marketing the program (where appropriate), and whether the materials were correctly targeted in marketing a comprehensive approach to energy efficiency.

The scoring for marketing and outreach is in Table 4-9.

Table 4-9 Assessment of Marketing & Outreach by Program

Program	Marketing Addresses Specific Barriers	Trade Allies Promote Program	Marketing Support Provided to Trade Allies	Marketing Performed Through Diverse Channels
HEEP	●	●	●	●
CWA	●	●	◒	●
CEEP	●	●	●	●

After reviewing the marketing and outreach materials, the Evaluators concluded that:

- OG&E programs have marketing materials that address specific barriers associated with the targeted segments or technologies.
- The OG&E programs are marketed through a diverse range of channels, including mass-media advertising, online advertising, and meetings and training sessions with professional organizations and trade groups.
- Trade Ally markets the programs through neighborhood canvassing, road signs, and flyers.
- Trade Allies would like more marketing effort from OG&E through newspaper ads, bill inserts, and other community outreach programs.

4.4.2 Factor Two: Budgetary, Management, and Program Delivery Resources

Whether the program and/or portfolio have adequate budgetary, management, and program delivery resources to plan, design, implement, oversee, and evaluate energy efficiency programs.

To evaluate budget and resource sufficiency, the Evaluators assessed performance indicators associated with the adequacy of budget allocations, the cost per kWh saved, and whether program staff and Trade Ally support was sufficient to support program goals.

The Evaluators determined that OG&E achieved the Factor 2 objectives.

4.4.2.1 In most cases, program budgets were sufficient to implement the programs.

In PY2020, at a portfolio level, OG&E achieved its energy savings (kWh) and demand reduction (kW) targets while spending 75% of its allocated budget[27], and at an overall levelized cost of $0.030/kWh. Additionally, all residential programs (HEEP and CWA) achieved 99% of their energy savings goal while spending 65% of their allocated budget. The C&I program (CEEP) achieved 120% of the energy savings goal while spending 85% of their allocated budget.

OG&E's energy resource acquisition cost at a portfolio level is below average for utilities across the country with programs that have been run for several years.[28] The CWA program had a higher levelized acquisition cost than any other program, at $0.053/kWh.

Program and implementation staff reported that, overall, they had sufficient budget to cover program implementation in PY2020. Table 4-10 shows the spending and energy savings percentages for each program, along with the cost per kWh of savings.

In PY2020, CWA was not able to reach goal due to COVID-19 related orders and restrictions. Program staff also mentioned that OG&E customers were more hesitant in allowing Trade Allies to enter their homes in PY2020. The program met 81% of program goal while spending 59% of the allocated budget; the shortfall in goal attainment is attributable to a decline in participation as project quality and cost-effectiveness remained high.

Table 4-10 PY2020 Budget Allocation and Program Goal Attainment

Program	Spending (Percentage of Budget)	Energy Savings (Percentage of Goal)	Levelized ($ per kWh)
HEEP	84%	125%	$ 0.017
CWA	59%	81%	$ 0.053
CEEP	85%	120%	$ 0.028
Total[29]	**75%**	**114%**	**$ 0.030**

The scoring for Factor Two is in Table 4-11.

[27] This factors out EEA budgets (total budget of $22,082, total spend of $22,170). If those budgets are included in this analysis, OG&E expenditures are 75% of planned budget.

[28] EPA estimates that energy efficiency programs will cost program administrators $0.58 cents up front per kWh saved in the first year for low savings levels, with costs declining to $0.46 and then $0.35 cents as programs ramp up. Source: http://aceee.org/sites/default/files/cost-of-ee.pdf

[29] Total is the percent of program-specific spend compared to program-specific budgets. This excludes EEA.

Table 4-11 Assessment of Budgetary, Management, and Delivery Resources

Program	Budget is Sufficient to Support Program Goals	Cost per-kWh Aligns with Program Plan	Program Has Sufficient Staffing	Program Has Sufficient Trade Ally Support
HEEP	●	●	●	●
CWA	●	●	●	●
CEEP	●	●	●	●

4.4.3 Factor Three: Major End-Uses Addressed

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

To assess Comprehensiveness Checklist Factor 3, the Evaluators identified the end-uses addressed by each program. OG&E designed programs to offer customers a range of choices. While some programs are focused on single end-use measures, OG&E offers other programs that encourage participants to capture deeper energy savings through comprehensive projects.

The Evaluators determined that OG&E continued to meet the objectives of Factor 3 in PY2020.

4.4.3.1 OG&E's targeted programs serve a wide range of customer sectors and end-use measure categories.

- All major end uses in the AR TRM v8.1 were utilized by the residential programs.
- While all major end uses are targeted in the C&I programs, the most significant HIM was lighting. However, a wide range of measures were seen, including refrigeration gaskets, HVAC, building envelope, and process equipment improvement.

The scoring for this factor is in Table 4-12.

Table 4-12 Assessment of End-uses Addressed by Program

Program	HVAC	Lighting	Weatherization	Industrial Process	Behavioral
HEEP	●	●	●	N/A	N/A
CWA	●	●	●	N/A	N/A
CEEP	●	●	N/A	●	●

Presently, the OG&E portfolio covers almost all end-uses. The Evaluators found that sectors where the program offerings were not providing sufficient outreach and market transformation included:

- **Behavioral.** The residential portion of the portfolio does not include any behavioral-based programs. However, this is likely not viable given the size of OG&E's service

territory. When examining the experiences of other electric utilities, the Evaluators found that behavioral programs in Arkansas would require a recipient group of at least 25,000 households to reach cost-effectiveness (44% of the residential customer count[30]). With the need of a control group, a behavioral program would likely encompass most of OG&E's service territory. Behavioral marketing is likely best-driven through Energy Efficiency Arkansas (EEA) which receives funding from all Arkansas IOUs.

4.4.4 Factor Four: Comprehensively Address Customer Needs

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

In assessing Factor 4, the Evaluators reviewed the extent to which OG&E offers technical support to educate customers on cost-effective, comprehensive projects and/or whether it provides incentives that encourage participants to install multiple measures and/or those with higher efficiency levels that increase project comprehensiveness.

The Evaluators found that OG&E met the Factor 4 objectives in PY2020.

4.4.4.1 OG&E provides technical support to educate customers and encourage them to install comprehensive projects.

The OG&E portfolio has programs that bundle on-site technical assistance with direct installation. The range of technical assistance varies by program. The programs have procedures for following up with customers after their participation, which includes thank-you calls or emails, and verification inspection. Marketing materials typically make attempts at cross-promotion of programs.

4.4.4.2 The majority of OG&E's programs are designed to facilitate multi-measure installations.

The OG&E portfolio has no specific requirements for installation of multiple measures. Customers are able participate to an extent of their choice. This is a program best-practice in enabling customers to engage in energy efficiency in a manner in accordance with their budget constraints. However, there is no specific encouragement in place to incentivize comprehensive projects, as seen elsewhere in Arkansas.

[30] Per the EIA Form 861, OG&E has 56,263 residential customers in Arkansas as of 2019.

The OG&E portfolio has no tiered or bundled incentives for premium efficiency measures at this time.

Table 4-13 provides an overview of the scoring for this Factor.

Table 4-13 Assessment of Project Comprehensiveness by Program

Program	Technical Assistance and/or Audits	Information Provided Comprehensive for Efficiency	Bundled Incentives for Multiple Measures	Tiered Incentives for Premium Efficiency	Trade Ally Incentives for Premium Efficiency
HEEP	●	●	●	●	●
CWA	●	●	●	●	●
CEEP	●	●	●	●	●

4.4.5 Factor Five: Targeting Market Sectors & Leveraging Opportunities

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

The Evaluators assessed the portfolio's ability to address customers' comprehensive needs in Factor 4, the Evaluators assessed Factor 5 by focusing specifically on OG&E's efforts to customize its approach for targeted customer sectors. The Evaluators also assessed OG&E's use of external resources to promote the program and/or to improve customers' project returns.

The Evaluators found that OG&E mostly met the Factor 5 objectives in PY2020. While OG&E has successfully targeted, and leveraged, industry partners for many market segments in CEEP. The Evaluators recommend expanding mobile home industry organizations.

4.4.5.1 OG&E has taken a collaborative and comprehensive approach to leveraging internal and external resources and targeting customer sectors most likely to benefit from its programs.

The CWA program is jointly implemented with OG&E and AOG and is a very successful example of cross-fuel coordination. The costs are split when a home is an OG&E and AOG customer and paid in full by OG&E if they are served by another gas utility (such as a municipal or a rural co-op). AOG pays in full if the home is served by an electric utility other than OG&E.

The Evaluators also found that OG&E's programs are marketed through industry partners including professional organizations, trade groups, universities, and homeowner's associations.

The program targeted residence that are at least 10 years old or have had an electric utility bill in the past 12 months equal to or greater than $0.10 per square foot. Table 4-14 summarizes the comprehensiveness of offerings for each program.

Table 4-14 Assessment of Targeted Customer Sectors by Program

Program	Residential	Multifamily	Mobile Home	Small Commercial	Large Commercial	Industrial	Agricultural	Public Sector
HEEP	●	●	◖	N/A	N/A	N/A	N/A	N/A
CWA	●	N/A	●	N/A	N/A	N/A	N/A	N/A
CEEP	N/A	N/A	N/A	●	●	●	●	●

4.4.6 Factor Six: Cost-effectiveness

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

To evaluate Factor 6 in PY2020, the Evaluators assessed three key performance indicators: 1) whether programs achieved their Plan goals, 2) NTG values, and 3) program cost-effectiveness.

4.4.6.1 Goal Achievement

In PY2020 CEEP and HEEP achieved their energy savings targets, but CWA did not. In PY2019, the portfolio exceeded its net energy savings (kWh) goal by 29%, in PY2020 the portfolio exceeded its net energy savings (kWh) goal by 14%.

4.4.6.2 Cost-Effectiveness Results and NTG

OG&E's portfolio is cost effective, as demonstrated with Total Resource Cost (TRC), Utility Cost Test[31] (UCT), and Participant Cost (PCT) test ratios greater than 1.0. The portfolio-level TRC test ratio is 2.48 and all programs achieved TRC ratios above 1.0. The portfolio achieved UCT ratio of 2.77, which looks at cost effectiveness from the utility perspective. The portfolio-level PCT is 5.81. The programs and portfolio failed the RIM (0.52).

Table 4-15 presents program- and portfolio-level NTG and benefit/cost ratios for each perspective. The UCT and PCT results are particularly relevant to Comprehensiveness Factor 6,

[31] The UCT is, in some cases, referred to as the Program Administrator Cost Test (PACT).

as these test results indicate that portfolio benefits exceeded its costs from the utility and customers' perspectives, respectively.

Table 4-15 Portfolio NTG and Cost Effectiveness Results

Program	Savings Goal Achieved (kWh)	NTG	TRC	UCT	RIM	PCT
HEEP	125%	83%	4.59	3.62	0.54	14.91
CWA	81%	88%	2.12	1.64	0.52	4.39
CEEP	120%	100%	2.30	3.17	0.51	5.47
Portfolio	**114%**	**95%**	**2.48**	**2.77**	**0.52**	**5.81**

Table 4-16 outlines the scoring for Factor Six.

Table 4-16 Assessment of Cost Effectiveness

Program	NTG Ratio	NTG Ratio Within Industry Norms	Met Net Savings Goal	Program TRC
HEEP	●	●	●	●
CWA	●	●	●	●
CEEP	●	●	●	●

4.4.7 Factor Seven: EM&V Procedures

Whether the programs and/or portfolio have EM&V procedures adequate to support program management and improvement; the calculation of energy, demand, and revenue impacts; and resource planning decisions.

To assess Factor 7, the Evaluators reviewed performance indicators, including: 1) whether the EM&V Plan conforms to the TRM v8.1[32], 2) whether the Plan achieved IEM approval, 3) whether the EM&V implementer followed an articulated plan, and 4) the extent to which OG&E provided high quality and timely data and other support necessary to conduct EM&V.

Below we summarize the PY2020 EM&V procedures' compliance with each of these evaluation metrics.

The EM&V Plan conformed to the TRM v8.1.

[32] At the time of developing the EM&V Plans, Arkansas TRM v8.1 had not been filed. The plan was checked against v8.1 after this version was released to ensure there were no conflicts as a result of the TRM update, and the plan was found to be compliant with v8.1 Protocols as well.

The Evaluators drew extensively on the AR TRM v8.1 to calculate deemed savings. Any deviation from the TRM has been explained in corresponding sections of the program.

The EM&V Plan was approved by the IEM.

The Evaluators prepared a comprehensive EM&V Plan for PY2020 and submitted it to OG&E and the IEM for review. The Evaluators received several comments from the IEM regarding areas for refinement or additional detail. In most cases, the IEM requested greater detail in the description of EM&V activities, and wherever possible, the Evaluators addressed these.

During the course of the Evaluation, if there were instances where the Evaluators needed to deviate from the original EM&V Plans, the Evaluators communicated the change to the IEM for their feedback and approval.

4.4.7.1 OG&E provided timely/high quality data and support for the EM&V process.

OG&E and its implementers were very responsive to the Evaluators' data requests and accessing data through CLEAResult's Catalyst and OG&E's Saratoga database was straightforward and productive.

Specific examples of collaboration provided by OG&E and its implementation contractors to support the EM&V process include:

- **Custom M&V Plans**: For custom projects implemented through the C&I programs, the implementer provided M&V plans that were reviewed by the Evaluator prior to project implementation. The early collaboration on M&V plans and data collection activities allow both implementer and Evaluators the opportunity to agree on data requirements and calculation approaches to custom projects. This collaboration reduces risk associated with differences in *ex ante* and *ex post* savings for these projects.
- **Data Transfer and Data Quality**: While there were some data integrity issues experienced, the Evaluators found that OG&E and their implementation partners, Frontier Energy[33], CLEAResult Consulting, and AM Conservation Group (AM Conservation), were all collaborative and worked quickly to resolve those issues across the multiple tracking systems.

The Evaluators reviewed the quality of program tracking data to assess whether the data allowed for complete evaluation. Further, the Evaluators reviewed the extent to which

[33] Frontier Energy is not an implementer, they are the data administrator for the CWA Program.

individual savings calculations were performed using facility-specific inputs into the AR TRM v8.1 algorithms versus the use of simplifying assumptions.

The scoring for Factor Seven is found in Table 4-17.

Table 4-17 Assessment of Data & QA/QC Procedures by Program

Program	Tracking Contains Necessary Fields	Savings Calculations Performed and Reported	Savings Calculations Based on Facility Data	QA/QC Inspections by Program Staff
HEEP	●	●	●	●
CWA	●	●	●	●
CEEP	●	●	●	●

CWA tracking previously did not track building type or propane use. This was corrected as part of the migration to a new tracking platform beginning with PY2021.

In PY2020, OG&E CWA staff perform QA/QC inspections on 10% of all sites in the program.

The table below is a summary of the net present value (NPV) of all NEBs in the PY2020 OG&E portfolio.

Table 4-18 PY2020 OG&E NEB Findings Summary

Program	NPV NGS ($)	NPV LPGS ($)	NPV of Water/ WW ($)	NPV ARC ($)	Total NPV of NEBs ($)
HEEP	$ (118,531)	$ 24,583	$ 181,982	$ 594,748	$ 2,771,093
CWA	$ 163,553	$ 456,659	$ 8,923	$ 74,542	$ 2,640,485
CEEP	$ (565,562)	$ -	$ -	$ 1,194,908	$ 9,323,843
Total	$ (520,541)	$ 481,243	$ 190,905	$ 1,864,197	$ 14,735,421
Sums may differ due to rounding.					

5 Home Energy Efficiency Program (HEEP)

5.1 Overview of Evaluation Findings

Table 5-1 and Table 5-2 presents the *ex ante* energy (kWh) and demand (kW) savings, *ex post* energy (kWh) and demand (kW) savings, energy (kWh) and demand (kW) realization rates, *ex post* net energy (kWh) and demand (kW) savings and NTG ratios for the PY2020 Home Energy Efficiency Program (HEEP), by channel.

Table 5-1 Energy Savings Summary for HEEP in PY2020

Channel / Measure	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	NTG (kWh)	*Ex post* Net Energy Savings (kWh)
Consumer Products	**3,808,442**	**112%**	**4,266,274**	**83%**	**3,528,764**
Advanced Power Strips	302,157	100%	302,157	52%	157,122
LEDs (Food Bank)	1,706,293	100%	1,706,293	100%	1,706,293
LEDs (Specialty)	89,626	127%	113,427	74%	83,936
LEDs (Standard)	1,644,627	127%	2,081,387	74%	1,540,226
Smart Thermostats	31,433	102%	31,977	86%	27,532
Window AC Replacement	34,306	91%	31,033	44%	13,655
HVAC	**122,384**	**102%**	**125,063**	**79%**	**98,986**
AC Replacement	36,275	100%	36,276	81%	29,384
ACTU: M&V	2,623	100%	2,626	75%	1,970
ACTU: Modeled	29,851	100%	29,862	78%	23,203
ACTU: Post measurement	1,933	131%	2,538	95%	2,399
ACTU: Pre-clean	247	100%	247	75%	185
HP Replacement	23,137	107%	24,837	74%	18,379
HPTU: M&V	6,880	100%	6,887	93%	6,424
HPTU: Modeled	19,209	100%	19,216	79%	15,113
HPTU: Post measurement	1,107	131%	1,453	75%	1,090
HPTU: Pre-clean	1,122	100%	1,121	75%	840
RSOL	**369,274**	**99%**	**367,416**	**86%**	**314,832**
Faucet Aerators	3,637	100%	3,637	87%	3,164
LEDs (Standard)	30,295	98%	29,708	74%	21,984
Low-Flow Showerheads	6,176	93%	5,736	86%	4,933
Advanced Power Strips	12,512	93%	11,681	78%	9,111
Air Infiltration	31,530	100%	31,530	100%	31,530
Duct Sealing	201,263	100%	201,263	100%	201,263
ES Pool Pumps	12,930	100%	12,930	90%	11,637
ES Windows	70,931	100%	70,931	44%	31,210
LivingWise® Schools Outreach	**317,856**	**72%**	**228,799**	**94%**	**214,092**
Faucet Aerators	68,070	55%	37,327	98%	36,580
LEDs (Standard)	106,983	51%	54,842	87%	47,713
Low-Flow Showerheads	142,803	96%	136,630	95%	129,799
HEEP Total	**4,617,956**	**108%**	**4,987,552**	**83%**	**4,156,673**
Sums may differ due to rounding.					

Table 5-2 Demand Reduction Summary for HEEP in PY2020

Channel / Measure	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)	NTG (kW)	*Ex post* Net Demand Reductions (kW)
Consumer Products	**615**	**122%**	**753**	**81%**	**610**
Advanced Power Strips	34	100%	34	52%	18
LEDs (Food Bank)	277	100%	277	100%	277
LEDs (Specialty)	15	143%	21	74%	15
LEDs (Standard)	267	143%	382	74%	283
Smart Thermostats	0.00	100%	0.00	100%	0.00
Window AC Replacement	22	178%	38	44%	17
HVAC	**44**	**101%**	**45**	**80%**	**36**
AC Replacement	14	100%	14	81%	12
ACTU: M&V	2	100%	2	75%	1
ACTU: Modeled	18	100%	18	78%	14
ACTU: Post measurement	1	115%	1	95%	1
ACTU: Pre-clean	0.15	100%	0.15	75%	0.11
HP Replacement	2.15	105%	2.26	74%	2
HPTU: M&V	2	100%	2	93%	2
HPTU: Modeled	5	100%	5	79%	4
HPTU: Post measurement	0.25	116%	0.29	75%	0.22
HPTU: Pre-clean	0.25	100%	0.25	75%	0.19
RSOL	**63**	**88%**	**62**	**76%**	**43**
Faucet Aerators	.38	100%	.38	87%	.33
LEDs (Standard)	5	99%	5	74%	4
Low-Flow Showerheads	1	93%	1	86%	1
Advanced Power Strips	2	93%	2	78%	2
Air Infiltration	2	100%	2	100%	2
Duct Sealing	18	100%	18	100%	18
ES Pool Pumps	3	100%	3	90%	2
ES Windows	31	100%	31	44%	14
LivingWise® Schools Outreach	**39**	**98%**	**27**	**76%**	**25**
Faucet Aerators	7	55%	4	98%	4
LEDs (Standard)	17	54%	9	87%	8
Low-Flow Showerheads	15	96%	14	95%	13
HEEP Total	**762**	**117%**	**887**	**80%**	**714**
Sums may differ due to rounding.					

Table 5-3 outlines the *ex post* gross, and *ex post* net lifetime energy (kWh) savings, by measure, for the PY2020 HEEP.

Table 5-3 PY2020 HEEP Lifetime Savings Summary

Channel / Measure	Tier One EUL	*Ex post* Gross Lifetime Energy Savings (kWh)	*Ex post* Net Lifetime Energy Savings (kWh)
Consumer Products		**77,933,624**	**65,380,031**
Advanced Power Strips	10	3,021,570	1,571,216
LEDs (Food Bank)	19	32,419,567	32,419,567
LEDs (Specialty)	20	2,268,540	1,678,720
LEDs (Standard)	19	39,546,353	29,264,301
Smart Thermostats	11	351,747	302,854
Window AC Replacement	11	325,847	143,372
HVAC		**1,547,855**	**1,218,615**
AC Replacement	19	689,244	558,288
ACTU: M&V	5	14,100	10,575
ACTU: Modeled	8	239,772	186,302
ACTU: Post measurement	3	7,614	7,196
ACTU: Pre-clean	3	741	556
HP Replacement	16	397,392	294,070
HPTU: M&V	5	36,979	34,490
HPTU: Modeled	8	154,291	121,346
HPTU: Post measurement	3	4,359	3,269
HPTU: Pre-clean	3	3,363	2,522
RSOL		**6,292,476**	**5,299,905**
Faucet Aerators	10	36,370	31,642
LEDs (Standard)	19	564,452	417,694
Low-Flow Showerheads	10	57,360	49,330
Advanced Power Strips	10	116,810	91,112
Air Infiltration	11	346,830	346,830
Duct Sealing	18	3,622,734	3,622,734
ES Pool Pumps	10	129,300	116,370
ES Windows	20	1,418,620	624,193
LivingWise® Schools Outreach		**2,781,568**	**2,570,328**
Faucet Aerators	10	373,270	365,805
LEDs (Standard)	19	1,041,998	906,538
Low-Flow Showerheads	10	1,366,300	1,297,985
HEEP Total		**88,555,522**	**74,468,878**
Sums may differ due to rounding.			

Table 5-4 outlines the NEB estimates for the PY2020 HEEP.

Table 5-4 *Ex post* Net Non-Energy Benefit (NEB) Estimates for HEEP

Channel / Measure	*Ex post* Net ARCs ($)	*Ex post* Net Propane Savings (gallons)	*Ex post* Net Natural Gas Savings (therms)	*Ex post* Net Water Savings (gallons)
Consumer Products	**$ 578,001**	**0**	**(20,428)**	**0**
Advanced Power Strips	$ -	0	0	0
LEDs (Food Bank)	$ 328,339	0	(11,082)	0
LEDs (Specialty)	$ 18,296	0	(492)	0
LEDs (Standard)	$ 231,365	0	(9,027)	0
Smart Thermostats	$ -	0	173	0
Window AC Replacement	$ -	0	0	0
HVAC	**$ -**	**0**	**0**	**0**
AC Replacement	$ -	0	0	0
ACTU: M&V	$ -	0	0	0
ACTU: Modeled	$ -	0	0	0
ACTU: Post measurement	$ -	0	0	0
ACTU: Pre-clean	$ -	0	0	0
HP Replacement	$ -	0	0	0
HPTU: M&V	$ -	0	0	0
HPTU: Modeled	$ -	0	0	0
HPTU: Post measurement	$ -	0	0	0
HPTU: Pre-clean	$ -	0	0	0
RSOL	**$ 4,313**	**0**	**8,312**	**81,600**
Faucet Aerators	$ -	0	3,164	32,824
LEDs (Standard)	$ 4,313	0	(123)	0
Low-Flow Showerheads	$ -	0	4,933	48,776
Advanced Power Strips	$ -	0	0	0
Air Infiltration	$ -	0	0	0
Duct Sealing	$ -	0	0	0
ES Pool Pumps	$ -	0	0	0
ES Windows	$ -	0	338	0
LivingWise® Schools Outreach	**$ 12,434**	**1,292**	**2,673**	**2,625,097**
Faucet Aerators	$ -	312	613	599,028
LEDs (Standard)	$ 12,434	-125	(114)	0
Low-Flow Showerheads	$ -	1,106	2,175	2,026,069
HEEP Total	**$ 594,748**	**1,292**	**(9,442)**	**2,706,697**
Sums may differ due to rounding.				

Figure 5-1 below represents measure installations that were performed in PY2020, by month. The spike in August and November from CPS was due to the timing of Food Bank giveaways.

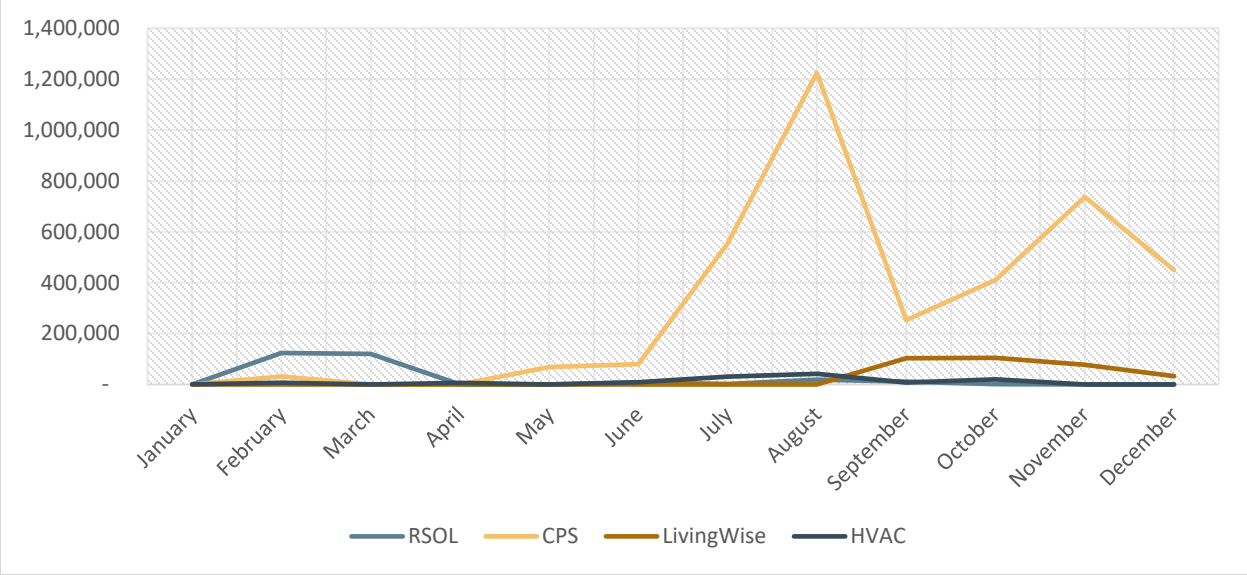


Figure 5-1 PY2020 *Ex ante* Energy Savings (kWh) by Month, installed in PY2020

Additional details (including evaluation approaches) are found in the following sections.

5.2 Program Overview

The HEEP program offering in PY2020 was a multipronged approach that is designed to incentivize residential customers to reduce the energy consumption of their homes. It provides the customer multiple avenues for participation, including Residential Solutions, LivingWise® Schools Outreach, HVAC Replacement and Tune-up, and Consumer Product Solutions offerings.

5.2.1 Residential Solutions

The RSOL offering is designed to provide direct install measures to residential customers. The program promotes energy efficiency by offering home assessments to both detached single-family and individually metered multi-family residential customers.

The program helped residents achieve electric savings by consulting with a contractor or OG&E representative, who helped analyze their energy use, identify energy efficiency improvement projects, and install low-cost energy saving measures at participant homes.

Key elements of the Residential Solutions offering include:

- **Customer engagement**: A variety of customer intake channels are made available through this program including phone, email and web.

- **Contractors or OG&E representatives**: These individuals are available to participants and potential participants in the program to provide information on the benefits and costs of energy efficient projects. They have the knowledge to discuss the potential options customers have and assist in defining the best path for them to take based on their individual situation.
- **Incentive application**: Applications are developed for customers to submit to the program for installed eligible measures. The program will conduct a QA/QC review of all applications to ensure that all required information and documentation has been provided.
- **Incentive payment**: Trade Allies receive payment checks directly from the program for approved applications of installed eligible equipment and measures. Customers receive payment checks on a case-by-case basis if it is deemed necessary and fits within the established program guidelines.
- **Project Verification & Quality Assurance**: A detailed QA/QC protocol was established to ensure technical and programmatic compliance by participating Trade Allies.

5.2.2 LivingWise® Schools Outreach

This channel includes an outreach channel targeted at elementary school students and was designed to provide an educational opportunity to learn about energy efficient opportunities in their home. This approach included an established teaching curriculum that teachers use to review and teach their students what activities they can do to help save energy. The students were given an energy efficiency kit with easy to install measures (e.g., LEDs, aerators, showerheads, etc.) that they took home to have their guardians help them install.

This channel is targeted at sixth grade school students and included a survey for the students to fill out at home and return to their teacher. Teachers received the completed survey responses and submitted them to the program.

5.2.3 HVAC Replacement & Tune-up Channel (HVAC)

The objective of the HVAC Replacement and Tune-up channel (HVAC) was to generate energy and demand savings from residential HVAC systems through replacement of older inefficient equipment, or a tune-up of customer's existing HVAC system to optimize its operation and efficiency, effectively reducing energy intensity. This offering was designed as a market-driven approach that utilizes local HVAC contractors for completion of the work.

Customer requested HVAC tune-ups or unit replacements, which were completed through a network of participating contractors. When customers contacted the program, the project team referred them to available contractors or scheduled an appointment for them. Contractors completed the tune-up or HVAC unit replacement, the data collection on system performance

and the paperwork required to submit for the applicable program rebates. Once the application passed the program requirements review, it was processed, and the rebate was paid.

5.2.4 Consumer Products Solutions

The objective of the Consumer Products Solutions (CPS) channel was to achieve cost-effective energy savings by incenting and educating customers to purchase residential lighting through an upstream channel. It drove participation in the program by developing relationships with participating partners and educating consumers to influence their purchasing behavior. Utility rebates focused on ensuring that retailers make energy efficient products available at discounted prices to OG&E residential customers.

The PY2020 CPS channel also offered LED bulbs through food bank distribution. Each food bank received the LED bulbs from CLEAResult, who packed those into food boxes and included them in the distribution of those food boxes to each food pantry. At the food pantry, each food box is given to an Arkansas resident, who may or may not be an OG&E customer. The food box contains one four-pack of LED bulbs. This channel aims to target at all residential customers living within the OG&E Arkansas service territory.

To estimate total household participation in HEEP, the Evaluators assumed that total packages of LEDs sold or distributed through the CPS channel would equal the total number of participant households. Under this assumption, in PY2020, 140,275[34] homes participated in the HEEP. Below, Table 5-5 summarizes the total number of households where a measure was installed in/performed at, total measures installed/performed and the *ex ante* gross kWh and peak kW savings, by measure.

Table 5-5 PY2020 HEEP Participation Summary by Channel

Channel	Number Participants/ Households	Total Quantity of Measures	*Ex ante* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Incentives
Residential Solutions	419[35]	1,947	369,274	63	$ 47,485
LivingWise® Schools Outreach	4,440	7,400	317,856	39	$ 70,571
HVAC Replacement & Tune-up	111	118	122,384	44	$ 28,693
Consumer Products	135,305[36]	137,138[37]	3,808,442	615	$ 275,297
HEEP Total	**140,275**	**146,603**	**4,617,956**	**762**	**$ 422,045**
Sums may differ due to rounding.					

[34] This includes participation estimates from the upstream portion of the CPS channel in PY2020.

[35] This value represents the number of unique account numbers in the project data.

[36] LEDs in Consumer Products is denominated in number of packages.

[37] LEDs in Consumer Products is denominated in number of bulbs sold. This value also includes 1,959 non-LED measures.

Table 5-6 below outlines participation by channel, by measure.

Table 5-6 PY2020 Participation for HEEP by Measure

Channel / Measure	Households / Measures	Identified SF Participants	Identified MF Participants
Consumer Products	**137,138**	**Unknown**	**Unknown**
Advanced Power Strips	1,805	Unknown	Unknown
LEDs (Food Bank)	68,000	Unknown	Unknown
LEDs (Specialty)	2,427	Unknown	Unknown
LEDs (Standard)	64,752	Unknown	Unknown
Smart Thermostats	22	Unknown	Unknown
Window AC Replacement	132	Unknown	Unknown
HVAC	**118**	**29**	**89**
AC Replacement	57	0	57
ACTU: M&V	2	0	2
ACTU: Modeled	27	23	4
ACTU: Post measurement	3	1	2
ACTU: Pre-clean	1	0	1
HP Replacement	17	0	17
HPTU: M&V	3	2	1
HPTU: Modeled	6	1	5
HPTU: Post measurement	1	1	0
HPTU: Pre-clean	1	1	0
RSOL	**1,947**	**1,395**	**464**
Faucet Aerators	71	0	71
LEDs (Standard)	1,207	880	327
Low-Flow Showerheads	20	3	17
Advanced Power Strips	124	103	21
Air Infiltration	7	0	7
Duct Sealing	21	0	21
ES Pool Pumps	4	4	0
ES Windows	405	405	0
LivingWise® Schools Outreach	**1,480**	**Unknown**	**Unknown**
Faucet Aerators	2,960	Unknown	Unknown
LEDs (Standard)	2,960	Unknown	Unknown
Low-Flow Showerheads	1,480	Unknown	Unknown
HEEP Total	**26,371**	**1,424**	**553**

Total households do not equal the sum of measures due to households receiving multiple measures.

5.3 Gross Impact Evaluation Approach

The impact evaluation effort of the HEEP included the following:

- **Desk Reviews.** The Evaluators utilized the AR TRM v8.1 values in assessing *ex post* gross energy savings (kWh), demand reductions (kW) and NEBs from residential measures. In addition to the AR TRM v8.1, the Evaluators also examined the Excel workbook used by the third-party implementation (TPI) staff (CLEAResult and AM Conservation) to assess savings by measure. The workbook utilizes AR TRM v8.1 savings algorithms with Trade Ally inputs to calculate savings based on the measure and input parameters. The Evaluators verified the factor tables for each measure to ensure the values were appropriate.
- **Site Visits.** Due to the pandemic, the Evaluators were unable to perform verification site visits for projects in PY2020. As a result, the Evaluators have reviewed the site visits from PY2017, PY2018, and PY2019 (166 total sites) and will apply the average of the three years to result in measure-level field verification rates (FVR).

5.3.1 Energy Savings Calculations

The following sections outline the impact evaluation approach for each channel in HEEP. For equipment and retrofits rebated through the PY2020 HEEP, calculation methodologies were performed as described in the AR TRM v8.1. Table 5-7 identifies the sections in the AR TRM v8.1 that were used for verification of measure-level savings. The gross impact evaluation effort included the following:

- **Desk Review of Residential Calculations**: for all channels, the Evaluators utilized AR TRM v8.1 values in assessing savings from measures in HEEP. In HVAC, for the CoolSaver measure, a CLEAResult white paper[38] was utilized to verify savings.
- **Data Tracking Review**: for all channels, project data from the TPIs was reviewed to ensure that tracking systems followed Protocol A, B1 and B2 of the AR TRM v8.1.
- **Site Visits**: Due to the pandemic, there were no site visits in PY2020 for HEEP.
- **Survey Analysis**: for AM Conservation, student/parent surveys were reviewed to determine in-service-rates (ISRs) and NEB estimates. For CPS, RSOL and HVAC, surveys were not used in impact analysis.
- **Leakage Analysis**: for CPS, leakage analysis was performed in compliance with Protocol K of the AR TRM v8.1.

[38] The white paper is titled, "2018 Measurement and Verification (M&V) Plan for CoolSaver – Option A – Retrofit Isolation: Key Parameter Measurement."

Table 5-7 AR TRM v8.1 Sections by Measure Type

Measure Category	Measure	TRM 8.1, Vol. 2 Subsection(s)
Appliances	Advanced Power Strip	2.4.4
	ENERGY STAR® Windows	2.2.7
	Smart Thermostat	2.1.12
Domestic hot water	Faucet Aerator[39]	2.3.4
	Showerhead	2.3.5
Envelope	Air Infiltration	2.2.9
	Ceiling Insulation	2.2.2
	Wall Insulation	2.2.3
HVAC	Duct Sealing	2.1.11
	AC Tune-up	2.1.5
	Central Air Conditioner (AC) Replacement	2.1.6
	Central Heat Pump (HP) Replacement	2.1.8
	Smart Thermostat	2.1.12
Lighting	LED Fixtures	2.5.1.3
	LED Lamps	2.5.1.4

5.4 Tracking System Review and Survey Approaches

5.4.1 Sampling for Telephone Surveys

The Evaluators conducted the sampling for the single-family telephone survey effort, drawing a random sample of single family RSOL participants and single-family CPS participants with an assumed response rate of 25% to reach a target sample of 68 completed telephone surveys. Selecting a target of 68 completions allowed for a margin of error in the survey recruitment effort. The actual response rate for the telephone survey was approximately 10%, resulting in 48 completions for RSOL.

The Evaluators conducted phone interviews with two property managers. All the property managers interviewed participated in RSOL.

5.4.2 Tracking Review

The impact evaluation began with a review of program tracking data. The tracking data included a separate row for each measure installed. Every premise in the program had a unique

[39] While this measure is included in the HEEP, there were no incentivized aerators in PY2020.

incentive identifier, so each premise had multiple rows to reflect the different measures completed.

The tracking data provided measured values for duct pressurization testing and blower door tests, allowing for the re-creation of *ex ante* calculations based on leakage reduction. Ceiling insulation included an indicator for baseline R-value. Program specifications are to bring the home's insulation level up to R-38 or R-49. The maximum allowable baseline insulation is R-22.

5.5 LivingWise® Schools Outreach

At the outset of each program year, AM Conservation calculates an average per-kit savings based on the then most current AR TRM and some assumptions about installation and NTG. AM Conservation sends electronic reports to OG&E throughout the year on the number of kits delivered to classrooms and the associated impacts. AM Conservation provides OG&E with a final report after the program year is complete that shows the number of kits delivered, as well as their final estimates of annual kWh and kW impacts for the program year.

OG&E maintains a tracking system that shows the number of participants in the program each year and recorded impacts. The data are provided by AM Conservation and transferred into the Saratoga tracking system by OG&E. OG&E uses the participation information and impact estimates provided by AM Conservation as the reported amounts for the program year. For measures rebated through the PY2020 LivingWise® Schools Outreach channel, calculation methodologies were performed as described in the AR TRM v8.1.

In addition to the AR TRM v8.1, the Evaluators also examined the Excel workbook used by implementation staff (AM Conservation) to assess savings by school. The workbook utilizes AR TRM v8.1 savings algorithms to estimate per kit savings based on input parameters and was reported in adjusted gross numbers. The Evaluators verified the project savings for each kit to ensure the values were appropriate and applied those values to the number of kits that were distributed in the program for PY2020.

5.6 HVAC Replacement and Tune-up

The HVAC Replacement and Tune-up channel provided financial incentives to encourage residential customers to improve the efficiency of their HVAC systems. Incentives were provided for a tune-up of the system and for HVAC system replacements.

5.6.1 HVAC Replacement and Tune-up: HVAC Replacements

More detail can be found in AR TR v8.1.

5.6.2 HVAC Replacement and Tune-up: AC Tune-ups

Tune-ups were provided by a qualified technician and involve testing the performance of the unit before and after measures are implemented. Typical measures implemented as part of the tune-up procedure include air flow correction; cleaning of the indoor blower, evaporator coils, condenser coils; and correction of refrigerant charge.

Evaluation of the program is based on the CoolSaver PY2020 M&V Plan provided by CLEAResult. The evaluators examined the Excel workbook containing a census of program participants to assess savings by measure. The workbook provided contains data exported from the program tracking tool. The Evaluators examined the data and recreated the overall savings calculations. Savings from AC and heat pump tune-ups were based on AR TRM v8.1 deemed equivalent full-load hours along with unit-specific capacity and deemed efficiency loss recovered due to work performed in accordance with the program.

5.7 Consumer Products Solutions (CPS)

5.7.1 Leakage

Leakage refers to cross-territory sales that occur when program discounted bulbs are installed outside of OG&E's service territory. When this occurs, the energy and demand impacts from the discounted bulbs are not being realized within the territory that paid for and claimed the savings. Estimates of leakage were assessed using an approach that combined random digit dial (RDD) survey responses with geo-mapping. The leakage analysis centered on the following approach:

- First, the Evaluators developed a mapping of concentric circles (drivetimes) surrounding each participating retailer. The initial modeling assumed the "reach" of a retailer is a 60-minute drive, which is then modified by the presence of an alternative sponsoring retailer (i.e., if a customer is within a 60-minute drive of two sponsoring retailers, it is assumed they purchased from the closest one). Non-participating retailers are also included as directly competing alternative retailers with the construction of the drive times. In PY2020, the Evaluators updated the list of non-participating retailer locations in Arkansas and neighboring states.
- Second, the Evaluators used 2010 Census block data from Environmental Systems Research Institute (ESRI) to determine the proportion of the population that falls within each drivetime circle (from Step 1), as well as the proportion of the population that falls within the OG&E AR territory and within the state of Arkansas. Thus, for each drivetime circle for each retail location, the Evaluators determined the proportion of the population within the OG&E AR service territory, outside of OG&E AR service

territory, and outside of the state of Arkansas. In addition, per the Department of Energy (DOE) National Renewable Energy Laboratory (NREL) Uniform Methods Project (UMP): Methods for Determining Energy Savings For Specific Measures Chapter 6: Residential Lighting Evaluation Protocol[40] (referred to herein as "the UMP Protocol"), the Evaluators also define that bulbs going to another utility which also runs upstream lighting programs will not be considered leakage. The Evaluators determined the following utilities run upstream lighting programs within OG&E's drivetime areas: SWEPCO Arkansas, Entergy Arkansas, and Public Service Company of Oklahoma (PSO).

- Third, a Random Digit Dial (RDD) survey was used to assess the shopping habits of customers within the radius of participating retailers. This was used to assess the total and maximum drivetime that Arkansas consumers accepted when shopping for products incentivized by the channel and was used in modifying the initial 60-minute drive assumption established in Step 1. An RDD survey was carried out for OG&E in 2015 and the results of this survey are shown in Table 5-8. This approach uses a log transformation of the drivetimes to smooth the data and estimates the cumulative percent via a second order polynomial regression. The RDD survey for the Wholesale retailer channel is from a RDD survey conducted by ADM in 2019 for Public Service Company of Oklahoma (PSO); a dedicated survey for the Wholesale channel did not occur in 2015.
- Fourth, for each drive time, the propensity to drive is calculated based on the predicted cumulative percent. The propensity to drive is equal to 1 minus the predicted cumulative percent, such that customers with shorter drive times have a high propensity to drive (because cumulative percent from the RDD survey is lower for shorter drive times), while customers with longer drive times have lower propensity to drive (because predicted cumulative percent is higher for longer drive times). Customers with a propensity to drive represent the estimated population for a given drive time (i.e. estimated population willing to drive = propensity to drive(%)*total population).
- Lastly, the percentage of bulbs that leaked out of OG&E territory (but still within AR) and the percent that leaked out of state were calculated.

The set of maps below show snapshots of the geo-mapping process for each retail channel (i.e. Discount, Do-it-yourself, and Mass Merchant). Discount stores would include stores such as

[40] Dimetrosky, Scott, Parkinson, Katie, and Lieb, Noah on behalf of the Department of Energy National Renewable Energy Laboratory. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures Chapter 6: Residential Lighting evaluation Protocol.* October 2017.

Dollar Store and Dollar General, while Do-it-yourself stores include stores such as Ace Hardware, Lowe's, and Home Depot. Mass Merchant would include stores such as Walmart or Sears, while Wholesome includes Costco and Sam's Clubs.

The first three maps show participating and non-participating retailer locations overlayed onto utility territories. The territory for OG&E is shown in light red. Participating stores are shown as green points while non-participating stores are shown as grey points. The second set of maps show the concentric drivetimes that were constructed to estimate leakage rates for each retail channel. This set of maps is meant to illustrate how far a 60-minute drivetime extends beyond a store location.

Figure 5-7 shows the drivetime survey results, shown below the two sets of maps.

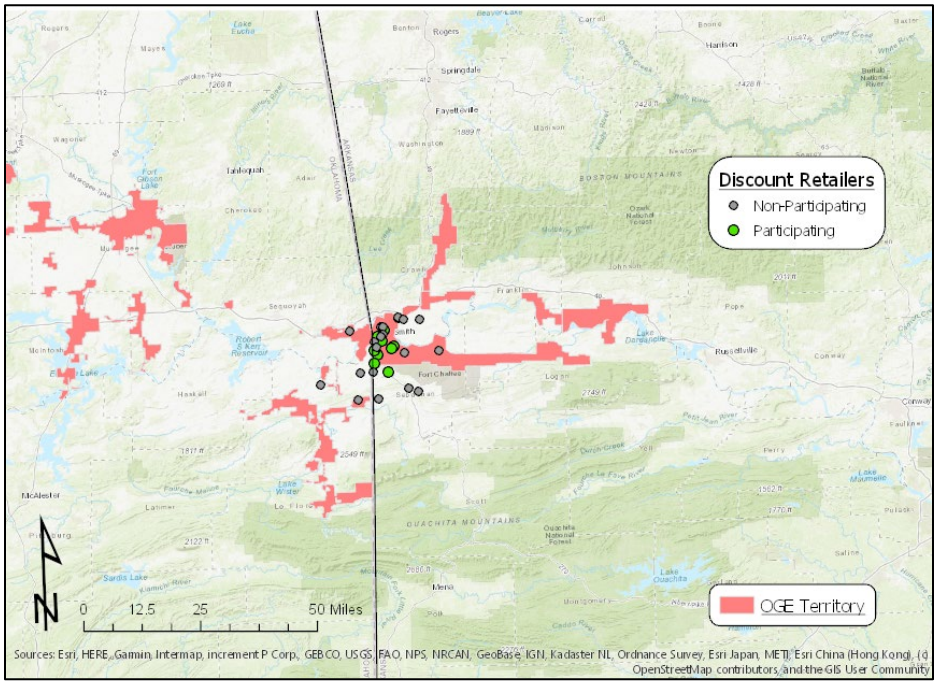


Figure 5-2 Discount Retailer Locations

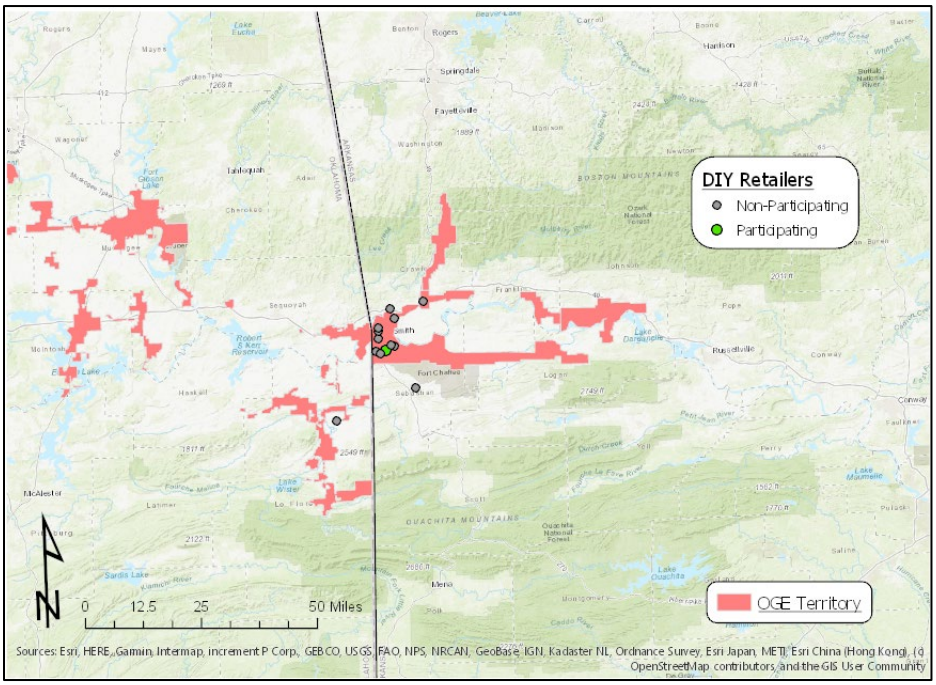


Figure 5-3 DIY Retailer Locations

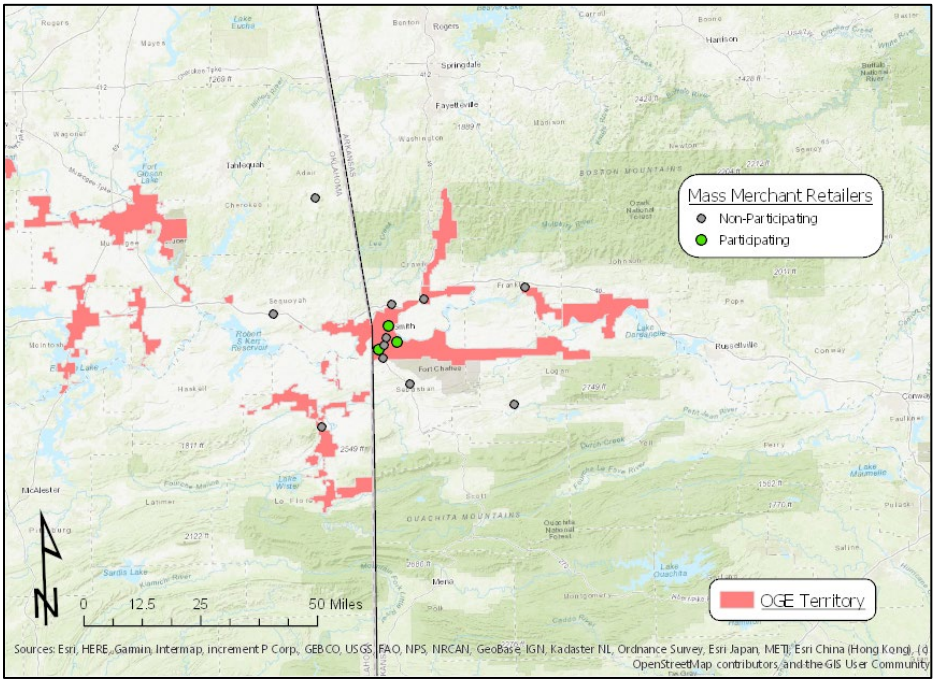


Figure 5-4 Mass Merchant Retailer Locations

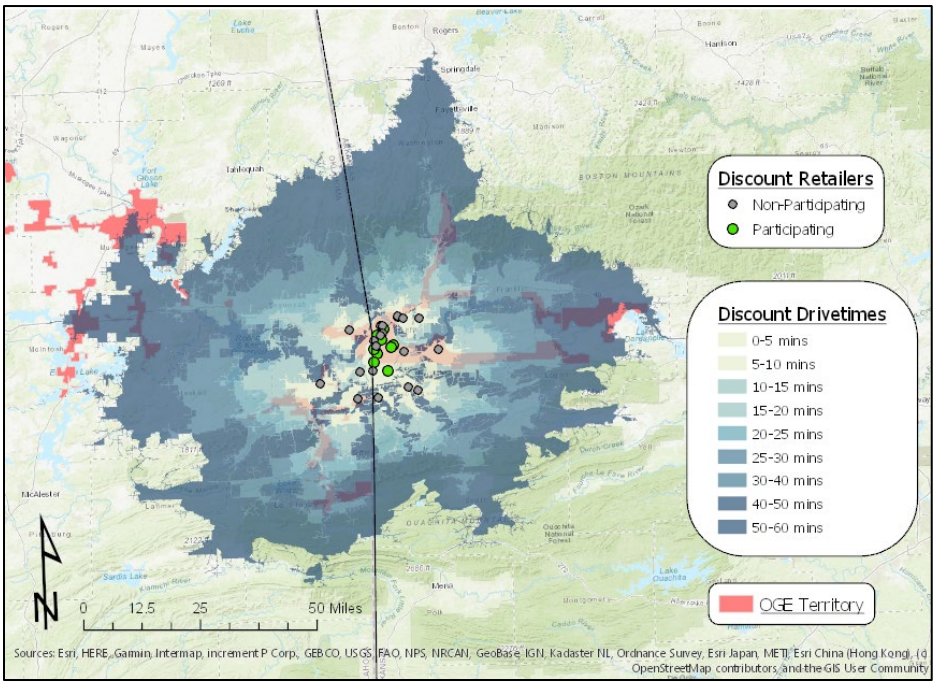


Figure 5-5 Discount Retailer Drive Times

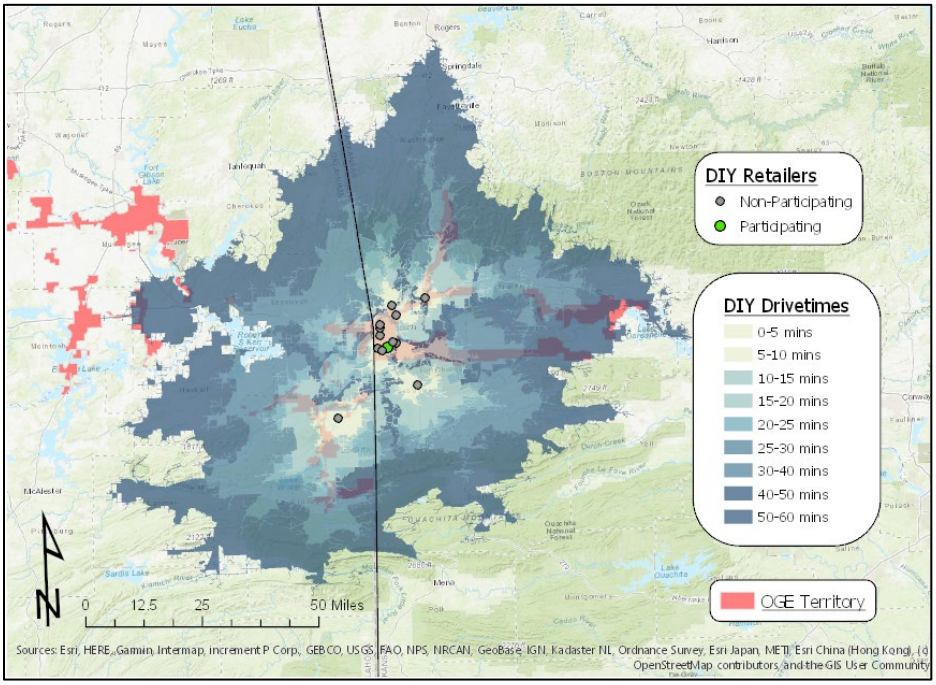


Figure 5-6 DIY Retailer Drive Times

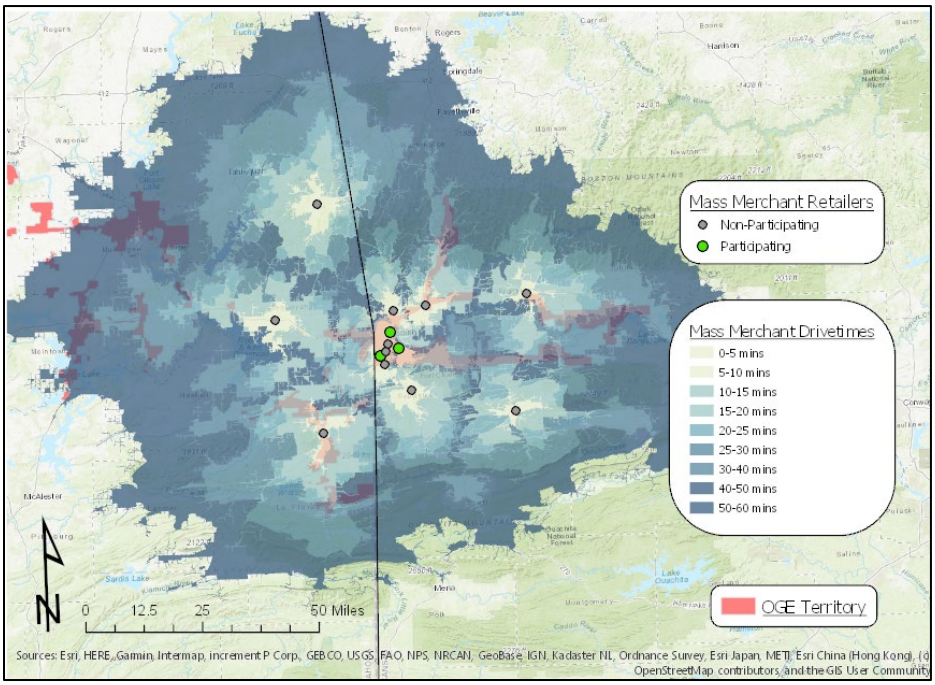


Figure 5-7 Mass Merchant Retailer Drivetimes

Table 5-8 Drivetime Estimates by Channel

Channel / Drive Time (minutes)	0-5	5-10	10-15	15-19	20-24	25-29	30-40	40-50	50-60	60-70
DIY	9%	15%	13%	28%	17%	6%	6%	0%	0%	7%
Discount	38%	0%	25%	13%	13%	0%	0%	13%	0%	0%
Mass Merchant	8%	22%	20%	15%	17%	3%	5%	2%	0%	7%
Wholesale	14%	16%	25%	16%	9%	5%	6%	4%	1%	4%

The overall estimated program-level leakage rate was 11%, with 12% leakage for Mass Merchant stores, 0% leakage for DIY stores, and 19% leakage for Discount stores. Table 5-9 below shows the estimated leakage for each participation channel in the Consumer Products channel for PY2020.

The overall estimated program-level leakage rate was 10%, with 9% leakage for Mass Merchant stores, 0% leakage for DIY stores, 9% leakage for Discount stores, and 36% for the single Wholesale store. The table below shows the estimated leakage for each participation channel in the Consumer Products channel for PY2020.

Values presented for Consumer Products are exclusive of leakage effects except where specifically noted.

Table 5-9 PY2020 Leakage Estimates

Measure / Pathway	Leakage Rate	Estimated Net Leakage for Energy Savings (kWh)	Estimated Net Leakage for Demand Savings (kW)	Estimated Net Leakage for Energy Savings (Lifetime kWh)
LEDs (Food Bank)	10%	170,629	27.74	3,241,956
LEDs (Standard)	10%	154,023	28.25	2,926,430
LEDs (Specialty)	10%	8,394	1.54	167,873
Total	**10%**	**333,046**	**57.54**	**6,336,259**
Sums may differ due to rounding.				

5.7.1.1 Cross Sector Sales Adjustments

The AR TRM v8.1 estimates that 6.7% of lighting incentivized through a residential retail markdown program will be installed in commercial facilities, and that the Annual Operating Hours (AOH) and Coincidence Factor (CF) for this lighting should align with the average values from commercial programs administered by the sponsoring utility in the same program year. The Evaluators estimated 3,894 AOH and a coincidence factor of 0.77 using a weighted average of AR TRM v8.1 deemed values for the building types found in the CEEP Small Business Direct Install Program. This has the effect of increasing annual energy savings and peak demand reduction for the 6.7% of bulbs estimated to be installed in non-residential settings.

5.8 Residential Solutions (RSOL)

Due to COVID-19, the Evaluators were unable to perform verification site for projects in PY2020. As a result, the Evaluators have reviewed the site visits from PY2017, PY2018, and PY2019 (166 total sites) and will apply the average of the three years to result in measure-level field verification rates (FVR).

The tables below summarize the average FVRs for PY2017-PY2020. These average values were applied to PY2020 projects.

Table 5-10 HEEP RSOL Single Family FVR – Three-year Average Applied to PY2020

Measure	RSOL – SF PY2017 FVR	RSOL – SF PY2018 FVR	RSOL – SF PY2019 FVR	RSOL – SF PY2020 FVR
Aerators	100%	N/A	N/A	100%
Air Infiltration	103% / 100%	114% / 100%	N/A	109% / 100%
APS	85%	N/A	100%	93%
Ceiling Insulation	N/A	N/A	N/A	N/A
Duct Sealing	95%/ 100%	101% / 100%	100% / 100%	99% / 100%
LEDs	89%	N/A	100%	95%
Pool Pump	N/A	N/A	100%	100%
Showerheads	92%	N/A	100%	96%
Windows	100%	100%	100%	100%

Table 5-11 HEEP RSOL Multi-family FVR – Three-year Average Applied to PY2020

Measure	RSOL – MF PY2017 FVR	RSOL – MF PY2018 FVR	RSOL – MF PY2019 FVR	RSOL – MF PY2020 FVR
Aerators	100%	N/A	N/A	100%
Air Infiltration	103% / 100%	114% / 100%	105% / 100%	107% / 100%
APS	85%	N/A	75% / 108%	97%
Ceiling Insulation	N/A	N/A	N/A	N/A
Duct Sealing	95%/ 100%	101% / 100%	102% / 100%	100% / 100%
LEDs	89%	N/A	99%	94%
Pool Pump	N/A	N/A	N/A	N/A
Showerheads	92%	N/A	N/A	92%
Windows	100%	100%	N/A	100%

5.9 Verified Savings by Measure

5.9.1 Residential Solutions (RSOL)

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified *ex post* savings per AR TRM v8.1 Protocols. The savings from the measures below were verified, and matched, to the calculations provided by CLEAResult.

- Advanced Power Strip;
- Air Infiltration;
- Duct Sealing;
- ENERGY STAR® Pool Pump;

- ENERGY STAR® Window;
- ENERGY STAR® LEDs (Specialty and Standard); and
- Low-flow Showerhead.

Factors that impacted savings are listed in individual measure sections below. The Evaluators verified measure-level savings per the AR TRM v8.1 guidelines.

5.9.2 RSOL: Advanced Power Strips

This measure was installed at 80 premises. All deemed values matched the AR TRM v8.1. The lower realization rate is due to the single family and multi-family field verification rates from prior program years applied to PY2020.

Table 5-12 Advanced Power Strip Savings Summary

Ex ante Energy Savings (kWh)	*Ex post* Energy Savings (kWh)	Realization Rate (kWh)	*Ex ante* Demand Reductions (kW)	*Ex post* Demand Reductions (kW)	Realization Rate (kW)
12,512	11,681	93%	2	2	93%

5.9.3 RSOL: ENERGY STAR® Windows

There were 66 windows projects at 66 premises.

Table 5-13 ENERGY STAR® Window Savings Summary

Ex ante Energy Savings (kWh)	*Ex post* Energy Savings (kWh)	Realization Rate (kWh)	*Ex ante* Demand Reductions (kW)	*Ex post* Demand Reductions (kW)	Realization Rate (kW)
70,931	70,931	100%	31	31	100%

5.9.4 RSOL: Duct Sealing

This measure was installed at 21 premises. Due to the variability in duct blaster testing, if the result is +/- 20% within that shown in the project data, the field verification rate is set at 100%. Field verification activities from prior program years resulted in no adjustments to savings and this was applied to PY2020.

Table 5-14 Duct Sealing Savings Summary

Heating Type	*Ex ante* Gross Energy Savings (kWh)	*Ex post* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex ante* Gross Demand Reduction (kW)	*Ex post* Gross Demand Reduction (kW)	Realization Rate (kW)
Natural Gas Furnace	0	0	N/A	0	0	N/A
Air Source Heat Pump	0	0	N/A	0	0	N/A
Electric Resistance	201,263	201,263	100%	18	18	100%
Total	**201,263**	**201,263**	**100%**	**18**	**18**	**100%**
Sums may differ due to rounding.						

5.9.5 RSOL: Air Infiltration

This measure was installed at seven premises. Due to the variability in blower door testing, if the result is +/- 20% within that shown in the project data, the field verification rate is set at 100%. Field verification activities from prior program years resulted in no adjustments to savings and this was applied to PY2020.

Table 5-15 Air Infiltration Savings Summary

Heating Type	*Ex ante* Gross Energy Savings (kWh)	*Ex post* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex ante* Gross Demand Reduction (kW)	*Ex post* Gross Demand Reduction (kW)	Realization Rate (kW)
Natural Gas Furnace	0	0	N/A	0	0	N/A
Air Source Heat Pump	0	0	N/A	0	0	N/A
Electric Resistance	31,530	31,530	100%	2	2	100%
Total	**31,530**	**31,530**	**100%**	**2**	**2**	**100%**
Sums may differ due to rounding.						

Due to the variability in blower door testing, if the result is +/- 20% within that shown in the project data, the field verification rate is set at 100%.

5.9.6 RSOL: ENERGY STAR® Pool Pumps

This measure was installed at four premises. There were no adjustments made from verification activities or the deemed savings review.

Table 5-16 ENERGY STAR® Pool Pump Savings Summary

Ex ante Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
12,930	12,930	100%	3	3	100%

5.9.7 RSOL: Showerhead

This measure was installed at 18 premises. All deemed values matched the AR TRM v8.1. The lower realization rate is due to the single family and multi-family field verification rates developed in prior program years and applied to PY2020.

Table 5-17 Showerhead Savings Summary

Ex ante Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
6,176	5,736	93%	1	1	93%

5.9.8 RSOL: LEDs

1,207 LEDs were installed at 105 premises in PY2020. There was a slight increase in savings during the deemed savings review, however, the lower realization rate is due to the single family and multi-family field verification rates.

Table 5-18 LEDs Savings Summary

Ex ante Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
30,295	29,708	98%	5	5	99%

5.9.9 LivingWise® Schools Outreach

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified *ex post* savings per AR TRM v8.1 Protocols. The savings from the measures below were verified, and matched, to the calculations provided in PY2020.

- Faucet Aerators;
- Showerhead; and
- LED Bulbs.

Factors that impacted savings are listed in individual measure sections below. The Evaluators verified measure-level savings per AR TRM v8.1 guidelines and obtained results that differed from AM Conservation's calculations for the following measures.

5.9.10 LivingWise® Schools Outreach: Faucet Aerators

Each kit included one 1.5 GPM kitchen aerator and one 1.0 GPM bathroom aerator. In-Service Rate (ISR): Kitchen 1.5 GPM (45%), Bathroom 1.0 GPM (42%).

Table 5-19 Aerator Savings Summary

Measure	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
1.5 GPM Aerator	34,035	14,698	43%	4	2	43%
1.0 GPM Aerator	34,035	22,629	66%	4	2	67%
Total	**68,070**	**37,327**	**55%**	**7**	**4**	**55%**
Sums may differ due to rounding.						

5.9.11 LivingWise® Schools Outreach

One showerhead 1.5 GPM is included within each kit. ISR is 47%.

Table 5-20 Showerhead Savings Summary

Ex ante Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
142,803	136,630	96%	15	14	96%

5.9.12 LivingWise® Schools Outreach Each kit included two LED bulbs. ISRs are as follows:

- LED 1 (75%)
- LED 2 (70%)

Table 5-21 LED Savings Summary

Ex ante Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
106,983	54,842	51%	17	9	54%

5.9.13 HVAC Replacement and Tune-up

5.9.13.1 HVAC Replacement and Tune-up: AC and Heat Pump (HP) Replacement

Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Certificates were matched to all units. Field verification was not conducted in PY2020.

Table 5-22 HVAC Replacement Savings Summary

Measure	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
AC Replacement	36,275	36,276	100%	14	14	100%
HP Replacement	23,137	24,837	107%	2	2	105%
Total	**59,412**	**61,113**	**103%**	**16**	**16**	**100%**
Sums may differ due to rounding.						

5.9.13.2 HVAC Replacement and Tune-up: Tune-up

Program calculations matched the CoolSaver M&V Plan provided by CLEAResult for PY2020. Field data collection was not performed in the PY2020 evaluation due to COVID-19 safety protocols.

Table 5-23 AC Tune-up Savings Summary

Tune up	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
M&V	2,623	2,626	100%	2	2	100%
Modeled	29,851	29,862	100%	18	18	100%
Post measurement	1,933	2,538	131%	1	1	115%
Pre-clean	247	247	100%	0.15	0.15	100%
Total	**34,654**	**35,273**	**102%**	**21**	**21**	**101%**
Sums may differ due to rounding.						

Table 5-24 HP Tune-up Savings Summary

Tune up	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
M&V	6,880	6,887	100%	2	2	100%
Modeled	19,209	19,216	100%	5	5	100%
Post measurement	1,107	1,453	131%	0.25	0.29	115%
Pre-clean	1,122	1,121	100%	0.25	0.25	100%
Total	**28,318**	**28,677**	**101%**	**7**	**7**	**101%**
Sums may differ due to rounding.						

5.9.14 Consumer Products

The applied residential Hours of Use (HOU) was defined by the AR TRM v8.1. Savings for Consumer Products are summarized in Table 5-25.

Table 5-25 Gross Summary for Consumer Products

Measure / Participation Pathway	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	kWh Realization Rate	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	kW Realization Rate
Smart Thermostats	31,433	31,977	102%	0	0	N/A
LED (Food Bank)	1,706,293	1,706,293	100%	277	277	100%
LED (Standard)	1,644,627	2,081,387	127%	267	382	143%
LED (Specialty)	89,626	113,427	127%	15	21	143%
Advanced Power Strips	302,157	302,157	100%	34	34	100%
Window AC Replacement	34,306	31,033	90%	22	38	178%
Total	**3,808,442**	**4,266,274**	**112%**	**615**	**753**	**122%**
Sums may differ due to rounding.						

5.10 Net Impact Evaluation Approach

5.10.1 Channel- and Measure-level NTG Overview

The following table summarizes the approach and estimate for NTG by channel and by measure.

Table 5-26 PY2020 NTG Summary for HEEP

Channel / Measure	PY2020 NTG	Single-family Free ridership	Single-family Spillover	Single-family NTG	Multi-family Free ridership	Multi-family Spillover	Multi-family NTG	NTG Source
Consumer Products	**83%**	**18%**	**1%**	**83%**	**18%**	**1%**	**83%**	
Smart Thermostats	86%	14%	0%	86%	14%	0%	86%	Statewide survey approach
LEDs (Food Bank)	100%	0%	0%	100%	0%	0%	100%	Leakage Analysis
LEDs (Specialty)	74%	23%	3%	74%	23%	3%	74%	Leakage Analysis
LEDs (Standard)	74%	23%	3%	74%	23%	8%	74%	Leakage Analysis
APS	52%	48%	0%	52%	48%	0%	52%	Literature Review
Window AC Replacement	44%	56%	0%	44%	56%	0%	44%	Literature Review
HVAC	**83%**	**23%**	**0%**	**77%**	**0%**	**0%**	**100%**[41]	
AC Replacement	81%	0%	0%	100%	25%[42]	0%	75%	Assigned PY2020 NTG value
HP Replacement	74%	0%	0%	100%	25%[43]	0%	75%	Assigned PY2020 NTG value
AC Tune-up M&V	75%	25%	0%	75%	0%	0%	100%	SF is PY2020 NTG, MF from property manager interviews.
AC Tune-up Modeled	78%	25%	0%	75%	0%	0%	100%	
AC Tune-up Post measurement	95%	25%	0%	75%	0%	0%	100%	
AC Tune-up Pre-clean	75%	25%	0%	75%	0%	0%	100%	
RSOL	**86%**	**14%**	**0%**	**86%**	**14%**	**0%**	**86%**	
Advanced Power Strips	78%	12%	0%	78%	12%	0%	78%	NTG from Lit. Review

[41] NTG is 100% because there was no participation from multifamily customers in the AC Replacement or HP Replacement measures.

[42] No participation in this measure in PY2020.

[43] No participation in this measure in PY2020.

Air Infiltration	100%	0%	0%	100%	0%	0%	100%	NTG from Participant Surveys
Duct Sealing	100%	0%	0%	100%	0%	0%	100%	NTG from Participant Surveys
ENERGY STAR® Pool Pumps	90%	10%	0%	90%	10%	0%	90%	Literature Review for SO, Participant Surveys for FR
ENERGY STAR® Windows	44%	10%	0%	90%	10%	0%	90%	NTG from Lit. Review
Faucet Aerators	87%	13%	0%	87%	13%	0%	87%	NTG from Lit. Review
LEDs (Standard)	74%	26%	0%	74%	26%	0%	74%	NTG from Lit. Review
Low-Flow Showerheads	86%	14%	0%	86%	14%	0%	86%	NTG from Lit. Review
LivingWise® Schools Outreach	**93%**	**7%**	**0%**	**93%**	**7%**	**0%**	**93%**	
Faucet Aerators	98%	2%	0%	98%	2%	0%	98%	NTG from Lit. Review
Low-Flow Showerheads	95%	5%	0%	95%	5%	0%	95%	NTG from Lit. Review
LEDs (Standard)	87%	13%	0%	87%	13%	0%	87%	NTG from Lit. Review
HEEP Total	**75%**							

The NTG approach in PY2020 is consistent with the approach used in PY2018 and PY2019. NTG was estimated for all program measures in PY2020, at the onset of the new planning period.

5.10.2 Literature Review Results

For measures or channels where the approaches described above could not be performed, such as LivingWise® Schools Outreach kit recipients or measures with low participation that were not captured in the participant survey, a literature review was performed. More information about which measures this pertains to can be found in the tables below.

5.10.3 Residential Solutions

Literature reviews were utilized to determine NTG for advanced power strips, aerators, ENERGY STAR® windows, LED lamps (direct install), and showerheads. Both free ridership and spillover were determined through this approach.

Table 5-27 PY2020 Literature Review Results for RSOL APS (Direct Install)

Reference Number	FR	SP	NTG	PY	State
1	8%	0%	92%	2016	OK
2	0%	0%	100%	2015	NM
3	0%	0%	100%	2017	NM
Average	**3%**	**0%**	**97%**		

1. https://www.occeweb.com/pu/EnergyEfficiency/2016OGE_DemandProgramsAnnualReport.pdf
2. https://www.pnm.com/documents/396023/3157050/2015+Independent+Measurement+%26+Verification+Report+-+Part+1+ADM+Associates.pdf/87814b15-cc02-4c8f-9fb5-50d39dd65fc0
3. https://www.pnm.com/documents/396023/3157050/2016+Independent+Measurement+and+Verification+Report%2C%20Part+1%2C%20ADM+Associates%2C%20Inc.pdf/011b6c03-4358-4396-acf8-73cd8a24009e

Table 5-28 PY2020 Literature Review Results for RSOL ENERGY STAR® Windows

Reference Number	FR	SP	NTG	PY	State
1	0%	11%	111%	2015	MD
2	33%	0%	67%	2016	AR
3	0%	0%	100%	2017	AR
4	18%	0%	82%	2014	UT
5	0%	0%	100%	2011	MA
6	22%	2%	80%	2015	CT
Average	**13%**	**2%**	**90%**		

1. http://webapp.psc.state.md.us/newIntranet/casenum/NewIndex3_VOpenFile.cfm?filepath=C:%5CCasenum%5C9100-9199%5C9157%5CItem_655%5C%5C9153-57-EY6NavigantEvaluationMemos-Navigant-102116.pdf
2. http://www.apscservices.info/EEInfo/EEReports/SWEPCO%202016.pdf
3. http://www.apscservices.info/EEInfo/EEReports/SWEPCO%202017.pdf
4. http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2016/2013-2014_Utah_HES_Evaluation.pdf
5. https://www9.nationalgridus.com/non_html/eer/ma/10_MA_E_EEAR_Pt_3.pdf
6. https://www.energizect.com/sites/default/files/R4_HES-HESIE%20Process%20Evaluation,%20Final%20Report_4.13.16.pdf

Table 5-29 PY2020 Literature Review Results for RSOL LED Lamps (Direct Install)

Reference Number	FR	SP	NTG	PY	State
1	0%	0%	100%	2017	AR
2	0%	0%	100%	2017	AR
3	5%	0%	95%	2017	AR
4	24%	0%	76%	2017	AR
5	24%	0%	76%	2018	WI
Average	**11%**	**0%**	**89%**		

1. SWEPCO AR HPwES, PY2017
2. SWEPCO AR REIP MF, PY2017
3. OG&E AR CWA, PY2017
4. SWEPCO AR REIP SF, PY2017
5. SWEPCO AR REIP SF, PY2018

Table 5-30 PY2020 Literature Review Results for RSOL Showerheads (Direct Install)

Reference Number	FR	SP	NTG	PY	State
1	12%	0%	88%	2016	WI
2	25%	0%	75%	2015	IN
3	2%	0%	98%	2017	IN
4	16%	0%	84%	2016	NC
Average	**14%**	**0%**	**86%**		

1. https://www.focusonenergy.com/sites/default/files/Evaluation%20Report%20-%202016%20Appendices.pdf
2. https://www.indianamichiganpower.com/global/utilities/lib/docs/info/projects/IMDemandSideManagement/44841%20Jon%20C.%20Walter%20Direct%20Testimony%20&%20Attachments%20Vol%20II.pdf
3. https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/86b05142-05c8-e811-8143-1458d04eaba0/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=43827DSM8%20IM%20WP%20WP%20JCW%201%20Residential%20100418.pdf
4. http://www.researchintoaction.com/wp-content/uploads/2018/12/P421-Duke-SEWKP-DEP-DEC-2016-PY-Evaluation-Report.pdf

5.10.4 Consumer Products

The Evaluators used the results from literature reviews performed in PY2020 for LED lamps (upstream) to determine spillover. The spillover from this literature review was combined with the free ridership determined through the econometric modeling described in Section 5.10.6 to develop NTG estimates.

Table 5-31 PY2020 Literature Review Results for LED Lamps (Upstream)

Reference Number	FR	SP	NTG	PY	Region
1		4%		2015	Midwest
2		2%		2019	Midwest
Average		**3%**			

1. This spillover literature review was previously published by Tetra Tech in the Entergy Arkansas PY2017 Evaluation found here: http://www.apscservices.info/EEInfo/EEReports/Entergy%202017.pdf

5.10.5 LivingWise® Schools Outreach

Literature reviews were utilized to determine NTG for school kits, which ideally include LED lamps, aerators and showerheads and are provided to elementary school students.

Table 5-32 PY2020 Sources of Literature Review for School Kits

Utility	State	Year
Ameren Missouri	Missouri	2016
Duke Energy	North and South Carolina	2015
ComEd	Illinois	2017
I&M	Indiana	2016
Duke	Kentucky	2015
Energy New Orleans	Louisiana	2015

Table 5-33 PY2020 Sources of Literature Review for School Kits

Program Measure	Number of Studies	Average Value
LED light bulbs	2	87%
Kitchen Faucet Aerators	6	98%
High-efficiency showerheads	6	95%

5.10.6 Econometric Modeling Approach for HEEP CPS channel

This method of free ridership was developed through the estimation of a price response model which will be used to predict sales levels in the absence of the program. The premise of the price response model is that the quantity of the subsidized product will vary based on the price of the product and how well they are promoted. The program tracking data should include sales for each retailer, by model number and week (monthly data works as well). For each retailer and model number combination, original retail price and program price data will be available. As program price discounts and/or retailer original pricing change throughout the year, the tracking data is updated, allowing for the comparison of same-model sales under slightly different pricing conditions. Price effects are the main program tool for encouraging the purchase of high efficiency lighting choices. Due to the inability to observe price effects for other program offerings, this approach will be used only for the lighting portion of the program. The final price response model is used to estimate a free ridership as described in the equation below:

$$Free\ ridership\ ratio = \frac{\sum_i^n (E[Product_{NoProgram_i}] * kWh_i)}{\sum_i^n (E[Product_{Program_i}] * kWh_i)}$$

Where:

$E[Product_{NoProgram_i}]$ = the expected number of products, i, purchased given original retail pricing (as predicted by the model).

$E[Product_{Program_i}]$ = the expected number of products, i, given program discounted pricing (as predicted by the model).

kWh_i = the average gross kWh savings for product, i.

The price response modeling approach is advantageous in that it is built upon actual sales data from participating retailers (as opposed to relying solely on consumer self-report surveys). There are, however, many limitations for the approach. Most importantly, non-program sales data was not for inclusion in the model. As a result, the modeling of price impacts may fit program sales data well, but it is uncertain whether those price effects apply well to prices outside of program ranges. Finally, there are likely variables that affect sales levels for products that are not captured by the program tracking data; thus, there is a risk of omitted variable bias in addition to the inherent amount of error from statistical modeling.

The Evaluators used a negative binomial model to account for the right-skewed relationship between prices and quantities. The dependent variable was number of packages sold by the program. Independent variables used to predict sales included, month, program price, and a dummy variable for each model type. Model types were defined as a combination of bulb type (i.e., specialty LED vs. standard LED), bulb shape (i.e., A19 vs BR40), lumens range (i.e., 0-500, 500-1000, etc.), rated life, and the number of bulbs per package.

Additional details on the HEEP NTG methods and results can be found in Appendix C Net-to-Gross Approach and Outcomes.

5.11 Gross Evaluation Summary and Findings

5.11.1 Residential Solutions

Table 5-34 presents the verified *ex post* savings results of the PY2020 RSOL channel by measure. 32% of energy savings coming from single-family customers, the remaining from multi-family customers.

Table 5-34 Residential Solutions Savings Summary for PY2020

Measure	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
Advanced Power Strips	12,512	93%	11,681	2	93%	2
Aerators	3,637	100%	3,637	0.38	100%	0.38
Air Infiltration	31,530	100%	31,530	2	100%	2
Duct Sealing	201,263	100%	201,263	18	100%	18
ENERGY STAR® Pool Pumps	12,930	100%	12,930	3	100%	3
ENERGY STAR® Windows	70,931	100%	70,931	31	100%	31
LEDs (Standard)	30,295	98%	29,708	5	99%	5
Low-Flow Showerheads	6,176	93%	5,736	0.64	93%	0.60
Total	**369,274**	**100%**	**367,416**	**63**	**100%**	**62**
Sums may differ due to rounding.						

Table 5-35 outlines the verified *ex post* lifetime savings for the RSOL channel by measure.

Table 5-35 Residential Solutions Lifetime Savings Summary for PY2020

Measure	EUL Tier One	EUL Tier Two	*Ex post* Gross Lifetime Energy Savings (kWh)
Advanced Power Strips	10	-	116,809
Aerators	10	-	36,370
Air Infiltration	11	-	346,831
Duct Sealing	18	-	3,622,734
ENERGY STAR® Pool Pumps	10	-	129,300
ENERGY STAR® Windows	20	-	1,418,621
LEDs (Standard)	19	-	564,452
Low-Flow Showerheads	10	-	57,360
Total			**6,292,476**
Sums may differ due to rounding.			

5.11.2 LivingWise® Schools Outreach

The table below presents the verified *ex post* energy savings (kWh) results of the PY2020 LivingWise® Schools Outreach channel, by measure.

Table 5-36 PY2020 LivingWise® Schools Outreach Savings Summary

Measure	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
Faucet Aerators	68,070	55%	37,327	7	55%	4
Showerheads	142,803	96%	136,630	15	96%	14
LEDs (Standard)	106,983	51%	54,842	17	54%	9
Total	**317,856**	**72%**	**228,799**	**39**	**70%**	**27**
Sums may differ due to rounding.						

The table below outlines the verified *ex post* lifetime energy savings (kWh) by measure for the LivingWise® Schools Outreach channel.

Table 5-37 Lifetime Savings Summary by Measure for PY2020

Measure	EUL Tier One	*Ex post* Gross Lifetime Energy Savings (kWh)
Faucet Aerators	10	373,270
Showerheads	10	1,366,300
LEDs (Standard)	19	1,041,998
Total		**2,781,568**

5.11.3 HVAC Replacement and Tune-up

5.11.3.1 HVAC Replacement and Tune-up: HVAC Replacement

The table below outlines the verified *ex post* energy savings (kWh) and demand reductions (kW) for the HVAC replacement projects within the HVAC Replacement and Tune-up channel.

Table 5-38 Gross Savings Summary for HVAC Replacement

Measure	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
AC Replacement	36,275	100%	36,276	14	100%	14
HP Replacement	23,137	107%	24,837	2	105%	2
Total	**59,412**	**103%**	**61,113**	**16**	**100%**	**16**
Sums may differ due to rounding.						

The table below outlines the *ex post* lifetimes savings (kWh) for the HVAC replacement projects within the HVAC Replacement and Tune-up channel.

Table 5-39 PY2020 HVAC Replacement Lifetime Savings Summary

Measure	EUL	*Ex post* Gross Lifetime Energy Savings (kWh)
AC Replacement	19	689,244
HP Replacement	16	397,392
Total		**1,086,636**
Sums may differ due to rounding.		

5.11.3.2 HVAC Replacement and Tune-up: Tune-up

The table below outlines the verified *ex post* energy savings (kWh) and demand reductions (kW) by savings type for the AC tune-up projects within the HVAC Replacement and Tune-up channel.

Table 5-40 PY2020 HVAC AC Tune-up Gross Savings Summary

Tune up	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
M&V	2,623	100%	2,626	2	100%	2
Modeled	29,851	100%	29,862	18	100%	18
Post measurement	1,933	131%	2,538	1	115%	1
Pre-clean	247	100%	247	0.15	100%	0.15
Total	**34,654**	**102%**	**35,272**	**21**	**101%**	**21**
Sums may differ due to rounding.						

The table below outlines the *ex post* lifetimes savings (kWh) for the AC tune-up projects within the HVAC Replacement and Tune-up channel.

Table 5-41 PY2020 HVAC AC Tune-up Lifetime Savings Summary

Tune-up	EUL	*Ex post* Gross Lifetime Energy Savings (kWh)
M&V	5	14,100
Modeled	8	239,772
Post measurement	3	7,614
Pre-clean	3	741
Total		**262,227**
Sums may differ due to rounding.		

Table 5-42 PY2020 HVAC HP Tune-up Gross Savings Summary

Tune up	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
M&V	6,880	100%	6,887	2	100%	2
Modeled	19,209	100%	19,216	5	100%	5
Post measurement	1,107	131%	1,453	0.25	115%	0.29
Pre-clean	1,122	100%	1,121	0.25	100%	0.25
Total	**28,318**	**102%**	**28,677**	**7**	**101%**	**7**
Sums may differ due to rounding.						

The table below outlines the *ex post* lifetimes savings (kWh) for the AC tune-up projects within the HVAC Replacement and Tune-up channel.

Table 5-43 PY2020 HVAC HP Tune-up Lifetime Savings Summary

Tune-up	EUL	*Ex post* Gross Lifetime Energy Savings (kWh)
M&V	5	36,979
Modeled	8	154,291
Post measurement	3	4,359
Pre-clean	3	3,363
Total		**198,992**
Sums may differ due to rounding.		

5.11.4 Consumer Products

The table below outlines the verified *ex post* energy savings (kWh) and demand reductions (kW) for the Consumer Products channel.

Table 5-44 Savings Summary for Consumer Products

Measure	*Ex ante* Gross Energy Savings (kWh)	Realization Rate (kWh)	*Ex post* Gross Energy Savings (kWh)	*Ex ante* Gross Demand Reductions (kW)	Realization Rate (kW)	*Ex post* Gross Demand Reductions (kW)
Smart Thermostats	31,433	102%	31,977	0	N/A	0
LEDs (Food Bank)	1,706,293	100%	1,706,293	277	100%	277
LEDs (Standard)	1,644,627	127%	2,081,387	267	143%	382
LEDs (Specialty)	89,626	127%	113,427	15	143%	21
Advanced Power Strips	302,157	100%	302,157	34	100%	34
Window AC Replacement	34,306	90%	31,033	22	178%	38
Total	**3,808,442**	**112%**	**4,266,274**	**615**	**122%**	**753**
Sums may differ due to rounding.						

The table below outlines the *ex post* lifetimes savings (kWh) for the Consumer Products channel.

Table 5-45 Lifetime Savings Summary for Consumer Products

Measure/ Participation Pathway	EUL Tier One	*Ex post* Gross Lifetime Energy Savings (kWh)
Smart Thermostats	11	351,747
LEDs (Food Bank)	19	32,419,567
LEDs (Standard)	19	39,546,353
LEDs (Specialty)	20	2,268,540
Advanced Power Strips	10	3,021,570
Window AC Replacement	10.5	325,847
Total		**77,933,624**
Sums may differ due to rounding.		

5.12 Net Impact Evaluation Summary and Findings

Below summarizes free ridership (FR), spillover (SO) and NTG by channel for the PY2020 HEEP.

Table 5-46 PY2020 NTG by Channel for HEEP

	Ex post Gross Energy Savings (kWh)	FR	SO	NTG	*Ex post* Net Energy Savings (kWh)
Consumer Products	4,266,274	21%	2%	83%	3,528,764
HVAC Replacement & Tune-up	125,063	21%	0%	79%	98,986
Residential Solutions	367,416	14%	0%	86%	314,832
LivingWise® Schools Outreach	228,799	7%	0%	94%	214,092
Total	**4,987,552**	**18%**	**2%**	**83%**	**4,156,673**
Sums may differ due to rounding.					

5.12.1 Residential Solutions Net Savings Results

Table 5-47 summarizes the measure-level free ridership results for RSOL. Rates of free ridership and spillover were generally low for most measures.

Table 5-47 PY2020 Measure-level NTG Estimates for HEEP Residential Solutions

Measure	*Ex post* Gross Energy Savings (kWh)	FR	SO	NTG	*Ex post* Net Energy Savings (kWh)
Advanced Power Strips	11,681	22%	0%	78%	9,111
Aerators	3,637	13%	0%	87%	3,165
Air Infiltration	31,530	0%	0%	100%	31,530
Duct Sealing	201,263	0%	0%	100%	201,263
ENERGY STAR® Pool Pumps	12,930	10%	0%	90%	11,637
ENERGY STAR® Windows	70,931	56%	0%	44%	31,210
LEDs (Standard)	29,708	26%	0%	74%	21,984
Low-Flow Showerheads	5,736	14%	0%	86%	4,933
Total	**367,416**	**14%**	**0%**	**86%**	**314,832**
Sums may differ due to rounding.					

Table 5-48 summarizes the results of the net savings analysis. Program net savings were calculated by weighting each measure free ridership score by the total savings for the free ridership and adding program spillover savings to the total. The net energy (kWh) savings of the RSOL channel totaled 314,832 kWh. The net demand (kW) reductions of the channel totaled 43 kW.

Table 5-48 PY2020 Net Savings for HEEP Residential Solutions

Measure	*Ex post* Gross Energy Savings (kWh)	*Ex post* Net Energy Savings (kWh)	NTG	*Ex post* Gross Demand Reductions (kW)	*Ex post* Net Demand Reductions (kW)
Advanced Power Strips	11,681	9,111	78%	2	2
Aerators	3,637	3,165	87%	0.38	0.33
Air Infiltration	31,530	31,530	100%	2	2
Duct Sealing	201,263	201,263	100%	18	18
ENERGY STAR® Pool Pumps	12,930	11,637	90%	3	2
ENERGY STAR® Windows	70,931	31,210	44%	31	14
LEDs (Standard)	29,708	21,984	74%	5	4
Low-Flow Showerheads	5,736	4,933	86%	0.60	0.51
Total	**367,416**	**314,832**	**86%**	**62**	**43**
Sums may differ due to rounding.					

Table 5-49 shows the net lifetime energy (kWh) savings for the Residential Solutions channel, by measure.

Table 5-49 PY2020 HEEP RSOL Net Lifetime Savings Summary

Measure	EUL Tier One	*Ex post* Net Lifetime Energy Savings (kWh)
Advanced Power Strips	10	91,112
Aerators	10	31,642
Air Infiltration	11	346,830
Duct Sealing	18	3,622,734
ENERGY STAR® Pool Pumps	10	116,370
ENERGY STAR® Windows	20	624,193
LEDs (Standard)	19	417,694
Low-Flow Showerheads	10	49,330
Total		**5,299,905**
Sums may differ due to rounding.		

5.12.2 LivingWise® Schools Outreach Net Savings Results

The literature review led the Evaluators to assign a NTG ratio of 93% for LivingWise® Schools Outreach. The table below outline the net energy savings (kWh) and net demand reduction (kW) results for the LivingWise® Schools Outreach channel. There is no free ridership or spillover for this channel in PY2020.

Table 5-50 PY2020 Net Energy (kWh) Savings for HEEP LivingWise® Schools Outreach

Measure	*Ex post* Gross Energy Savings (kWh)	*Ex post* Net Energy Savings (kWh)	NTG	*Ex post* Gross Demand Reductions (kW)	*Ex post* Net Demand Reductions (kW)
Faucet Aerators	37,327	36,580	98%	4	4
Low-Flow Showerheads	136,630	129,799	95%	14	13
LEDs (Standard)	54,842	47,713	87%	9	8
Total	**228,799**	**214,092**	**93%**	**27**	**25**
Sums may differ due to rounding.					

Table 5-51 shows net lifetime energy (kWh) savings for LivingWise® Schools Outreach channel by measure.

Table 5-51 LivingWise® Schools Outreach Net Lifetime Savings Summary

Measure	EUL Tier One	*Ex post* Net Lifetime Energy Savings (kWh)
Faucet Aerators	10	365,805
Low-Flow Showerheads	10	1,297,985
LEDs (Standard)	19	906,538
Total		**2,570,328**

5.12.3 HVAC Replacement and Tune-up Net Savings Results

In PY2019, the Evaluators administered surveys to single-family and multi-family decision makers who participated in the HEEP program. Results from these decision-makers were applied to PY2020 program participants.

The table below summarize the results of the net savings analysis for the HVAC Replacement and Tune-up channel. The net savings were calculated by weighting each measure free ridership score by the total savings for the free ridership and adding program spillover savings to the total. Due to low participation in the HVAC replacement measure, AC and Heat Pump replacements were aggregated for NTG analysis. The net energy savings of the HEEP HVAC Replacement and Tune-up channel totaled 98,986 kWh. Net peak demand (kW) reductions totaled 36 kW.

Table 5-52 PY2020 NTG Results for the HVAC Channel

Measure	*Ex post* Gross Energy Savings (kWh)	FR	SO	NTG	*Ex post* Net Energy Savings (kWh)
HVAC Replacement (AC and HP)	61,113	22%	0%	78%	47,763
AC Tune-up	35,272	19%	0%	81%	27,756
HP Tune-up	28,678	20%	0%	80%	23,467
Total	**125,063**	**21%**	**0%**	**79%**	**98,986**
Sums may differ due to rounding.					

The NTG in the HVAC channel differs between demand reductions (kW) and energy savings (kWh) because of the mix of housing type (SF/MF), which leads to a different mixture of heating type (i.e., heat pump vs non-heat pump). This difference impacts the NTG.

Table 5-53below shows net results by measure in the HVAC channel.

Table 5-53 PY2020 Net Savings Summary for HVAC Channel

Measure	*Ex post* Gross Energy Savings (kWh)	*Ex post* Net Energy Savings (kWh)	NTG	*Ex post* Gross Demand Reductions (kW)	*Ex post* Net Demand Reductions (kW)
Central AC Replacement	36,276	29,384	81%	14	12
Central HP Replacement	24,837	18,379	74%	2	2
AC Tune-up M&V	2,626	1,970	75%	2	2
AC Tune-up Modeled	29,862	23,203	78%	18	14
AC Tune-up Post measurement	2,538	2,399	94%	1	1
AC Tune-up Pre-clean	247	185	75%	0.15	0.11
HP Tune-up M&V	6,887	6,424	94%	2	2
HP Tune-up Modeled	19,216	15,113	79%	5	4
HP Tune-up Post measurement	1,453	1,090	75%	0.29	0.22
HP Tune-up Pre-clean	1,121	841	75%	0.25	0.19
Total	**125,063**	**98,986**	**79%**	**45**	**36**
Sums may differ due to rounding.					

The table below outlines the net lifetime energy (kWh) savings for the HVAC Replacement and Tune-up channel.

Table 5-54 Net Lifetime Energy Savings for HVAC Channel

Measure	Tier One EUL	*Ex post* Net Lifetime Energy Savings (kWh)
Central AC Replacement	19	558,288
Central HP Replacement	16	294,070
AC Tune-up M&V	5	10,575
AC Tune-up Modeled	8	186,302
AC Tune-up Post measurement	3	7,196
AC Tune-up Pre-clean	3	556
HP Tune-up M&V	5	34,490
HP Tune-up Modeled	8	121,346
HP Tune-up Post measurement	3	3,269
HP Tune-up Pre-clean	3	2,522
Total		**1,218,615**
Sums may differ due to rounding.		

5.12.4 Consumer Products Net Savings Results

The Evaluators estimated a free ridership rate of 94% for Specialty bulbs and 24% for Standard bulbs for upstream LEDs using the price response model. The model coefficients are shown in the tables below. The coefficients on program price are negative for both Standard and Special bulbs. However, the program price coefficient for Specialty bulbs was not statistically significant

at the 90% level (p-value = .537). The overall free ridership rate is 29%. In PY2019, the free ridership rate was 34%, therefore, free ridership has decreased by 5% in PY2020. The magnitude of the change in free ridership is small considering the limited price variation observed in the data and the sensitivity of the model (e.g., the price coefficient) to changes in sales volumes.

The equations below show how free ridership is calculated for a single bulb model (the one listed for Standard bulbs in Table 5-56 below) with sales in August, a retail price of $10, and a program price of $5.

Pre-program Sales = exp(4.305 -0.814 -0.031 - 0.210*10) = 3.90

Program Sales = exp(4.305 -0.814 -0.031 - 0.210*5) = 11.13

Free ridership (Example Bulb) = 3.90/11.13 = 35%

This calculation is done for each invoiced line item, using retail and program prices, a dummy variable for the presence of a promotional event, and the month of sale. As mentioned in Section 0, each bulb model receives its own coefficient but only one bulb model coefficient is shown below for each bulb type for the sake of brevity.

The Evaluators assessed other predictors of sales quantities related to retailer-specific characteristics, such as, retailer type (e.g., DIY, Mass Merchant, etc.), retailer (e.g., Walmart, Home Depot, etc.), and unique store identifier. However, inclusion of one or more of these predictors resulted in model overfitting or non-sensical price coefficients due to limited price variation observed within a particular store for a particular model type. While bias from omitting these retail-specific predictors may exist, a suitable model could not be developed with their inclusion (e.g., price coefficients are positive and non-sensical or there are too many predictors in the model). The Evaluators judge this to be a limitation of this method in estimating free ridership.

NTG is calculated as: 100*(1 – Free Ridership + Spillover). The NTG ratio for the program is 74% (100*(1-0.29+0.03)).

Table 5-55 Price Response Model Results, Specialty LEDs

Coefficient	Estimate	Std Err	Statistic	P-Value	CI-low	CI-high
(Intercept)	3.077	0.734	4.191	0.000	1.638	4.516
Program Price	-0.007	0.011	-0.617	0.537	-0.029	0.015
Aug	0.250	0.180	1.387	0.165	-0.103	0.603
Dec	0.044	0.171	0.257	0.798	-0.291	0.378
Feb	0.547	0.168	3.263	0.001	0.219	0.876
Jan	0.502	0.161	3.115	0.002	0.186	0.818
July	0.355	0.180	1.967	0.049	0.001	0.708
June	-0.201	0.163	-1.230	0.219	-0.520	0.119
Mar	0.073	0.176	0.415	0.678	-0.272	0.418
May	0.017	0.149	0.114	0.910	-0.274	0.308
Nov	-0.038	0.201	-0.188	0.851	-0.433	0.357
Oct	0.399	0.161	2.469	0.014	0.082	0.715
Sept	0.059	0.170	0.348	0.728	-0.275	0.393
Specialty LED_A-Line Omni_500-1000_4_15000	2.070	0.859	2.409	0.016	0.386	3.754

Table 5-56 Price Response Model Results, Standard LEDs

Coefficient	Estimate	Std Err	Statistic	P-Value	CI-low	CI-high
(Intercept)	4.305	0.653	6.594	0.000	3.025	5.584
Program Price	-0.210	0.032	-6.651	0.000	-0.272	-0.148
Aug	-0.031	0.155	-0.197	0.844	-0.334	0.273
Dec	-0.048	0.151	-0.320	0.749	-0.344	0.248
Feb	0.354	0.158	2.235	0.025	0.043	0.664
Jan	0.436	0.162	2.701	0.007	0.120	0.753
July	-0.156	0.144	-1.078	0.281	-0.439	0.127
June	-0.164	0.140	-1.172	0.241	-0.439	0.110
Mar	0.280	0.151	1.862	0.063	-0.015	0.575
May	-0.198	0.148	-1.344	0.179	-0.488	0.091
Nov	0.054	0.160	0.337	0.736	-0.259	0.366
Oct	0.017	0.143	0.117	0.907	-0.263	0.296
Sept	-0.351	0.149	-2.350	0.019	-0.643	-0.058
Standard LED_A-Line Omni_0-500_4_20000	-0.814	0.657	-1.239	0.215	-2.101	0.473

The tables below summarize the results of the net savings analysis. The net energy (kWh) savings of the Consumer Products channel totaled 3,528,764 kWh, with a NTG ratio of 83%. Net peak demand (kW) reductions totaled 610 kW with an 81% NTG ratio.

Table 5-57 Net kWh Savings for HEEP Consumer Products

Measure	*Ex ante* Gross Energy Savings (kWh)	*Ex post* Gross Energy Savings (kWh)	FR	SO	*Ex post* Net Energy Savings (kWh)	NTG
Smart Thermostats	31,433	31,977	14%	0%	27,532	86%
LEDs (Food Bank)	1,706,293	1,706,293	0%	0%	1,706,293	100%
LEDs (Standard)	1,644,627	2,081,387	29%	3%	1,540,226	74%
LEDs (Specialty)	89,626	113,427	29%	3%	83,936	74%
Advanced Power Strips	302,157	302,157	48%	0%	157,122	52%
Window AC Replacement	34,306	31,033	56%	0%	13,655	44%
Total	**3,808,442**	**4,266,274**	**19%**	**2%**	**3,528,764**	**83%**
Sums may differ due to rounding.						

Table 5-58 Net kW Peak Demand Reductions for HEEP Consumer Products

Measure	*Ex ante* Gross Demand Reductions (kW)	*Ex post* Gross Demand Reductions (kW)	FR	SO	*Ex post* Net Demand Reductions (kW)	NTG
Smart Thermostats	0	0	14%	0%	0	N/A
LEDs (Food Bank)	277	277	0%	0%	277	100%
LEDs (Standard)	267	382	29%	3%	283	74%
LEDs (Specialty)	15	21	29%	3%	15	74%
Advanced Power Strips	34	34	48%	0%	18	52%
Window AC Replacement	22	38	56%	0%	17	44%
Total	**615**	**753**	**21%**	**2%**	**610**	**81%**
Sums may differ due to rounding.						

Table 5-59 outlines net lifetime energy (kWh) savings for the Consumer Products channel.

Table 5-59 Net Lifetime Savings Summary for Consumer Products Channel

Measure	EUL Tier One	*Ex post* Net Lifetime Energy Savings (kWh)
Smart Thermostats	11	302,854
LEDs (Food Bank)	19	32,419,567
LEDs (Standard)	19	29,264,301
LEDs (Specialty)	20	1,678,720
Advanced Power Strips	10	1,571,216
Window AC Replacement	10.5	143,372
Total		**65,380,031**
Sums may differ due to rounding.		

5.13 Non-Energy Benefits (NEBs)

Protocol L of the AR TRM v8.1 states that EM&V of demand-side management (DSM) programs in Arkansas must account for NEBs resulting from each program. Specifically, the categories of NEBs that are to be calculated for each DSM program are as follows:

- Benefits of electricity, natural gas, and liquid propane energy savings (i.e. other fuels);
- Benefits of public water and wastewater savings; and
- Benefits of avoided and deferred equipment replacement costs.

As discussed below, the NEBs applicable to the HEEP Program in PY2020 are avoided replacement costs (ARCs), propane, natural gas, and water savings.

Measures with zero entries are included to ensure consistency of table structure and to demonstrate that no measures or potential energy and non-energy impacts were omitted.

5.13.1 Natural Gas Energy Savings

In the HEEP Program, OG&E customers can have either electric or natural gas heating. When a customer has natural gas heating, OG&E can claim the natural gas therms savings as NEBs. The table below presents the *ex post* net natural gas that can be claimed as NEBs for cost-effectiveness purposes. The natural gas savings estimated in HEEP were all from channels where there are no gas utility partners as there are in the CWA. The natural gas penalties presented for Consumer Products are inclusive of leakage effects. The Evaluators cross-referenced smart thermostat program tracking data for OG&E with tracking data for AOG's Equipment Rebates Program to account for customers that submit for rebates to both utilities. When a dual-program applicant was found, the gas savings were zeroed out in the NEB calculations.

Table 5-60 Natural Gas Savings (NGS) by Measure, for HEEP in PY2020

Measure	*Ex post* NGS (Therms)	*Ex post* Net NGS (Therms)	*Ex post* Net Lifetime NGS (Therms)	NEB Natural Gas Savings ($)	NPV NGS ($)
Consumer Products	**(23,744)**	**(20,428)**	**(390,000)**	**$ (10,554)**	**$ (173,176)**
LEDs (Food Bank)	(11,082)	(11,082)	(210,558)	$ (5,725)	$ (93,568)
LEDs (Specialty)	(665)	(492)	(9,842)	$ (254)	$ (4,324)
LEDs (Standard)	(12,198)	(9,027)	(171,504)	$ (4,663)	$ (76,213)
Smart Thermostats	201	173	1,904	$ 89	$ 929
LivingWise® Schools Outreach	**2,783**	**2,673**	**25,705**	**$ 1,381**	**$ 12,782**
Faucet Aerators	625	613	6,125	$ 316	$ 3,021
LEDs (Standard)	(131)	(114)	(2,165)	$ (59)	$ (962)
Low-Flow Showerheads	2,289	2,175	21,746	$ 1,123	$ 10,724
RSOL	**9,975**	**8,312**	**85,396**	**$ 4,294**	**$ 41,862**
ENERGY STAR® Windows	768	338	6,758	$ 175	$ 2,969
Faucet Aerators	3,637	3,164	31,642	$ 1,635	$ 15,604
LEDs (Standard)	(166)	(123)	(2,334)	$ (63)	$ (1,037)
Low-Flow Showerheads	5,736	4,933	49,330	$ 2,549	$ 24,327
Total	**(10,986)**	**(9,442)**	**(278,899)**	**$ (4,878)**	**$ (118,531)**

The bullets below outline how the Evaluators determined if there were natural gas savings:

- **Consumer Products**: the project data provided heating type, which was used to determine if the project qualified for natural gas savings.

- **Residential Solutions**: the project data provided heating type, which was used to determine if the project qualified for natural gas savings.
- **LivingWise® Schools Outreach**: participant survey responses provided by AM Conservation were used to estimate natural gas savings.

5.13.2 Propane Savings

When a customer has propane, OG&E can claim the savings as NEBs. The table below presents the *ex post* net propane savings can be claimed as NEBs for cost-effectiveness purposes. Propane was only identified in the surveys delivered to the LivingWise® Outreach participants.

Table 5-61 Propane Savings by Measure, for HEEP in PY2020

Channel	Measure	*Ex post* Gross LPG Savings (gallons)	*Ex post* Net LPG Savings (gallons)	LPG Benefit ($)	NPV LPGS ($)
LivingWise® Schools Outreach	Aerator	318	312	$ 726	$ 6,341
	Showerhead	1,164	1,106	$ 2,577	$ 22,499
	LED (Standard)	(144)	(125)	$ (292)	$ (4,256)
Total		**1,338**	**1,292**	**$ 3,011**	**$ 24,583**
Sums may differ due to rounding.					

5.13.3 Water Savings

The Evaluators applied AR TRM v8.1 Volume 1, Section II, Protocol L1 to calculated water savings from faucet aerators and low-flow showerheads. Avoided costs for water savings is calculated using values from the 'TRM Clarification Memo' distributed by the IEM on July 22, 2020. The Evaluators relied on the TRM-calculated marginal water rates. The corrected marginal water rates below are reported for PY2020.

Table 5-62 Total Marginal Water Rates

	Original 2020 TRM V8.1 Values			Corrected: For use in 2020
Customer Class	Water Rates (per 1,000 gallons)	Sewage Rates (per 1,000 gallons)	Marginal Water Rates (per 1,000 gallons)	Marginal Water Rates (per 1,000 gallons)
Residential	$3.41	$4.61	$6.49	$8.03
Commercial	$2.76	$4.16	$7.25	$6.92
Average Cost $/Gallon	**$3.12**	**$4.38**	**$6.87**	**$7.50**

The water savings for PY2020 HEEP, for both single-family and multi-family, are presented in the table below.

In PY2020, the water saving measures implemented through the HEEP included faucet aerators and energy saving showerheads. The program tracking data included flow rates for these measures, and the Evaluators applied these flow rates to the AR TRM algorithms for faucet aerators and showerheads to calculate annual gallons of water saved. Table 5-63 below presents the estimates for HEEP.

Table 5-63 Water Savings by Measure Type for HEEP in PY2020

Channel	Measure	*Ex post* Gross Water/WW Savings (gallons)	*Ex post* Net Water/ WW Savings (gallons)	NEB Water/ WW Benefit ($)	NPV Water/ WW ($)
RSOL	Aerators	37,729	32,824	$ 253	$ 2,207
RSOL	Showerheads	56,716	48,776	$ 376	$ 3,279
LivingWise® Schools Outreach	Faucet Aerators	611,253	599,028	$ 4,613	$ 40,275
	Showerheads	2,132,704	2,026,068	$ 15,601	$ 136,221
Total		**2,838,402**	**2,706,697**	**$ 20,843**	**$ 181,982**
Sums may differ due to rounding.					

5.13.4 Avoided and Deferred Replacement Costs

To calculate avoided replacement costs (ARCs) and incremental costs for LEDs in OG&E's HEEP, the AR TRM v8.1 Protocol L calculator was used with the following assumptions: 1) replacement-on-burnout for all bulbs and 2) EUL for LEDs is 19 years [1]. LED costs were sourced from OG&E program tracking data where available. For direct install LEDs, the Evaluators assumed that the incentive was equal to the total cost of equipment and labor. In cases where project cost was not available and the project was not direct install, the Evaluators cited costs from IL TRM v6.0 Volume 3[44].

There were no deferred replacement costs (DRC) estimated in the PY2020 HEEP. Table 5-64 below shows the ARC benefits for the PY2020 HEEP.

[44] http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-TRM_Effective_010118_v6.0_Vol_3_Res_020817_Final.pdf

Table 5-64 Avoided Replacement Costs (ARCs) by Measure, for HEEP in PY2020

Channel	Measure	*Ex post* Gross ARCs ($)	*Ex post* Net ARC ($)	NPV of ARC ($)
Consumer Products	LED Lamp (Food Bank)	$ 328,339	$ 328,339	$ 328,339
	LED Lamp (Specialty)	$ 24,725	$ 18,296	$ 18,296
	LED Lamp (Standard)	$ 312,656	$ 231,365	$ 231,365
RSOL	LED Lamp (Standard)	$ 5,828	$ 4,313	$ 4,313
LivingWise® Schools Outreach	LED Lamp (Standard)	$ 14,292	$ 12,434	$ 12,434
Total		**$ 685,840**	**$ 594,748**	**$ 594,748**
Sums may differ due to rounding.				

5.13.5 NEBs Summary

The table below summarizes the net present value (NPV) of NEBs attributable to HEEP, including natural gas savings, water savings, propane, and avoided replacement cost. There were no deferred replacement costs (DRCs) in the PY2020 HEEP. There were no NEBs identified in the HVAC channel.

Table 5-65 PY2020 Non-Energy Benefits (NEBs) Summary, OG&E

Channel	Measure	NPV NGS ($)	NPV LPGS ($)	NPV Water/WW ($)	NPV ARC ($)	Total NPV ($)
Consumer Products	LEDs (Food Bank)	$ (93,568)	$ -	$ -	$ 328,339	$ 234,771
	LEDs (Specialty)	$ (4,324)	$ -	$ -	$ 18,296	$ 13,973
	LEDs (Standard)	$ (76,213)	$ -	$ -	$ 231,365	$ 155,152
	Smart T-stats	$ 929	$ -	$ -	$ -	$ 929
LivingWise® Schools Outreach	Faucet Aerators	$ 3,021	$ 6,341	$ 40,275	$ -	$ 49,636
	LEDs (Standard)	$ (962)	$ (4,256)	$ -	$ 12,434	$ 7,216
	Showerheads	$ 10,724	$ 22,499	$ 136,221	$ -	$ 169,443
RSOL	ES® Windows	$ 2,969	$ -	$ -	$ -	$ 2,969
	Faucet Aerators	$ 15,604	$ -	$ 2,207	$ -	$ 17,811
	LEDs (Standard)	$ (1,037)	$ -	$ -	$ 4,313	$ 3,276
	Showerheads	$ 24,327	$ -	$ 3,279	$ -	$ 27,606
Total		**$ (118,531)**	**$ 24,583**	**$ 181,982**	**$ 594,748**	**$ 682,782**
Sums may differ due to rounding						

5.14 Process Evaluation Reasoning

The AR TRM v8.1 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the program in the context of these requirements.

Table 5-66 Determining Process Evaluation Timing

Variable Name	Variable Type
New and Innovative Components	Partially. The program continues to incorporate a set list of measures that is similar to prior years with a few additions.
No Previous Process Evaluation	The Program has not received a prior process evaluation in this planning period.
Less than Expected Energy Savings or Accomplishments	No. OG&E offerings have exceeded energy savings expectations in prior years.
Participant Reported Problems or Low Participant Satisfaction	No. There have been few reported incidences of customer dissatisfaction for OG&E offerings.
New Vendor or Contractor	No. The program continues to be implemented by CLEAResult and uses installation contractors who were previously involved.
Energy Savings are being Achieved Slower than Expected	No. Energy savings are being achieved at a rate that is consistent with program expectations.

Table 5-67 Determining Process Evaluation Conditions

Component	Status
Impact problems	No. Savings are not substantially lower than expected for most measures although M&V activities will verify the accuracy of savings estimates and TRM guidelines.
Informational/educational objectives	None identified thus far.
Participation problems	None identified thus far.
Operational challenges	None identified thus far.
Cost-effectiveness issues	No. The program is designed to implement the most cost-effective measures for each participating customer, and historical cost-effectiveness for the offering has been adequate.
Negative feedback	None identified thus far.
Market effects	None identified thus far.

5.15 Process Evaluation Approach and Findings

This section outlines the findings of the PY2020 HEEP process evaluation.

5.15.1 Data Collection Activities

As part of the PY2020 evaluation of HEEP, the Evaluators completed in-depth interviews with program staff working on the program: the program managers from OG&E, and a program representative from CLEAResult. The Evaluators used the information gleaned in these interviews to identify program updates or changes experienced in PY2020 compared to available documentation. Further, these interviews explored energy efficiency staff roles and responsibilities, program communications and marketing, and the overall program delivery processes in place during PY2020.

Telephone surveys were completed with HEEP program participants through the Evaluators' in-house call center. Surveys collected process evaluation information, including gathering respondent feedback on program communication and offerings, evaluating changes in participant energy efficiency awareness and behaviors due to program participation, and verifying measure installation. The surveys also collected household characteristics and limited demographic information. The Evaluators received, and reviewed program population data queried from tracking data received through CLEAResult. The program tracking data provides contact information on participating customers and measure descriptions of equipment installed through the program. For LivingWise® Schools Outreach, the Evaluators relied upon survey data collected by AM Conservation as part of their implementation process.

Table 5-68 below summarizes the survey and interview data collection for the PY2020 program evaluation, including data collection type and number of respondents.

Table 5-68 Interview and Survey Data Collection Summary

Target	Component	Activity	n	Precision	Details
Program Staff	OG&E Program Staff	Interview: Program Manager EM&V Analyst	3	N/A	The Program Manager handles day-to-day operations of the program, including interactions with Trade Allies and implementers. The EM&V Analyst liaisons between the program and the Evaluators and ensures that program operations and energy savings calculations are TRM-compliant.
	CLEAResult Staff	Interview: Program Manager Program Consultant	2	N/A	The Program Manager handles overall program oversight for HEEP while the Program Consultant conducts QA and energy savings calculations.
	AM Conservation Program Staff	Interview: Senior Program Manager	1	N/A	The Senior Program Manager runs the LivingWise® Schools Outreach channel under separate contract to OG&E
Program Participants	LivingWise® Schools Outreach	Implementer Survey Data Analysis	324	±0.5%	This questionnaire administered by program implementers captures pre- and post-program participation feedback and provides gross impact parameters such as ISRs and DHW fuel type.
	HEEP Single Family Retrofit	Telephone Survey	48	±17.7%	Single-family participants in Residential Solutions complete weatherization projects that do not qualify for the Unified Weatherization Program, and complete other miscellaneous projects including windows, pool pumps, and AC tune-up
	HEEP Multifamily	Property Manager Telephone Survey	2	±4.9%	Two property managers participated in the Residential Solutions channel, one participated in the HVAC channel.

The next few sections present the results and key findings from the process evaluation activities. These findings are based upon interviews with utility staff, implementation staff, and surveys with participating customers. The findings presented pertain to program communications and marketing, program delivery, participant energy efficiency awareness and behaviors, and customer characteristics.

5.15.2 OG&E Staff Interview Findings

The interviewees identified as the Lead Program Manager, LivingWise® Schools Outreach Program Manager, and EM&V Analyst. Interviewees interact with many staff members at OG&E and CLEAResult. One interviewee meets with CLEAResult members on a weekly basis with additional meetings happening as needed. Additionally, one interviewee stated they receive emails from CLEAResult if a problem or question arises. Due to the pandemic, all communication with CLEAResult and AM Conservation are done remotely.

For the new triennial period, LivingWise® Schools Outreach is now part of the Residential Solutions Program. Interviewees stated they were on target to attain the goals set for the portfolio after stopping participation for one quarter of the year due to the pandemic. The school closures due to the pandemic impacted the LivingWise® Schools Outreach channel making it difficult to distribute the kits to the students. There were concerns earlier in the year about the pandemic's effect on meeting program goals, but the programs have performed well enough to negate those concerns.

Marketing for HEEP is mostly created by CLEAResult, however OG&E does their own marketing for the LivingWise® Schools Outreach channel. CLEAResult and OG&E communicate and coordinate often about marketing strategies.

Interviewees stated they had no concerns or issues with the program data tracked by CLEAResult. Additionally, the interviewees stated they are happy with the amount of data being collected by CLEAResult and the monthly transfers are a smooth process.

In previous years, OG&E provided educational training, safety trainings, and Building Performance Institute, Inc. (BPI) training for the Trade Allies, however, due to the pandemic no trainings were offered this year. Additionally, interviewees stated they are content with how CLEAResult manages Trade Allies.

Regarding quality management, an interviewee stated that the program manager inspects ten percent of homes that participate in the HEEP as a quality assurance aspect. Trade Allies are required to upload documentation, including project documentation, invoices, and savings estimates, to Catalyst for each home that received measures.

5.15.3 CLEAResult Staff Interview Findings

The interviewees are identified as a Program Manager and a Program Consultant. The interviewees stated the program they oversee had grown by adding more measures. The interviewees work on the HEEP Channels, (RSOL, CPS, and Residential HVAC). The interviewees stated they interact with various CLEAResult staff members that work within Arkansas

specifically. Additionally, the interviewees stated they interact with two staff members specifically from OG&E. The interviewees stated the only change in the HEEP program is that LivingWise® Schools Outreach is now part of the Residential Solutions program. However, there were more measures added to the HEEP program.

In PY2020, there were no changes made to HEEP's incentive design and program participation process. For HEEP projects that include a home walk through, there is a requirement of the participating contractor. One interviewee stated that a barrier to participating in the program is the home walk through as participants are hesitant for people to be in their home during the pandemic. The requirement is that if a unit has been weatherized previously, the contractor must not re-install measures that have been previously installed. To ensure that the contractor is complying with program requirements, CLEAResult's program consultant accompanies the contractor on his or her first job. For HEEP non-multifamily projects, the contractor calls the homeowners directly to make a reservation. The rebate format is such that the rebate for eligible measures is either given to the customer or the contractor; the rebates are not split.

The HEEP program does not see participation from customers living in manufactured or mobile homes because the marketing does not target these properties.

The HEEP program met participation goals.

OG&Es markets the HEEP RSOL single-family channel program by reaching out to a list of the weatherized homes that did not previously receive duct sealing. CLEAResult recruits for the multi-family channel through their internal staff by reaching out to various property owners. CLEAResult does not need any additional information or resources from OG&E to effectively market the programs. It was recommended by CLEAResult that to recruit participants in the residential programs, OG&E could attach information about the HEEP programs with the utility bill.

Before the onset of COVID-19, CLEAResult would meet in person with OG&E staff monthly. Since the onset of COVID-19, CLEAResult has remote meetings with OG&E every two weeks or as needed. The quality control/assurance processes have been consistent in the last two years with QA/QC being conducted for 10% of the jobs. The installing contractor submits photos of pre and post install conditions and equipment. Verification visits include if health and safety issues were addressed and have actually identified some gas leaks while doing the assessment.

Currently, OG&E does customer surveys for HEEP AC tune-up and in-home assessment measures.

5.15.4 AM Conservation Energy Services Program Staff Interview Response

The interviewee identified as a Senior Program Manager and has worked on the OG&E LivingWise® Schools Outreach since 2011, prior to its incorporation into HEEP. AM Conservation was contracted directly by OG&E to implement LivingWise® Schools Outreach . In the last year, Resource Action Programs (RAP, the former implementer) had merged with Franklin and formed AM Conservation. The merger has not changed the senior program manager's interactions with OG&E staff in terms of the program level interactions.

The interviewee stated they have meetings with OG&E staff members periodically, but that there is often not specific cause for a meeting due to the seasonal nature of the program. The interviewee stated they discuss various topics during the meeting such as program goals and status of the program.

5.16 Survey Analysis & Findings

5.16.1 Residential Solutions Single Family

Table 5-69 summarizes the sources from which respondents learned of the program. The most common replies respondents gave were learning about the program from a utility bill message or from word of mouth.

Table 5-69 Source of Program Awareness

How did you learn of the program?	Residential Solutions (n = 47)
Contractor	26%
Utility website	19%
Word of mouth	15%
Email from utility	11%
Utility bill message	11%
Utility Website	0%
Web Search	0%
OG&E Program Staff	4%
OG&E online energy assessment	0%
Info at a retailer	0%
Social Media	0%
Other	11%
Don't Know	4%

5.16.1.1 Appliance Rebate

Those surveyed were asked a series of questions about their appliance and the rebate they received. Out of the 45 respondents, 38% stated that they purchased the model they wanted, and 18% stated that it was a good price and costs less to operate. Those surveyed were able to select more than one response which is why the total percentage is greater than one hundred percent. Results are summarized in Table 5-70.

Table 5-70 Reasons for Selecting Model or Type

Why did you select the model or type?	**Residential Solutions (n = 45)**
Wanted that brand	38%
It was a good price	18%
It costs less to operate	18%
There was a rebate for it	16%
It's good for the environment	16%
It was all that was available/only choice	9%
It had features I wanted	7%
The contractor/retailer recommended it	4%
It had an ENERGY STAR® label	4%
It was the right size/color	2%
Other	2%
Don't Know	0%

Furthermore, 11 respondents in the Residential Solutions channel revealed where they learned about what equipment to purchase. Fifty-five percent of the respondents got their information about the products from an internet search. Thirty-six percent got their information from the installing contractor. Table 5-71 summarizes the results for the Residential Solutions respondents.

Table 5-71 Where Participants Learned about Information to Buy Appliance

When you were deciding to purchase the appliance, from where did you get information about what to buy?	Residential Solutions (n = 11)
Internet Search	55%
Installation contractors	36%
Retailers	9%
Television	9%
Friend, neighbor, relative, or co-worker	0%
Other	18%
Don't Know	0%

Ten participants in Residential Solutions stated where they purchased their appliance equipment with most participants purchasing the equipment from a home improvement store or other. Table 5-72 summarizes the results.

Table 5-72 Type of Store or Contractor from which Appliance was Purchased

What type of store, or from what sort of contractor did you purchase the appliance?	Residential Solutions (n = 10)
Home improvement store	50%
Door & window retailer*	20%
Internet	10%
Swimming pool contractor	10%
Other	10%
Don't Know	0%
*This is noted separately from home improvement as it is a narrowly-focused specialty retailer rather than a large home improvement store.	

5.16.1.2 Participant Satisfaction

Participants rated their satisfaction with the program overall and various aspects of the program. Figure 5-8 summarizes the results.

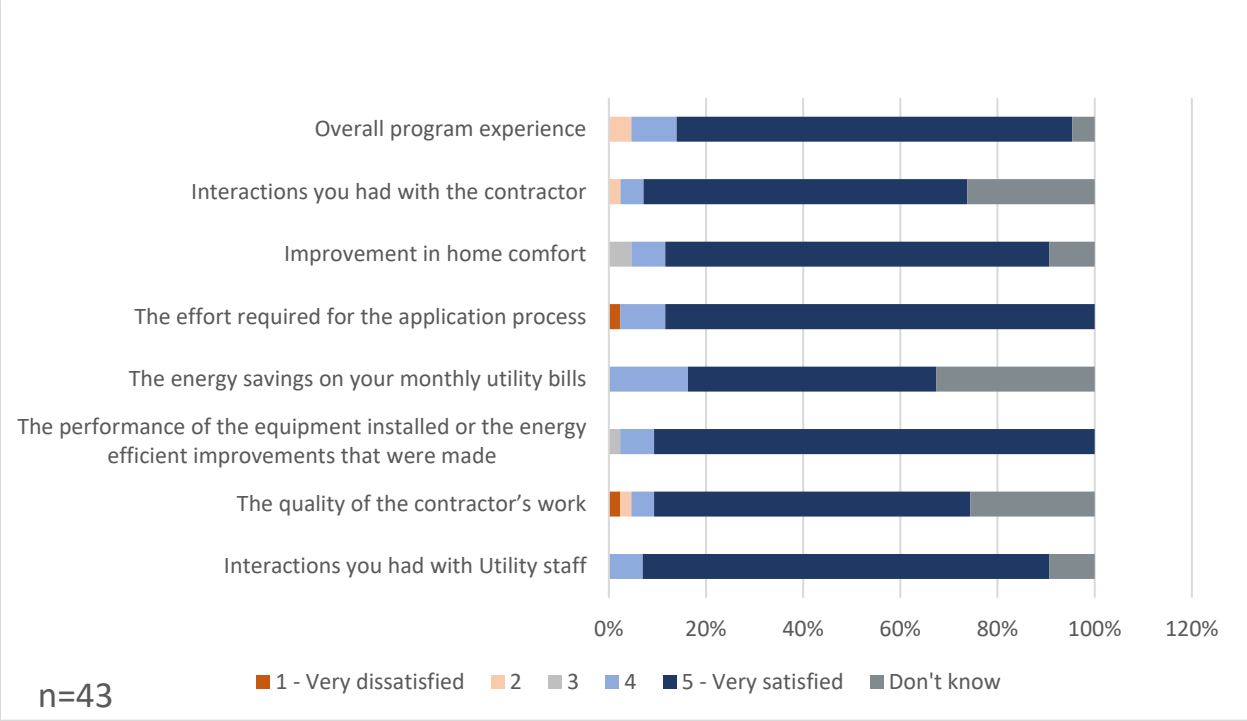


Figure 5-8 Participant Satisfaction – Residential Solutions

As shown in Table 5-73, the majority of participants were very satisfied with OG&E as their electric service provider with 5% providing a neutral satisfaction level.

Table 5-73 Satisfaction with OG&E

How satisfied are you with OG&E as your electric service provider?	Residential Solutions (n=43)
1 (Very dissatisfied)	0%
2	0%
3	5%
4	7%
5 (Very satisfied)	88%

5.16.1.3 Respondent Demographics and Fuel Types

Table 5-74 through Table 5-76 summarize home ownership rates and equipment fuel types.

Table 5-74 Homeownership Status

Do you own or rent your home?	Residential Solutions (n = 43)
Own	86%
Rent	12%
Own and rent to someone else	0%
Don't know	0%
Refused	2%

Table 5-75 Space Heating Fuel

What is the main fuel used for heating your home?	Residential Solutions (n = 43)
Electricity	33%
Natural Gas	63%
Propane	0%
Something else	2%
Don't heat home	0%
Don't know	0%
Prefer not to answer	2%

Table 5-76 Water Heater Fuel

What is the main fuel used for heating your water heater?	Residential Solutions (n = 42)
Electricity	62%
Natural Gas	33%
Propane	0%
Something else	2%
Don't heat home	0%
Don't know	0%
Prefer not to answer	2%

5.16.2 Multifamily (RSOL & HVAC)

The Evaluators interviewed four Trade Allies who participated in OG&E residential programs. Overall, the Trade Allies reported positive feedback of their experiences with the program. The interview consisted of a series of questions pertaining to a variety of categories including Trade Ally general background, impacts of COVID-19 on business in 2020, program marketing and recruitment, and program participation.

5.16.2.1 Trade Ally Background

The Trade Allies who participated in the interviews were all experienced in the OG&E Home Energy Efficiency Program, all four Trade Allies reported that they have worked in OG&E energy efficiency programs for four years or more.

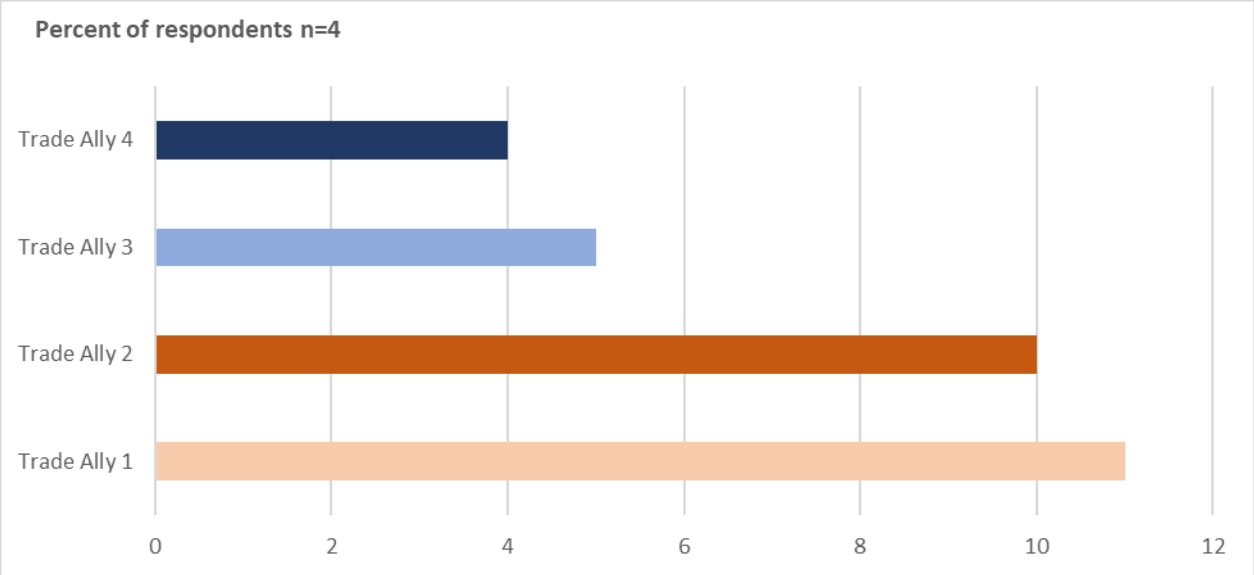


Figure 5-9 Years Worked in AOG & OG&E Energy Efficiency Programs

Three of the interviewees were the President/CEO of their businesses, and one was a manager at their company. Every participant reported to only perform work in the residential sector. The participants provided further details about what type of work their businesses perform in OG&E residential programs, two of the Trade Allies responded that they perform weatherization work, one said their company primarily provides AC tune-ups, and another stated their company only does hot water heating equipment rebates. The majority of work the Trade Allies perform is done in Arkansas, except for one Trade Ally who responded only about ten percent of the work they do is in Arkansas.

Table 5-77 Percentage of Work in Arkansas

About what percentage of the projects your firm completes are in Arkansas?	
Trade Ally 1	100%
Trade Ally 2	100%
Trade Ally 3	95%
Trade Ally 4	10%

5.16.2.2 Impacts of COVID-19

Next, some questions were posed relating to the effects of the COVID-19 pandemic on the Trade Allies' businesses in 2020. The pandemic did have a negative impact on the amount of work performed by the Trade Allies, every interview participant reported that the COVID-19 pandemic had decreased the amount of program work that they conducted in 2020. Furthermore, the participants were asked if they thought the COVID-19 pandemic had an influence of the work they do outside of the OG&E residential programs and each participant said that the amount of work their businesses did outside of the residential programs was also decreased due to the pandemic.

Three of the Trade Allies stated the OG&E did provide training materials related to COVID-19. They said that they received training materials from OG&E through email about safety procedures to be sure to follow including practicing social distancing, wearing PPE, and handwashing.

5.16.2.3 Program Marketing and Recruitment

The following portion of the interview was focused on marketing and recruitment for residential energy efficiency programs. The questions were intended to get a better understanding of the companies' marketing practices and recruitment efforts for the programs. The Trade Allies were asked what approach their company takes to promote OG&E residential programs; their responses are detailed in Table 5-78.

Table 5-78 Marketing Practices

What program promotion efforts does your company practice?	
Trade Ally 1	No promotion efforts, they are assigned work through the program implementer and receive leads through word of mouth.
Trade Ally 2	Canvassing of neighborhood that they work in with door hangers and flyers with program offerings.
Trade Ally 3	They have a road sign outside of their office with program offerings listed, and door hangers in surrounding neighborhoods
Trade Ally 4	They reported that they always mention rebate offerings when working with customers.

Additionally, they were asked approximately what percentage of their clients that they recruited for the program were already aware OG&E had offerings for energy efficient measures. One Trade Ally said that all the customers the recruited were aware that the utilities offered energy efficient measures, two interviewees said around seventy percent were aware of the programs, and one respondent said none of their customers were already aware.

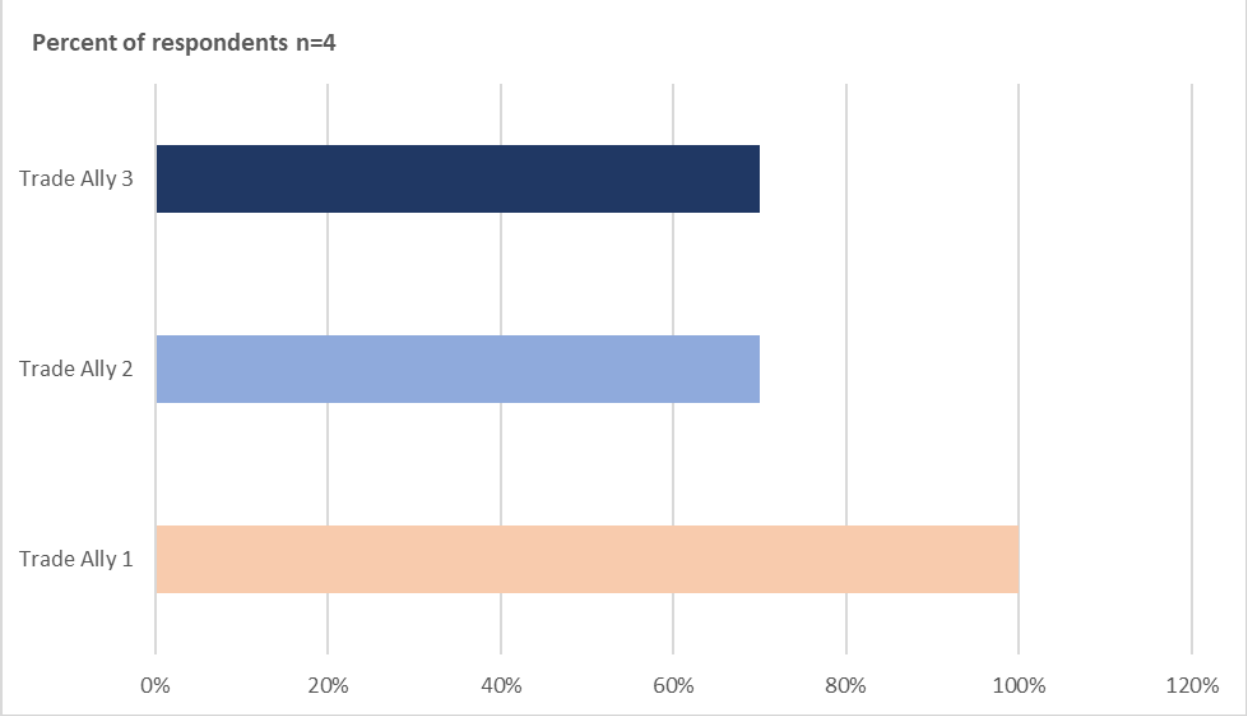


Figure 5-10 Percent of Customers Previously Aware of Residential Programs

One of the interview participants offered the recommendation that it could be beneficial to the program if OG&E did more marketing through newspaper ads, rebate information in utility bill inserts, and community outreach programs through churches and civics programs.

5.16.2.4 Program Participation and Feedback

The final part of the interview was surrounding the topic of program participation and program feedback. The Trade Allies were asked if they use AOG & OG&E incentives to promote and sell their services, three Trade Allies said they do, and one said they do not. The Trade Allies who responded they do use OG&E incentives to promote their services said they let customers know about all the measures the programs have to offer and calculate the potential energy savings in the home and give them an estimate of the savings they could achieve by installing the measures.

When asked what part of the program they believed is the most beneficial to the customers three of the Trade Allies identified duct sealing as being one of the most beneficial offerings and one Trade Ally also said that attic insulation is at the top of the list.

The interviewees were asked if they are happy with the amount of support they receive from AOG and OG&E, the responses were split with two reporting they are satisfied and two reporting they are not satisfied. When asked to elaborate on why they were not satisfied with the amount of support one respondent said they would like to have more meetings to receive feedback from the utility on how they are doing in the field and to discuss implementation processes of the program services, another respondent replied that the utility can be more receptive to increase their volume of work.

Lastly, the interview participants were asked if they had any suggestions for improvement to the overall program. Three respondents said they think the standard for qualifying for attic insulation through the program is too high, and one of these three specifically suggested going back to R-12 for the benchmark of adding insulation.

5.16.3 LivingWise® Schools Outreach

Students were given a quiz before and after participating in the program. Three-hundred-twenty-four students participated in the quiz.

Students were asked a series of questions to learn about their knowledge and understanding of energy efficiency before participating in the program. After participating in the program, students were quizzed to understand what they have learned.

In the pre and post program quiz, students reveal they have a strong understanding of the difference between a fossil fuel and what is not a fossil fuel. Table 5-79 summarizes the results.

Table 5-79 Student Responses: Identification of Fossil Fuels

Which of the following is not a fossil fuel?	Pre-Program (n = 321)	Post-Program (n = 302)
Wind	74%	90%
Coal	9%	4%
Oil	11%	2%
Natural Gas	7%	4%

However, when students were asked to identify a renewable resource from the same list given to them in the previous question about fossil fuels, many students struggled to identify the correct answer. This is summarized in Table 5-80.

Table 5-80 Student Responses: Identification of Renewable Resources

Which of the following is a renewable resource?	Pre-Program (n = 322)	Post-Program (n = 301)
Wind	9%	2%
Coal	60%	70%
Oil	8%	53%
Natural Gas	23%	24%

When students were asked to identify the unit of measure for electricity consumption, most students answered correctly. However, there is a significant different between the pre and post answers. It is possible students are confused between kilowatt and kilowatt-hour. Table 5-81 summarizes the results.

Table 5-81 Student Responses: Identification of Unit of Measurement for Electricity Consumption

What is the unit of measure for electricity consumption?	Pre-Program (n = 317)	Post-Program (n = 300)
Therm	13%	4%
Kilowatt	42%	24%
Kilowatt-Hour	33%	70%
Pounds	13%	3%

Furthermore, students were asked to identify stored energy. There is a significant difference between the pre- and post-program answers. Table 5-82 illustrates that by the end of the program, more students learned to identify the term for stored energy.

Table 5-82 Student Responses: Identification of Stored Energy

Energy stored within any physical thing is called…	Pre-Program (n = 309)	Post-Program (n = 299)
Nuclear Energy	15%	6%
Kinetic Energy	16%	12%
Mechanical Energy	14%	4%
Potential Energy	55%	78%

Students were asked to identify examples of distributed generation, and by the end of the program they were able to identify examples. Table 5-83 summarizes the results.

Table 5-83 Student Responses: Identification of Distributed Generation Types

Which are examples of distributed generation?	Pre-Program (n = 314)	Post-Program (n = 301)
Solar panels on your home	14%	6%
A wind turbine at your home	10%	5%
Using fuel cells at home	10%	4%
All of the above	66%	85%

Students were asked if a high-efficiency showerhead can save water, energy, or both. By the end of the program, many students understood that a high-efficiency showerhead can save water and energy. Table 5-84 summarizes the results. Additionally, in a previous question in the quiz, students were asked whether it is true or false that saving water saves energy. In the pre-program quiz, 78% of students answered true. In the post-program quiz, 93% of students answered true.

Table 5-84 Student Responses: Knowledge of High-Efficiency Showerhead

A high-efficiency showerhead can save…	Pre-Program (n = 314)	Post-Program (n = 298)
Water	16%	9%
Energy	12%	5%
Both	73%	86%

Students were asked to identify the term for when an item is turned off and continues to use electricity. In the pre-program quiz, students struggle to answer correctly. However, by the end of the program, majority of students were able to successfully identify the correct answer. Table 5-85 summarizes the results.

Table 5-85 Student Responses: Awareness of Phantom Loads

An item that continues to use electricity even though its switch may be in the "off" positions is called…	Pre-Program (n = 307)	Post-Program (n = 295)
Transformer	19%	7%
Phantom Load	27%	76%
Peak Load	17%	9%
High Efficiency	37%	8%

Students were asked true or false LED can reduced lighting energy use in their home by 75%. Before participating in the program 77% of students answered correctly. By the end of the program, 96% of students answered correctly.

Table 5-86 Student Responses: Knowledge of LED Light Bulbs

LED Light Bulbs can reduce lighting energy use in your home by 75%	Pre-Program (n = 307)	Post-Program (n = 293)
TRUE	77%	96%
FALSE	23%	4%

5.16.3.1.1 Demographics

Majority of students live in a single-family home. Additionally, 77% of students stated their home is owned by their parents, and 23% rent their home. Furthermore, 57% of students stated their home was built after 1992, and 43% stated their home was built before 1992. Fifty-two percent of students live in a home with 4-5 people.

Table 5-87 Home Occupancy

How many people live in your home (including you)?	Percent of Respondents (n = 313)
One	0%
Two	3%
Three	13%
Four	31%
Five	26%
Six	14%
Seven or more	13%

Seventy-three percent of students do not have a dishwasher. Sixty-nine percent of students don't have half-bathrooms. However, thirty percent of students have between one and three half-bathrooms. The majority of students have between one and two full bathrooms (85%).

Figure 5-11 summarizes water heating fuel types. This was used as an impact parameter for low flow devices in the kits.

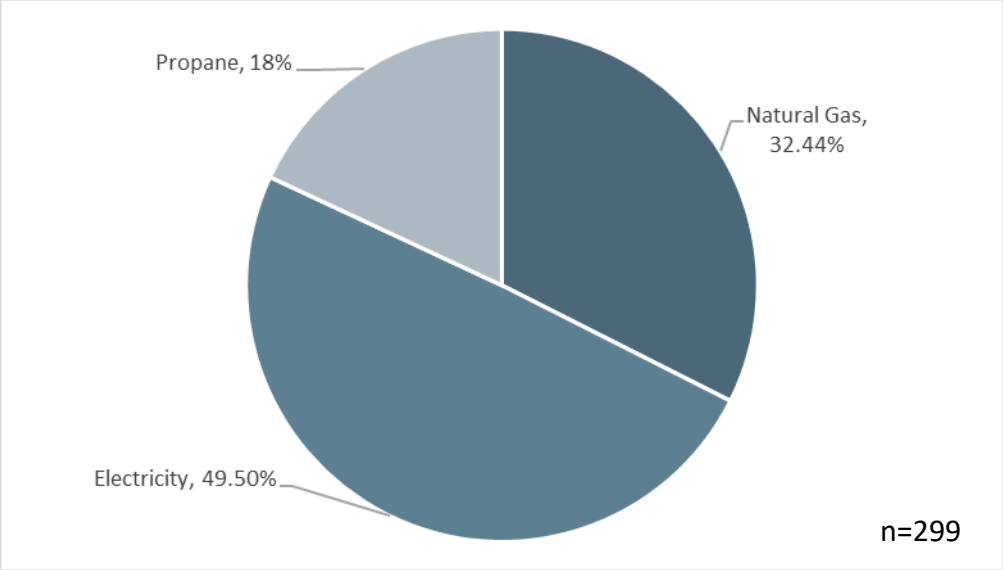


Figure 5-11 Water Heating System Types

Figure 5-12 summarizes heating system configurations.

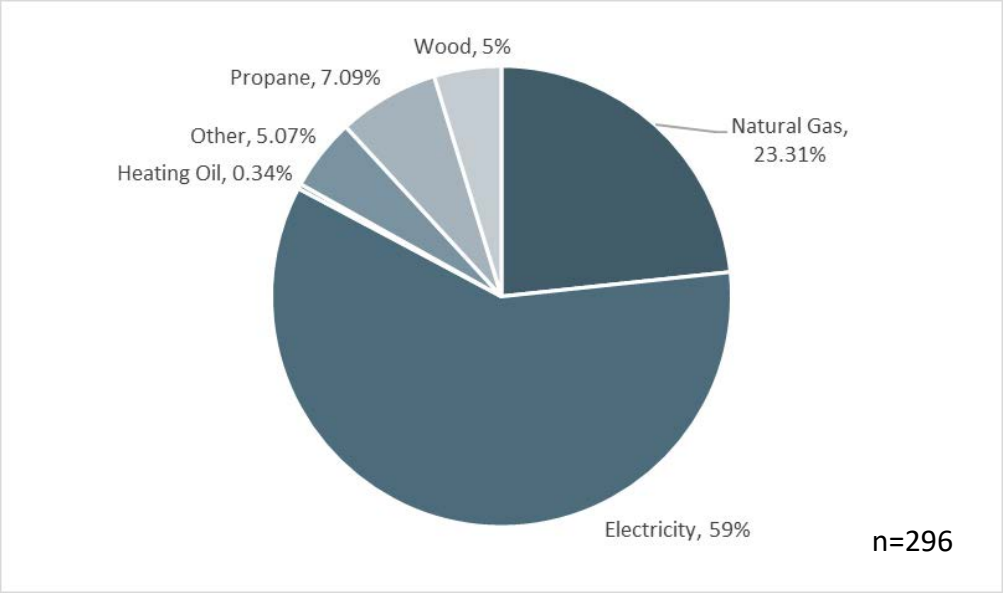


Figure 5-12 Space Heating System Types

Figure 5-13 summarizes cooling system configurations.

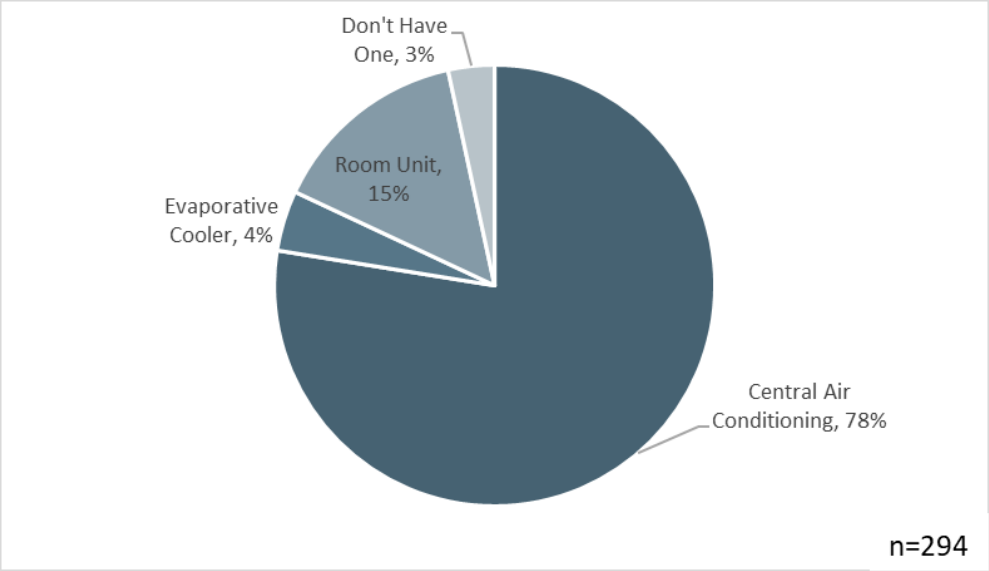


Figure 5-13 Space Cooling System Types

5.16.3.1.2 Home Activities

In the post-program quiz, students were asked a series of questions about items installed and whether their parents made efforts to reduce energy use.

Students revealed which energy efficient items their family installed. Most students and their families installed LED light bulbs. Whereas less than half of the students and their families installed showerheads and aerators. Table 5-88 summarizes the results.

Table 5-88 Did Your Family Install the Energy Efficient Items?

Energy Efficient Measures Installed	Yes	No
Did you your family install the new High-Efficiency Showerhead? (n = 305)	47%	53%
Did you your family install the new Bathroom Faucet Aerators? (n = 306)	42%	59%
Did your family install the new Kitchen Faucet Aerators? (n = 298)	45%	55%
Did your family install the first 9-watt LED Light Bulb? (n = 306)	75%	25%
Did your family install the second 9-watt LED Light Bulb? (n = 303)	70%	30%
Did your family install the LED Night Light? (n = 302)	80%	20%

Additionally, students were asked if their parents adjusted the refrigerator and the water heater. Most students stated their parents did not make any adjustment to the refrigerator temperature or the water heater settings. Table 5-89 summarizes the results.

Table 5-89 Appliance Adjustments

	Yes	No
Did your family raise the temperature on your refrigerator? (n = 301)	25%	75%
Did your family lower your water heater settings? (n = 297)	24%	76%

Furthermore, students were asked if their parents made any adjustments to the thermostat during winter or summer, and if so by how many degrees. Figure 5-14 illustrates that more than half of students reported their parents not making any adjustments to the thermostat during winter or summer. However, slightly less than half of students reported their family made adjustments to their thermostats during winter or summer.

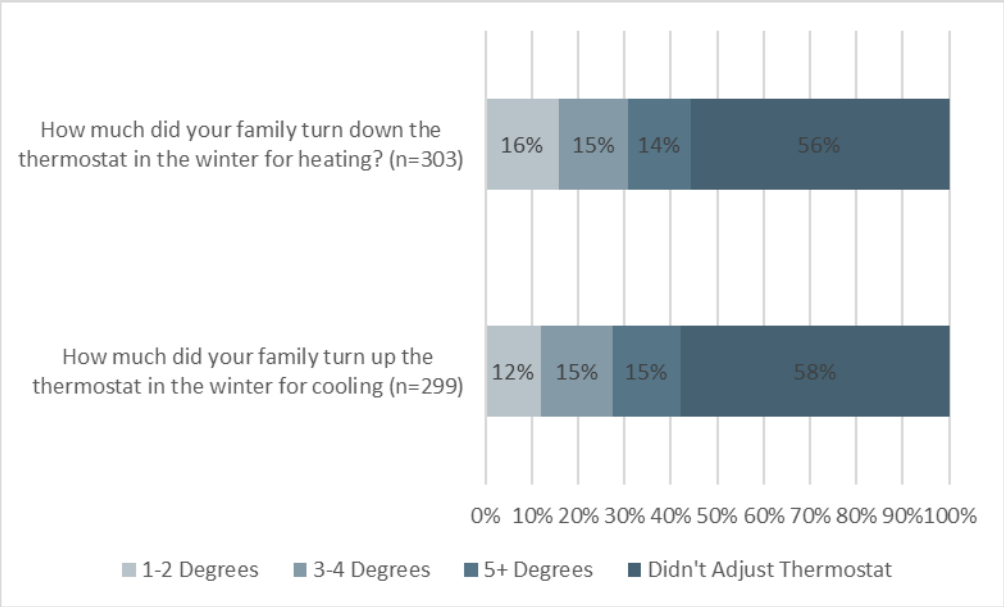


Figure 5-14 Thermostat Adjustment

Sixty-nine percent of students stated they worked with their family on this program, and thirty-one percent of students did not work with their family on this program. It's not clear whether students who did not work with their family on this program had any kind of influence. Furthermore, sixty-five percent of students stated their family changed the way the use energy, and thirty-five percent of students stated their family did not change how they use energy.

Students were asked to rate LivingWise® Schools Outreach. Sixty-two percent of students expressed it was "Great". Table 5-90 summarizes the results.

Table 5-90 How Students Rate LivingWise® Schools Outreach

How would you rate the LivingWise® Schools Outreach?	Percent of Respondents (n = 303)
Great	62%
Pretty Good	25%
Okay	10%
Not So Good	3%

5.17 Adherence to Protocol A

The tracking system in the databases managed by both CLEAResult (CPS, RSOL and HVAC) and AM Conservation (LivingWise® Schools Outreach) conforms reasonably well to the tracking system protocol developed for use in Arkansas. These bullets below show a summary of how well the program tracking systems meets the components of the protocol.

- Participating Customer Information – includes all information required including customer contact information, customer identifier (account number), location of building, and date completed. There were some issues with accurate contact information.
- Measure Specific Information – includes type and quantity of measures installed. For measures where square feet are required for deemed savings verification, the implementer tracks square feet of installed measure in place of quantity. The implementer could consider adding a field to track quantity of these measures.
- Measure Codes – measure codes were provided.
- Vendor Specific Information – this was included in the dataset.
- Marketing and Outreach Activities – One-on-one outreach made by implementation contractor with building owners/property managers continues to be effective form of marketing.

5.18 Progress on PY2019 Evaluation Recommendations

There were no recommendations for HEEP in PY2019.

5.19 Planned Program Changes

The HEEP will remain in OG&E's portfolio in PY2021, with no significant changes.

5.20 Conclusions & Program Recommendations

5.20.1 Conclusions

The key conclusions from the PY2020 evaluation of the HEEP are as follows:

- **Micro-level Database Quality:** The Evaluators found the *ex ante* savings values within the database to be accurate for most measures. Additionally, CLEAResult was very consistent in responding to data requests and correcting errors when necessary.
- **Macro-level database inconsistency:** The datasets for the various program channels often have inconsistent heading titles for the same datapoint. Additionally, each channel is provided in unique and separate tabs. It is a time-consuming effort to combine them for the program-level evaluation of HEEP.
- **Successful outreach to multi-family customers:** Multi-family projects represent a significant volume of participation in PY2020, accounting for (53%) of HEEP savings where housing type is known. There is no housing type information for LivingWise® Schools Outreach or the upstream component of CPS.
- **Advanced power strips claimed savings slightly overstated:** Trade Allies' default to entering the entertainment space type for APS. In some cases, this was adjusted to align with what was found on site.
- **Projects from the previous program year:** In PY2020, a few Trade Allies were delayed in their rebate submission from PY2019. The rebate submissions were accepted by OG&E to best manage Trade Ally and customer satisfaction. Typically, rebate submissions from the previous calendar are to be submitted within 90 days of the first day of the program year. Additionally, the Evaluators reviewed the project data from the previous year and determined that these projects were not submitted in PY2019 and therefore were counted in PY2020.

5.20.2 Recommendations

The HEEP was very successful in PY2020. The Evaluators identified very few specific, systematic, or persistent issues with program operation and design. As the utilities plan to continue offering similar services and maintaining their current operational structure under the program, consideration of the following recommendations may be useful moving forward:

- **Track Propane heating and water heating.** Propane heating is not directing tracked in the HEEP database. Propane savings as a NEB can be determined if propane heating and water heating is tracked.
- **Track building Type for RSOL.** Currently HVAC tracks building type. Tracking building type in RSOL will allow for better NTG ratio assignment to each participant.

Table 5-91 presents the above items, outlining the relevant issue, potential consequences, and associated recommendations.

Table 5-91 Recommendations from PY2020 Evaluation

Issue	Consequences	Recommendation
Propane heating and water heating in not tracking data.	No propane related NEBs.	Add propane heating and water heating to database.
Track building Type for RSOL	Potential difficulty in properly assignment NTG ratio to projects.	Better appropriate NTG ratio assignment

6 Consistent Weatherization Approach (CWA) Program

6.1 Overview of Evaluation Findings

Table 6-1 and Table 6-2 outline the *ex ante* and verified *ex post* energy (kWh) savings and demand (kW) reductions by measure, respectively, for the Consistent Weatherization Approach (CWA) Program.

Table 6-1 Gross Electric Energy Savings Summary, by Measure, for PY2020

Measure	*Ex Ante* Annual Energy Savings (kWh)	*Ex Post* Gross Annual Savings (kWh)	Realization Rate (kWh)
Ceiling Insulation	1,743,434	1,734,530	99%
Duct Sealing	1,022,843	1,022,628	100%
Air Infiltration	588,001	597,935	102%
Advanced Power Strips	435,868	264,005	61%
LEDs (Standard)	363,475	648,332	178%
Low-Flow Showerheads	4,314	4,210	98%
Faucet Aerators	1,906	1,877	98%
Water Heater Jackets	3,431	3,431	100%
Water Heater Pipe Insulation	2,368	2,370	100%
Total	**4,165,639**	**4,279,317**	**103%**
Sums may differ due to rounding.			

Table 6-2 Gross Electric Demand Savings Summary, by Measure, for PY2020

Measure	*Ex Ante* Annual Demand Savings (kW)	*Ex Post* Gross Demand Savings (kW)	Realization Rate (kW)
Ceiling Insulation	518	511	99%
Duct Sealing	232	234	101%
Air Infiltration	126	126	100%
Advanced Power Strips	52	31	61%
LEDs (Standard)	57	103	183%
Low-Flow Showerheads	0.45	0.44	98%
Faucet Aerators	0.20	0.20	98%
Water Heater Jackets	0.26	0.26	100%
Water Heater Pipe Insulation	0.088	0.18	204%
Total	**986**	**1,007**	**102%**
Sums may differ due to rounding.			

Table 6-3 outlines the *ex ante* and verified *ex post* natural gas savings (therms) claimed by OG&E, by measure, for the PY2020 CWA. Measures with zero entries are included to ensure consistency of table structure and to demonstrate that no measures or potential energy and non-energy impacts were omitted.

Table 6-3 Gross Gas Savings Summary by Measure for PY2020

Measure	*Ex Ante* Annual Therms Savings	*Ex Post* Gross Annual Therms Savings
Ceiling Insulation	16,386	9,894
Duct Sealing	11,048	6,541
Air Infiltration	8,170	5,914
Advanced Power Strips	-	-
LEDs (Standard)	-	(648)
Low-Flow Showerheads	-	-
Faucet Aerators	-	6
Water Heater Jackets	-	4
Water Heater Pipe Insulation	-	13
Total	**35,604**	**21,725**
Sums may differ due to rounding.		

Table 6-4 outlines the *ex ante* and *ex post* lifetime energy (kWh) savings, by measure, for the PY2020 CWA.

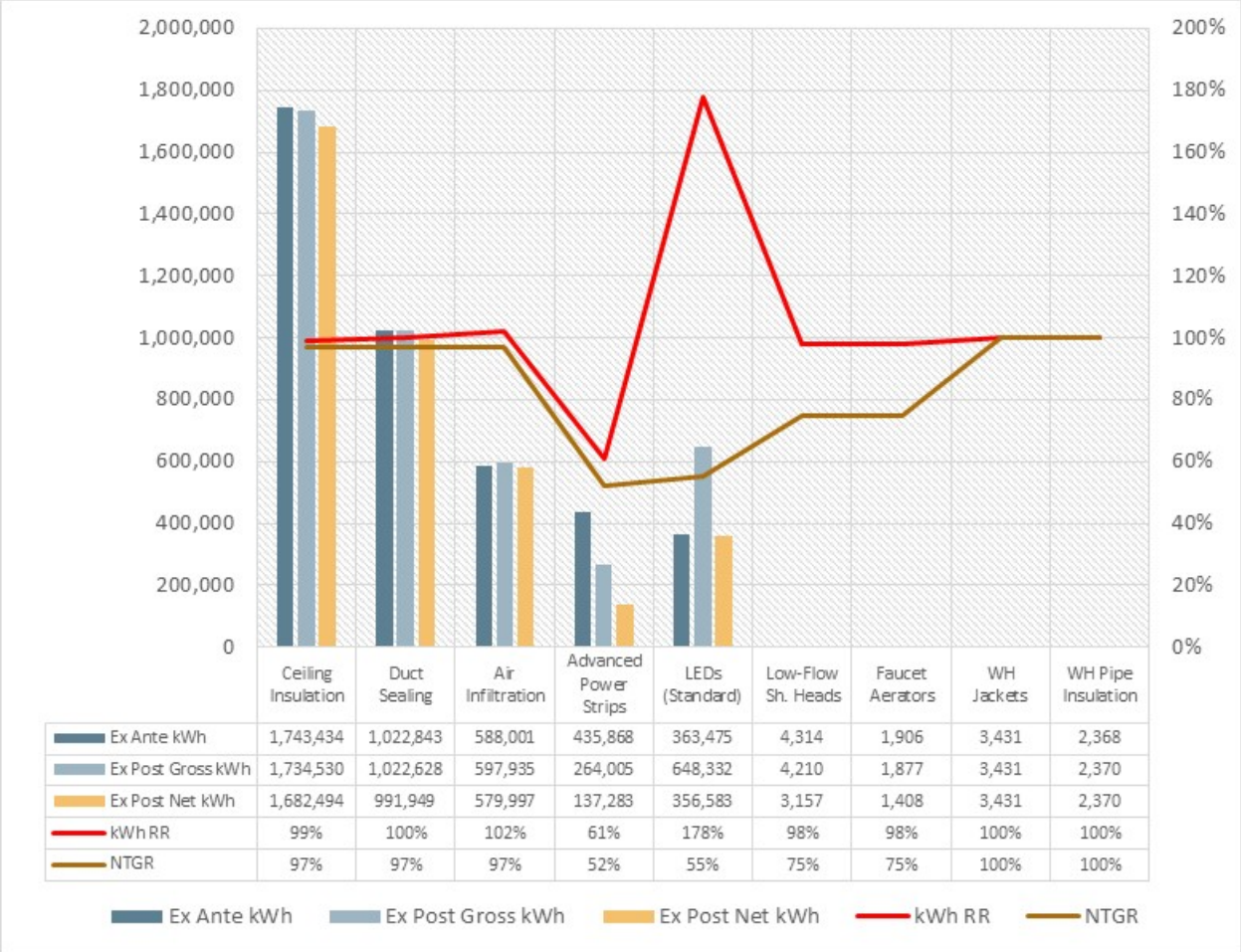
Table 6-4 Gross Lifetime Savings Summary by Measure for PY2020

Measure	EUL	*Ex Post* Gross Lifetime kWh Savings
Ceiling Insulation	20	34,690,591
Duct Sealing	18	18,407,304
Air Infiltration	11	6,577,285
Advanced Power Strips	10	2,640,051
LEDs (Standard)	19	12,318,306
Low-Flow Showerheads	10	42,097
Faucet Aerators	10	18,767
Water Heater Jackets	13	44,603
Water Heater Pipe Insulation	9	20,515
Total		**74,759,521**
Sums may differ due to rounding.		

Table 6-5 presents the net savings summary, by measure, for the PY2020 CWA. The overall program NTG ratio is 88%.

Table 6-5 Ex Post Net Savings Summary

# Homes	*Ex Post* Net Annual kWh Savings	*Ex Post* Net kW Savings	*Ex Post* Net Lifetime kWh Savings	NTG Ratio
1,184	3,758,670	919	66,143,587	88%
Sums may differ due to rounding.				



	Ceiling Insulation	Duct Sealing	Air Infiltration	Advanced Power Strips	LEDs (Standard)	Low-Flow Sh. Heads	Faucet Aerators	WH Jackets	WH Pipe Insulation
Ex Ante kWh	1,743,434	1,022,843	588,001	435,868	363,475	4,314	1,906	3,431	2,368
Ex Post Gross kWh	1,734,530	1,022,628	597,935	264,005	648,332	4,210	1,877	3,431	2,370
Ex Post Net kWh	1,682,494	991,949	579,997	137,283	356,583	3,157	1,408	3,431	2,370
kWh RR	99%	100%	102%	61%	178%	98%	98%	100%	100%
NTGR	97%	97%	97%	52%	55%	75%	75%	100%	100%

Figure 6-1 CWA Energy Savings (kWh) Summary

Figure 6-1 is a summary of the gross and net energy savings (kWh) for the program and Figure 6-2 is a summary of the gross and net demand reduction (kW) savings for the PY2020 CWA.

Figure 6-2 CWA Demand Reduction (kW) Summary

Table 6-6 presents the total participants, measures, and incentives for the PY2020 CWA.

Table 6-6 Measures and Incentives Summary

Measure	Total Participants	Total Measures	Total Incentives
Assessment	1,105	1,105	$ 261,922
Ceiling Insulation	934	934	$ 211,908
Duct Sealing	968	968	$ 73,692
Air Infiltration	1,071	1,071	$ 811,558
Advanced Power Strips	941	1,737	$ 52,072
LEDs (Standard)	1,095	25,572	$ 43,826
Low-Flow Showerheads	34	42	$ 165,436
Faucet Aerators	41	91	$ 260
Water Heater Jackets	48	42	$ 2,140
Water Heater Pipe Insulation	392	392	$ 3,535
Health & Safety	939	939	$ 348
Total	**1,184**	**32,893**	**$ 1,626,697**
Total participants is the sum of unique electric account numbers to represent households. Sums may differ due to rounding.			

Additional details, including approaches, are found in the following sections.

6.2 Program Overview

The CWA administered by OG&E provides residential energy audits and whole house retrofit services to OG&E residential customers. The program is administered with significant coordination with AOG due to their high level of overlap in their service territory.

The program is designed to use both gas utility and electric utility funds to provide customers in-home audit and energy efficient measures at no additional cost.

Although the overall structure and delivery of the CWA in PY2020 is consistent with prior years, PY2020 marks the third year that the Arkansas Investor Owned Utilities (IOUs) are offering weatherization programs under the CWA statewide design.

The CWA was developed by the Parties Working Collaboratively (PWC) Weatherization Collaborative comprised of Arkansas IOUs and other stakeholders to provide a consistent and comprehensive weatherization offering across the state of Arkansas. The former OG&E/AOG Weatherization Program designed and implemented by OG&E and AOG was the model for the rest of the state's IOUs CWA programs.

The IOUs are responsible for delivering the Program, and each IOU has a separate program budget and may use its own Building Performance Institute (BPI) or Residential Energy Services

Network (RESNET) certified contractors or trained private contractors. Each IOU must follow the guidelines of the statewide approach when delivering weatherization services but is able to supplement the Program with complementary program elements such as additional measure offerings. While all IOUs are required to offer weatherization services under the CWA Program framework, each IOU offers its own iteration of the framework and may or may not deliver weatherization through a joint utility offering. The CWA is an example of a joint utility offering, where OG&E and AOG are the joint sponsors and share the costs of weatherizing participant homes.

The program targets energy-inefficient homes by requiring that participating residences must either be at least 10 years old or have a minimum energy usage cost per square foot of ten cents for electricity based on the customer's highest bill in the past 12 months.

The program is designed to facilitate the installation of a wide range of cost-effective weatherization measures that have been approved as "core measures" to be provided under the CWA framework, including:

- Ceiling Insulation;
- Floor Insulation;
- Air Infiltration;
- Duct Sealing;
- Advanced Power Strips;
- LEDs (Standard);
- Water Heater Pipe Insulation;
- Water Heater Jacket;
- Low-Flow Shower Heads; and
- Faucet Aerators.

Measures are selected for individual homes through a contractor assessment which identifies a list of cost-effective improvements. As with prior program years, the program contracts with three installation contractors who perform the weatherization and measure implementation services. After the measures are installed, utility staff members perform post-inspections on a sample of homes to verify that all measures have been properly implemented.

In PY2020, the CWA provided direct install and weatherization services in a total of 1,184 homes. Although the overall number of participants slightly reduced from PY2019, this is still a consistent participation rate with prior years. Participants received in-home energy assessments and one or more of the following measure types:

- Attic Insulation;

- Air Infiltration;
- Duct Sealing;
- Advanced Power Strips;
- LEDs (Standard);
- Water Heater Pipe Wrap;
- Water Heater Jacket;
- Low Flow Showerheads;
- Faucet Aerators; and
- Health & Safety Measures.

Depending on the location of customers and the fuel sources used in their homes, services for each customer are funded by OG&E, AOG or both OG&E and AOG. Table 6-7 cross-tabulates the number of participating homes by utility. As participants were only required to be customers of one of the two sponsoring utilities, some residences in the program were serviced by utilities other than OG&E and AOG. These utilities included municipal utilities, co-ops, propane service providers, or other investor-owned utilities that do not pay into the CWA.

Table 6-7 Participation by Associated Utility

Electric Utility	Gas Utility	
	AOG	Other/None
OG&E	631	553
OG&E Total	**AOG Total**	**Total Homes**
1,184	631	1,184

Figure 6-3 below displays the month of weatherization for homes serviced during PY2020, based on the weatherization date listed in program tracking data. Program participation was somewhat evenly distributed during PY2020.

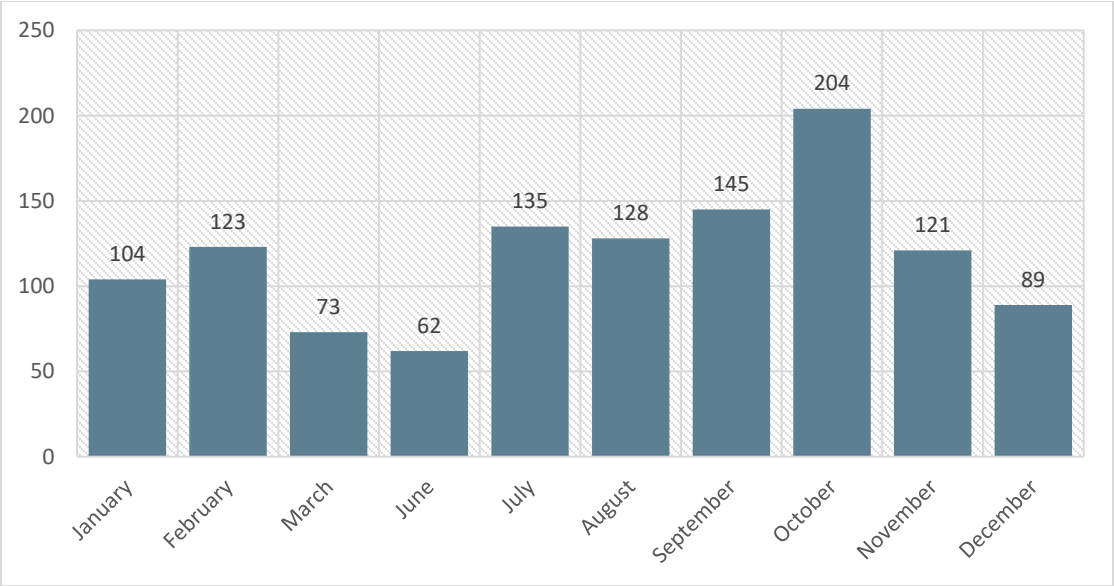


Figure 6-3 Homes Participating by Month, PY2020

6.3 Act 1102 Pilot Evaluation Metrics

In PY2020, CWA also included a low-income pilot per Act 1102. The participants are tracked in the CWA database. Table 6-8 shows how OG&E has met the Act 1102 Pilot evaluation metrics.

Table 6-8 ACT 1102 Metrics

Topic Area	Metric	Tracked by OG&E	Reported by Evaluators
Marketing Efforts	Track how program is marketed	Yes	Yes
	Identify effectiveness of each method	No	Yes
	Indicate if and how utility is working with CAP agency/social service agency	No	N/A
Site Visit Assessment	Track if customer qualifies as LI, Age or Both	Yes	Yes
	Catalog measures not installed and why	No	No
	Track if customer is receiving benefits from other programs	No	No
	Track NEBs such as eliminating arrearages, collectibles, LIHEAP payments, etc.	Yes	Yes
Deferred Homes	Identify if program referral methods were left behind	No	Yes
	Identify reasons for deferral	No	No
	Track health and safety repairs completed	Yes	Yes
	Identify any measures installed	Yes	Yes
	Identify if home was tracked to CAP agency	No	No
	Track reasons for customer denial in program	No	No
Post Installation	Track participation in other utility programs	No	No
	Assess participant's satisfaction with all aspects of the pilot program	No	Yes
	Track number of times a participant was visited	Yes	Yes
	Track number of hours spent in the home	No	No
	Calculate average project cost-effectiveness-	Yes	Yes
	TRC for each project	No	No
	SIR for each project	Yes	Yes
	Cost range of projects	Yes	Yes
	Average cost of projects	Yes	Yes
	Track home type	Yes	Yes
	Identify neighborhoods where the pilot would be effective	Yes	No
	Identify methods to certify age/income	Yes	Yes

6.4 Gross Impact Evaluation Approach

This section presents the methodologies for, and key findings from, the gross impact evaluation of the PY2020 Program. *Ex post* gross savings are summarized in Table 6-1.

For measures implemented through the PY2020 program, savings verification was performed according to methodologies described in AR TRM v8.1. For savings verification involving lighting and NEBs, methodologies described in AR TRM v8.1 were performed. Table 6-9 identifies the sections in the AR TRM v8.1 and/or AR TRM v8.1 that were used for verification of measure-level savings under the CWA.

Table 6-9 AR TRM v8.1 Sections by Measure

Measure Type	AR TRM v8.1 Section
Ceiling Insulation	2.2.2
Duct Sealing	2.1.11
Air Infiltration	2.2.9
Advanced Power Strips	2.4.4
LEDs (Standard)*	2.5.1.4
Low-Flow Showerheads	2.3.5
Faucet Aerators	2.3.4
Water Heater Jackets	2.3.2
Water Heater Pipe Insulation	2.3.3
*LEDs were evaluated using AR TRM v8.1. Both versions of the AR TRM listed LEDs in the same section. This decision was based on IEM guidance that TRM v8.1 provided an expanded list of lighting baseline definitions but does not affect other impact parameters.	

The calculation methodologies for these measures are detailed in the AR TRM v8.1.

6.5 Field Verification Rates and Survey Procedures and Findings

6.5.1 Field Verification Rates

Due to the pandemic, the Evaluators were unable to perform verification site for projects in PY2020. As a result, the Evaluators have reviewed the site visits from PY2017, PY2018, and PY2019 (160 total sites) and applied the average of the three years to result in measure-level field verification rates (FVR). These results are summarized in Table 6-10 below.

Table 6-10 WA FVR – Three-year Average Applied to PY2020

Measure	CWA PY2017 FVR	CWA PY2018 FVR	CWA PY2019 FVR	CWA PY2020 FVR
Aerators	96%	95%	100%	97%
Air Infiltration	91% / 100%	10% / 100%	89% / 100%	97% / 100%
APS	92%	33%	57%	61%
Ceiling Insulation	100%	100%	100%	100%
Duct Sealing	126%	106% / 100%	97%	110% / 100%
LEDs	84%	95%	99%	92%
Showerheads	100%	N/A	100%	100%
Water Heater Pipe Insulation	100%	N/A	100%	100%
Water Heater Jacket	100%	N/A	100%	100%

6.5.1.1 Sampling Plan for the Impact Evaluation

The Evaluators developed a sample for telephone surveying for the PY2020 CWA evaluation. [45] The Evaluators' sample approach was designed to achieve a minimum 10% precision and 90% confidence level (90/10) (see 3.4.3 for sampling methodology).

The Evaluators conducted the sampling for the telephone survey effort, drawing a random sample of 700 participants with an assumed response rate of 10% to reach a target sample of 68 completed telephone surveys in a combined effort for OG&E and AOG. This provided a total of 113 survey respondents for this evaluation:

- 64 respondents that received funding solely from OG&E; and
- 49 respondents that received funding from both OG&E and AOG.

Due to the importance of collecting a viable sample of demographic data, the Evaluators established a survey target greater than the minimum sample of 68 respondents required for ±10% precision at 90% confidence. The actual response rate for the telephone survey was approximately 26%. The sample achieved ±7.8% precision at 90% confidence.

6.6 Net Impact Evaluation Approach

PY2020 CWA used NTG ratios found in PY2019. Table 6-11 shows the NTG ratio used in PY2020.

[45] OG&E provided the Evaluators with a do-not-call list of customers who had opted out of non-essential utility-related communications. These customers were removed from the sampling frame for both sampling efforts.

Table 6-11 PY2020 Measure-Level NTG Ratio

Measure	NTG Ratio
Ceiling Insulation	97%
Duct Sealing	97%
Air Infiltration	97%
Advanced Power Strips	52%
LEDs (Standard)	55%
Low-Flow Showerheads	75%
Faucet Aerators	75%
Water Heater Jackets	100%
Water Heater Pipe Insulation	100%

Additional details on the NTG approach and results can be found in Appendix C Net-to-Gross Approach and Outcomes.

6.7 Gross Evaluation Summary and Findings

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided *ex post* gross savings according to protocols from the AR TRM v8.1. *Ex post* gross electricity and gas savings were within 3% of *ex ante* estimates for the program.

Table 6-12 presents the *ex post* gross energy savings (kWh) achieved from participating homes receiving electric utility service from OG&E.

Table 6-12 *Ex Post* Gross Electricity Savings, OG&E

# of homes	*Ex Post* Gross Peak Demand Savings (kW)	*Ex Post* Gross Annual Savings (kWh)	*Ex Post* Gross Lifetime Savings (kWh)	*Ex Post* Gross Realization Rate
1,184	1,007	4,279,317	74,759,521	103%
Sums may differ due to rounding.				

Table 6-13 summarizes the *ex post* gross energy (kWh) and demand reductions (kW) for OG&E, by measure, for PY2020.

Table 6-13 *Ex Post* Gross Savings by Measure

Measure	*Ex Post* Gross Annual Savings (kWh)	*Ex Post* Gross Lifetime Savings (kWh)	*Ex Post* Gross Peak Demand Savings (kW)
Ceiling Insulation	1,734,530	34,690,591	511
Duct Sealing	1,022,628	18,407,304	234
Air Infiltration	597,935	6,577,285	126
Advanced Power Strips	264,005	2,640,051	31
LEDs (Standard)	648,332	12,318,306	103
Low-Flow Showerheads	4,210	42,097	0.44
Faucet Aerators	1,877	18,767	0.20
Water Heater Jackets	3,431	44,603	0.26
Water Heater Pipe Insulation	2,370	20,515	0.18
Total	**4,279,317**	**74,759,521**	**1,007**
Sums may differ due to rounding.			

Table 6-14 presents overall energy savings (kWh) and demand reductions (kW) *ex post* gross realization rates by measure.

Table 6-14 Overall Gross Realization Rates by Measure

Measure	*Ex Post* Gross Realization Rate (kWh)	*Ex Post* Gross Realization Rate (kW)
Ceiling Insulation	99%	99%
Duct Sealing	100%	101%
Air Infiltration	102%	100%
Advanced Power Strips	61%	61%
LEDs (Standard)	178%	183%
Showerhead	98%	98%
Faucet Aerators	98%	98%
WH Jacket	100%	100%
WH Pipe Wrap	100%	204%

6.8 Net Impact Evaluation Summary and Findings

Table 6-15 summarizes *ex post* net kWh and kW savings by measure for OG&E.

Table 6-15 *Ex Post* Net Savings by Measure

Measure	*Ex Post* Net Peak Demand (kW)	*Ex Post* Net Savings (kWh)	*Ex Post* Net Lifetime Savings (kWh)
Ceiling Insulation	496	1,682,494	33,649,874
Duct Sealing	227	991,949	17,855,085
Air Infiltration	123	579,997	6,379,967
Advanced Power Strips	16	137,283	1,372,827
LEDs (Standard)	57	356,583	6,775,069
Low-Flow Showerheads	0.33	3,157	31,573
Faucet Aerators	0.15	1,408	14,075
Water Heater Jackets	0.26	3,431	44,603
Water Heater Pipe Insulation	0.18	2,370	20,515
Total	**919**	**3,758,670**	**66,143,587**
Sums may differ due to rounding.			

6.9 Non-Energy Benefits (NEBs)

Protocol L of the AR TRM v8.1 states that EM&V of DSM programs in Arkansas must account for NEBs resulting from each program. Specifically, the categories of NEBs that are to be calculated for each DSM program are as follows:

- Benefits of electricity, natural gas, and liquid propane energy savings (i.e. other fuels);
- Benefits of public water and wastewater savings; and
- Benefits of avoided and deferred equipment replacement costs.

As discussed below, the NEBs applicable to the CWA in PY2020 are natural gas savings, liquid propane savings, and water savings.

Measures with zero entries are included to ensure consistency of table structure and to demonstrate that no measures or potential energy and non-energy impacts were omitted.

6.9.1 Electricity, Natural Gas, and Liquid Propane Energy Savings

In the CWA, the participating utilities are OG&E and AOG. Typically, the amount that either utility pays for a participating home depends on whether the utility is serviced by OG&E, by AOG, or by both utilities. Weatherization of a home receiving both electric service from OG&E and gas service from AOG would typically be paid for by both utility companies.

Table 6-16 presents the *ex post* net natural gas savings attributed to these customers.

Table 6-16 Natural Gas (Therms) Savings Paid by OG&E

Measure	*Ex Post* Gross Natural Gas Savings (therms)	Net Natural Gas Savings (therms)	Net Lifetime N. Gas Savings (therms)	NEB Natural Gas Savings ($)	NPV NGS ($)
Ceiling Insulation	9,894	9,597	191,943	$ 4,958	$ 84,323
Duct Sealing	6,541	6,344	114,198	$ 3,278	$ 51,337
Air Infiltration	5,914	5,737	63,105	$ 2,964	$ 30,792
LEDs (Standard)	(648)	(356)	(6,766)	$ (184)	$ (3,007)
Water Heater Pipe Wrap	13	13	116	$ 7	$ 60
Faucet Aerators	6	5	47	$ 2	$ 23
Water Heater Jackets	4	4	51	$ 2	$ 25
Total	**21,725**	**21,344**	**362,694**	**$ 11,027**	**$ 163,553**
Sums may differ due to rounding.					

The Evaluators identified 43 OG&E customer homes in the PY2020 tracking data that receive propane service but had natural gas savings reported. The Evaluators converted these savings to gallons of propane using a conversion rate of 0.91 Therms per gallon of propane.[46] Table 6-17 presents the *ex post* net propane savings, in gallons, attributed to these customers and the monetization of these benefits.

Table 6-17 Propane (Gallons) Savings for CWA in PY2020

Measure	*Ex Post* Gross LPG Savings (gallons)	Net LPG Savings (gallons)	LPG Benefit ($)	NPV LPGS ($)
Air Infiltration	2,772	2,689	$ 6,266	$ 59,304
Ceiling Insulation	7,153	6,938	$ 16,167	$ 244,676
Duct Sealing	5,012	4,862	$ 11,329	$ 158,698
LEDs (Standard)	(327)	(180)	$ (419)	$ (6,112)
Water Heater Jackets	4	4	$ 9	$ 94
Total	**14,614**	**14,313**	**$ 33,351**	**$ 456,659**
Sums may differ due to rounding.				

6.9.2 Avoided and Deferred Replacement Cost

To calculate avoided or deferred replacement costs and incremental costs for LEDs in OG&E's CWA Program, the AR TRM v8.1 Protocol L calculator was used with the following assumptions: 1) replacement-on-burnout for all bulbs and 2) EUL for LEDs is 19 years [1]. LED costs were

[46] Based on 1 gallon of propane = 91,000 BTU, and 1 Therm ~100,000 BTU.

sourced from OG&E program tracking data where available. For direct install LEDs, the Evaluators assumed that the incentive was equal to the total cost of equipment and labor.

Table 6-18 shows the avoided or deferred replacement costs for LED lamps in PY2020. The total net avoided replacement cost for CWA was $74,542. There were no deferred replacement costs for CWA in PY2020.

Table 6-18 Avoided Replacement Costs

Measure	Net ARC ($)
LEDs	$ 74,542

6.9.3 Water Savings

During PY2020 the water saving measures implemented through the CWA included faucet aerators and energy saving showerheads. The program tracking data included flow rates for these measures, and the Evaluators applied these flow rates to the AR TRM v8.1 algorithms for faucet aerators and showerheads to calculate annual gallons of water saved.

For homes receiving utility service from only one of the sponsoring utilities (OG&E or AOG), all water savings resulting from program measures were attributed to the sponsoring utility, regardless of water heater fuel type. For homes receiving utility service from both OG&E and AOG, water savings were attributed based on water heater fuel type. For example, water savings for a home receiving electric service from OG&E and gas service from AOG would be attributed to OG&E if the home had an electric water heater and to AOG if the home had a gas water heater. Table 6-19 presents water savings for the CWA in PY2020.

Table 6-19 Water (gallons) Savings by Measure for CWA in PY2020

Measure	*Ex Post* Gross Water/ WW Savings (gallons)	*Ex Post* Net Water/ WW Savings (gallons)	Water/ WW Benefit ($)	NPV Water/WW ($)
Showerheads	125,702	94,277	$ 726	$ 6,339
Faucet Aerators	51,244	38,433	$ 296	$ 2,584
Total	**176,946**	**132,710**	**$ 1,022**	**$ 8,923**
Sums may differ due to rounding.				

6.9.4 NEBs Summary

Table 6-20 summarizes the net present value (NPV) of NEBs attributable to OG&E for the PY2020 CWA, including avoided and deferred replacement costs, natural gas savings, water savings, and propane savings.

Table 6-20 Non-Energy Benefits (NEBs) Summary

Measure	NPV NGS ($)	NPV LPGS ($)	NPV Water/ WW ($)	NPV ARC ($)	Total NEB NPV ($)
Ceiling Insulation	$ 84,323	$ 244,676	$ -	$ -	$ 328,999
Duct Sealing	$ 51,337	$ 158,698	$ -	$ -	$ 210,035
Air Infiltration	$ 30,792	$ 59,304	$ -	$ -	$ 90,096
LEDs (Standard)	$ (3,007)	$ (6,112)	$ -	$ 74,542	$ 65,423
Advanced Power Strips	$ -	$ -	$ -	$ -	$ -
Water Heater Jackets	$ 25	$ 94	$ -	$ -	$ 119
Low-Flow Showerheads	$ -	$ -	$ 6,339	$ -	$ 6,339
Water Heater Pipe Insulation	$ 60	$ -	$ -	$ -	$ 60
Faucet Aerators	$ 23	$ -	$ 2,584	$ -	$ 2,607
Total	**$ 163,553**	**$ 456,659**	**$ 8,923**	**$ 74,542**	**$ 703,677**
Sums may differ due to rounding.					

6.10 Process Evaluation Summary and Findings

The AR TRM v8.1 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the program in the context of these requirements.

Table 6-21 Determining Process Evaluation Timing

Variable Name	Variable Type
New and Innovative Components	No. Program offering has been consistent with past evaluations.
No Previous Process Evaluation	No. The program received a process evaluation in PY2017
Less than Expected Energy Savings or Accomplishments	No. OG&E weatherization offerings have exceeded energy savings expectations in prior years.
Participant Reported Problems or Low Participant Satisfaction	No. There have been few reported incidences of customer dissatisfaction for OG&E weatherization offerings.
New Vendor or Contractor	No. The program continues to be implemented by OG&E and uses installation contractors who were previously involved in the joint Consistent Weatherization Approach Program.
Energy Savings are being Achieved Slower than Expected	No. Energy savings are being achieved at a rate that is consistent with program expectations.

Table 6-22 Determining Process Evaluation Conditions

Component	Status
Impact problems	No. Savings for OG&E weatherization offerings are not substantially lower than expected for most measures although M&V activities will verify the accuracy of savings estimates and TRM guidelines.
Informational/educational objectives	Addressed. The participant surveys for the OG&E weatherization offering in the past determined that customers are more aware of energy efficiency options and energy-saving methods after participating.
Participation problems	No. The prior OG&E weatherization offering gained substantial customer participation during its initial years and is expected to continue to perform at or above participation targets.
Operational challenges	None identified thus far.
Cost-effectiveness issues	No. The program is designed to implement the most cost-effective measures for each participating customer, and historical cost-effectiveness for the OG&E weatherization offering has been adequate.
Negative feedback	No. Response to the OG&E weatherization offering has been highly positive.
Market effects	Addressed. Staff interviews and contractor interviews determined that the OG&E weatherization offering resulted in minor market effects where contractors promote energy saving measures to the broader customer market.

Based on these criteria, the CWA program received a limited process evaluation in PY2020.

6.10.1 Data Collection Activities

As part of the PY2020 evaluation of the CWA, the Evaluators completed an in-depth interview with the program manager from OG&E. The Evaluators used the information gleaned in this interview to identify program updates or changes experienced in PY2020 compared to available documentation. Further, these interviews explored energy efficiency staff roles and responsibilities, program communications and marketing, and the overall program delivery processes in place during PY2020.

Telephone surveys were completed with CWA participants. Surveys collected process evaluation information, including gathering respondent feedback on program communication and offerings, evaluating changes in participant energy efficiency awareness and behaviors due to program participation, and verifying measure installation. The survey also collected household characteristics and limited demographic information. The Evaluators received, and reviewed program population data queried from tracking data received through Frontier

Associates. The program tracking data provides contact information on participating customers and measure descriptions of equipment installed through the program.

The Evaluators surveyed 83 participants from a survey sample of 600 participants. This sampling strategy was designed to achieve an overall 90/10 level of precision at the program level. The final sample distribution and response rate for this survey can be found in Appendix C.

Table 6-23 below summarizes the survey and interview data collection for the PY2020 program evaluation, including data collection type and number of respondents.

Table 6-23 Interview and Survey Data Collection Summary

Target	Component	Activity	n	Precision	Details
Program Staff	OG&E Program Staff	Interview	1	N/A	The program manager and operational staff are responsible for coordinating program data, managing program resources, directing installation contractors, and communicating with OG&E or AOG staff as needed during the program process.
Program Participants	Telephone Survey	Survey	83	±7.8%	This consisted of a satisfaction questionnaire and a series of questions related to program and energy efficiency awareness and engagement.

6.10.2 Process Results and Findings

This section presents the results and key findings from the process evaluation activities. These findings are based upon interviews with utility staff, implementation staff, and surveys with participating customers. The findings presented pertain to program communications and marketing, program delivery, participant energy efficiency awareness and behaviors, and customer characteristics.

6.10.3 Program Delivery

The primary focus for the PY2020 process evaluation was on two key program delivery items 1) identify program delivery aspects that may have changed within the past year and 2) verify that the actual program measures and equipment offered through the program were installed.

6.10.4 Program Staff Interview

CWA was managed internally by OG&E CWA staff which includes marketing, data collection, incentivizing for contractors, reporting, and quality assurance. In PY2020 a low-income component was added to the program to comply with Act 1102. OG&E staff stated that there are sufficient resources to meet the program goals. CWA achieved 81% of its goal despite being shut down for a quarter of the year. There were concerns earlier in the year about the pandemic's effect on meeting program goals, but the programs have performed well enough to negate those concerns.

The pandemic affected the goal attainment of the CWA Program due to the program being put on pause for one quarter. The pandemic impacted the frequency and method of communication between OG&E and their program contractors for the CWA. Communication was mainly conducted through increased frequency of web-conference or telephone calls.

OG&E staff said that the CWA Program has had trouble engaging customers for the last few years due to market saturation and, while it did not help, the pandemic did not significantly impact the program. The CWA involves in-home visits that were not well received by customers during the height of the pandemic.

OG&E staff worked internally to market the CWA Program using email, mailers and bill inserts, radio ads, online banner ads, social media, and encouragement of word of mouth referral by past participants. OG&E staff are generally pleased with marketing efforts but feels that their market is heavily saturated, and a possibly more robust marketing effort will be required to maintain goal attainment. OG&E offered no trainings in 2020 due to the pandemic.

CWA's program data administer is Frontier Associates. OG&E staff are satisfied with their data administer. OG&E staff conducts field quality checks and program staff verifies 10% of the work done by its Trade Allies. Data quality QA/QC did not change in 2020 compared with past years.

6.10.5 Participant Survey

The Evaluators spoke to 83 program participants from a random sample of 600 participants. All 83 program participants were funded at least in part by OG&E.

6.10.5.1 Program Awareness

OG&E's marketing of its CWA is driven primarily by word of mouth (34%). Other sources of awareness include mailed information from the Utility (29%), Utility Website (9%), radio ad (9%), contractor (2%), and social media (2%).

Table 6-24 CWA Source of Awareness

How did you first learn about the program?	Percent of Respondents (n = 83)
Word of Mouth from friends, relatives, or others	34%
Mailed information from utility	29%
Radio/TV ad	9%
Utility website	9%
Completion of a utility online energy assessment	5%
Contractor	2%
Utility program staff	2%
Social media (Facebook, Instagram, Twitter)	2%
Email from utility	1%
Newspaper or magazine article/ad	1%
Web search (Google)	1%
Other	4%
Don't Know	1%

6.10.5.2 Reasons for Participation

Respondents were asked about their primary motivations for becoming involved with this program. Reduce monthly bill (46%), saving energy (38%), and program paid for improvements (13%) were the other top motivations for program involvement. Other reasons for participating included that improve value of the home, helping the environment, and recommended by others. Some respondents noted that there were multiple reasons for their involvement in the program. All responses are summarized in Table 6-25 below.

Table 6-25 CWA Reasons for Participation

Why did you decide to participate in the program?	Percent of Respondents (n = 83)*
To reduce my monthly utility bill	46%
Save Energy	38%
The program paid for the improvements	13%
To improve the value of your home	9%
To help the environment or because it was the right thing to do	8%
A friend, relative, or neighbor recommended it	7%
A contractor recommended it	2%
Other	10%
*Sum greater than 100% due to multiple responses per respondent	

6.10.5.3 Home Energy Assessment

The CWA includes a home energy assessment. A series of questions were asked of respondents to determine their experience and satisfaction with the energy assessment received. Ninety-four percent of respondents reported receiving an assessment.

Respondents were asked about the experience during their home assessment. Fifty-seven percent of respondents stated that the assessor asked if there were any specific issues that the participant wanted to address. Additionally, sixty-six percent stated that the assessor provided an energy assessment report with energy efficiency recommendations, and seventy-one percent discussed potential energy savings based on recommendations. Respondents' experiences are summarized in Figure 6-4.

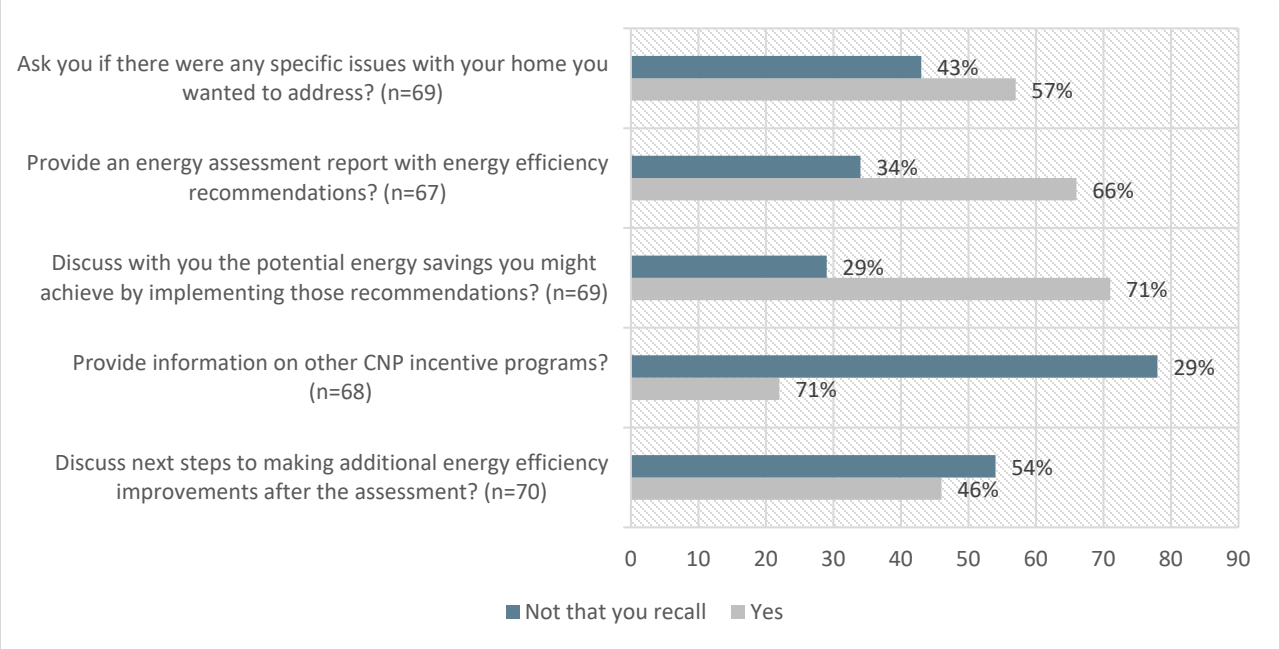


Figure 6-4 Home Energy Assessment Customer Experience

Those interviewed were asked a series of questions if they made the energy efficient improvements recommended in the home energy assessment. Ninety percent of respondents made all the energy efficiency improvements that were recommended throughout the program. Ten percent did not make all the recommended energy efficiency improvements.

The respondents were asked to rate how helpful the home energy assessment report that they received was on a scale of one to five, one being not at all helpful and five being very helpful. Ninety-six percent believed the report to be helpful.

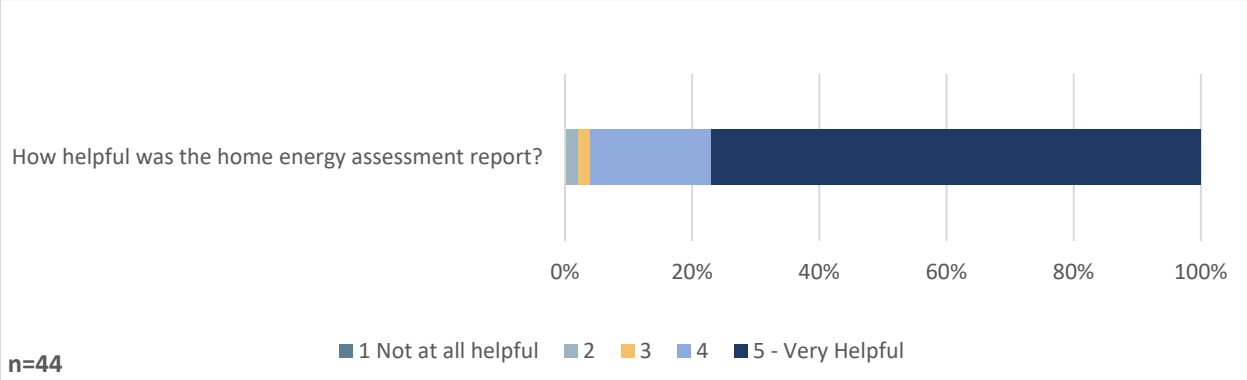


Figure 6-5 Home Energy Assessment Report Rating

6.10.5.4 Satisfaction

Customer feedback was generally positive about a variety of aspects of the program. Respondents were asked to use a scale of one to five, where one is “very dissatisfied” and five is “very satisfied”. Ninety-seven percent of respondents were either “very satisfied” or “satisfied” with the program overall, while three percent of respondents reported neutral feeling about the program.

Ninety-seven percent reported that they were “very satisfied” or “satisfied” with the performance of the equipment installed or the energy efficient improvements that were made, 3% percent reported a neutral opinion of the energy efficient upgrades.

Those surveyed were asked about their satisfaction levels about OG&E as their utility company. Ninety-nine percent responded that they are “very satisfied” or “satisfied” with OG&E as their utility provider, one percent reported neutral feelings about OG&E as their utility provider.

The respondents were also asked general satisfaction questions about OG&E and the programs on a scale of one to five where one is “completely disagree” and five is “completely agree”. Ninety-eight percent responded that they believe OG&E is a trusted resource for information on saving energy, two percent reported neutral feelings on the matter. Ninety-seven percent reported that they would recommend the OG&E weatherization program to other customers who want to save energy, and three percent were neutral. The findings on satisfaction are exhibited in Figure 6-6.

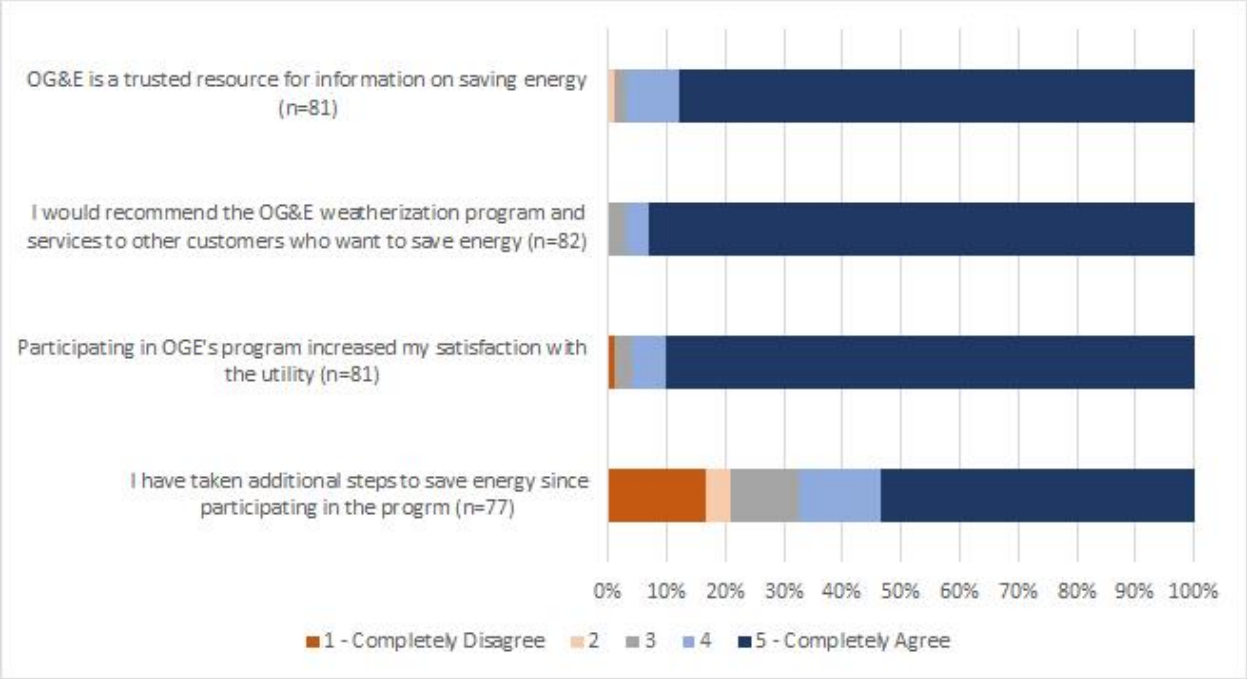


Figure 6-6 CWA Agreement & Disagreement Statements

6.10.5.5 Demographics

Respondents were additionally asked a series of questions related to demographic information. Eighty-one percent of respondents own the property that participated in the weatherization program, eighteen percent rent the property, and one percent own and rent the property to someone else.

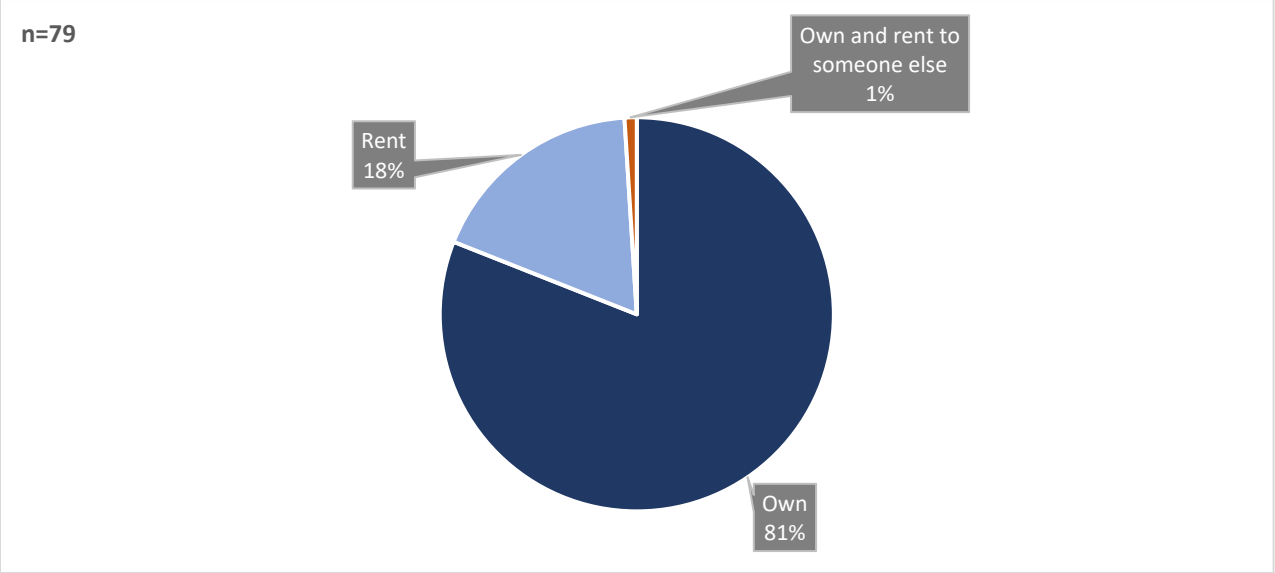


Figure 6-7 Home Ownership

Fifty-three percent reported that natural gas is the main fuel used to heat their home, forty-three percent reported electricity, and one percent reported propane as the main source used for heat. Fifty-three percent stated that natural gas is the fuel used in the main water heater, forty-six percent claimed electric, and one percent said propane. Table 6-26 summarizes the age brackets of survey respondents.

Table 6-26 Age of Respondents

What is your age?	Percent of Respondents (n = 80)
18-24	0%
25-34	23%
35-44	18%
45-54	12%
55-64	17%
65-74	17%
75+	10%
Prefer not to answer	4%

If a respondent stated an age grouping less than sixty-five, they were then asked if there were any occupants in their home that are sixty-five or older. None out of the of seventy-four respondents had at least one occupant aged sixty-five or older in their home.

Table 6-27 Residents Over Sixty-Five

Is any member of your household age 65 or older?	Percent of Respondents (n =74)
Yes	0%
No	100%

Respondents were asked to identify the total number of occupants in their home. Based on this response, respondents were then asked a "yes or no" question addressing whether their income level was above or below a pre-specified value that maps to 150% of the Federal Poverty Line given their number of occupants. This survey approach was taken with the intent of mitigating refusal rates from survey respondents to income questions (which in past evaluations have been as high as 90%). The occupancy level, income cut-off, and percent indicating below this cutoff are summarized in Table 6-28.

Table 6-28 Household Size/Income

How many occupants live in your home?	Percent of Respondents (n = 75)	Income Cut-off (150% of FPL)	Percent of Respondents Below Threshold
1 person	15%	$18,735	1% (n=11)
2 people	41%	$25,365	16% (n=31)
3 people	17%	$31,995	38% (n=13)
4 people	9%	$38,625	57% (n=7)
5 people	12%	$45,225	56% (n=9)
6 people	5%	$51,885	50% (n=4)
7 people	0%	$58,515	N/A (n=0)
8 or more people	0%	$65,145	N/A (n=0)
Don't know	3%	N/A	N/A
Prefer not to answer	3%	N/A	N/A

6.11 Adherence to Protocol A

The EnerTrek database system managed by Frontier Associates includes a full list of all OG&E-AOG Weatherization Program participants, the measures that were installed in their homes, and the kWh and therms savings associated with each measure.

During PY2020, the Evaluators received quarterly tracking data updates as well as final tracking exports. The EnerTrek system was updated to include necessary inputs as per AR TRM v8.1. Other than these updates, there were no major updates to the structure or content of program tracking data. The Evaluators previously reviewed program tracking data in PY2019 to assess its compliance with Protocol A of the AR TRM v8.1 which specifies that tracking data should be checked for:

- Participating Customer Information;
- Measure Specific Information;
- Vendor Specific Information;
- Program Tracking Information;
- Program Costs; and
- Marketing & Outreach Activities.

The Evaluators conducted a review of each of the above factors within PY2020 tracking data except for marketing and outreach activities as these are outside the scope of EnerTrek reporting.

6.11.1 Customer, Premise, Cost, and Vendor Information

Each of these factors was assessed individually based on the guidelines stated in AR TRM v8.1. Overall, the Evaluators conclude the following regarding tracking data completeness:

- Participating customer information was complete for nearly all participants. This included Job IDs, telephone numbers, addresses, full names, and utility account numbers for OG&E and AOG.
- Starting in PY2020, OG&E is tracking eligibility for the low-income component of CWA. Tracking database tracks if participants are 65 or older and low income eligibility.
- All participant records included the name of the contractor who performed the weatherization services as well as the invoice date and weatherization date.
- Tracking data included the measure and project costs for each home.
- As with the prior program year, premise characteristics such as home heating type, cooling type, and ceiling square footage were present for all participants where appropriate and needed. However, 525 participants were listed as having a water heating type of “N/A”. This also occurred in PY2019, although the water heater type was included for all participants who received at least one of the water heater measures, which include, water heater jackets, water heater pipe insulation, low-flow showerheads, and faucet aerators.

6.11.2 Measure Specific Information

The content of tracking data was found to include sufficient information for all measures in PY2020.

6.11.3 Consistent Weatherization Approach Metrics

Table 6-29 CWA Metrics for the PY2020 Evaluation

Metric	Value
Program Name	Consistent Weatherization Approach
CWA Implementation	Yes
Total Audits Completed	1,184
Total Submitted Projects	1,184
Conversion Rate	100%
Measures installed per-project	6.4
Cost per participant	$1,967.57
Percent of contractors promoting program	100% (3 Contractors)

6.12 Progress on PY2019 Evaluation Recommendations

OG&E responded to the Evaluators' PY2019 recommendations. The status of these recommendations is summarized in Table 6-30.

Table 6-30 Status of Recommendations from PY2019 Evaluation

2019 Recommendations	Status	Comment
Several measures require weather dependent calculations. By providing weather zones used for savings calculations in the tracking data, savings estimations can be more accurate. Add weather zones to tracking data.	Complete	OG&E has collected and added weather zones to the CWA database.
Analyze evaluation results to identify trends among Act 1102 customers or seek referrals from this subset.	Not applicable	The program is currently successful in its pilot phase. OG&E will review participation results as needed to meet program goals.

6.13 Planned Program Changes

The CWA added the Low Income Pilot in PY2020. This provides enhanced services to low income and elderly customers, installing health and safety measures in addition to CWA measures.

6.14 Conclusions and Recommendations

6.14.1 Conclusions

The key conclusions from the PY2020 process and impact evaluations of the CWA are as follows:

- **Continued Cross-Fuel Coordination:** OG&E coordinates successfully with AOG, ensuring appropriate co-funding of projects served by both utilities. In prior years, AOG would typically expend their budget by September, with the result being a full quarter of OG&E servicing homes with AOG gas service without AOG funding (resulting in a high degree of cross-fuel NEBs). In PY2020, CWA program budgets for both utilities were under-utilized, and thus projects were jointly funded throughout the entirety of the program year.
- **CWA Low Income Pilot:** OG&E's new pilot targets low-income residents. The Low Income Pilot supplements the CWA program measure offerings with health and safety (H&S) improvements.
- **Targeting of single family and duplexes:** OG&E staff have confirmed that the program presently only targets single family and multi-family up to four units that are separately metered. The program does not service mobile homes or multi-family properties.

6.14.2 Recommendations

The CWA was very successful in PY2020. The Evaluators identified few specific, systematic or persistent issues with program operation and design. As the utilities plan to continue offering similar services and maintaining their current operational structure under the program, consideration of the following recommendations may be useful moving forward:

- **Propane heating and water heating in not tracking data.** Propane heating is not directly tracked in the CWA database. Currently propane heating is calculated for participants recorded to have "none" as Gas Utility, and "gas heat" or "gas space heat" as Heating Type. Directly collecting propane heating on site will increase precision of propane related NEBs.

- **Expand low-income component to reach additional Act 1102 eligible customers.** 21% of CWA participants were flagged to be Act 1102 eligible. Expanding the low-income component of the program will help reach new participants in PY2021 and PY2022.

Table 6-31 presents the above items, outlining the relevant issue, potential consequences, and associated recommendations.

Table 6-31 Recommendations from PY2020 Evaluation

Issue	Consequences	Recommendation
Propane heating and water heating in not tracking data.	Reduced precision in propane related NEBs.	Add propane heating and water heating to database.
Expand low-income component to reach additional Act 1102 eligible customers.	Potential difficulty in satisfying new regulatory requirements.	Increase budget to reach additional Act 1102 customers.

7 Commercial Energy Efficiency Program (CEEP)

7.1 Evaluation Findings Overview

The verified *ex post* kWh and kW savings for the PY2020 CEEP are summarized by sampling stratum in Table 7-1. Overall, the gross *ex post* kWh savings of 20,134,899 kWh equals 101% of the *ex ante* savings for the program. The gross *ex post* kW impacts of 3,245 kW equals 102% of the *ex ante* savings.

Table 7-1 *Ex Ante* and *Ex Post* Gross kWh Savings by Sampling Stratum

Stratum Name	*Ex Ante* Gross kWh Savings	*Ex Post* Gross kWh Savings	Realization Rate - kWh	*Ex Ante* Gross kW Savings	*Ex Post* Gross kW Savings	Realization Rate - kW
C&I Solutions (Certainty)	3,948,188	4,062,686	103%	467	488	104%
C&I Solutions 1	2,591,703	2,631,737	102%	470	482	103%
C&I Solutions 2	3,504,323	3,583,143	102%	622	641	103%
C&I Solutions 3	3,995,183	3,566,541	89%	469	415	88%
SBS (Certainty)	102,118	102,118	100%	13	13	100%
SBS 1	517,866	517,921	100%	107	107	100%
SBS 2	588,141	588,140	100%	111	111	100%
SBS 3	549,865	550,470	100%	89	91	102%
SAGE (Certainty)	689,879	690,263	100%	99	99	100%
SAGE 1	437,083	472,763	108%	110	141	128%
SAGE 2	947,599	947,606	100%	235	235	100%
Midstream	1,857,304	2,195,538	118%	360	408	113%
CEI	204,962	184,500	90%	13	7	54%
RCx	40,841	41,472	102%	5	5	100%
Total	**19,975,055**	**20,134,899**	**101%**	**3,170**	**3,245**	**102%**
Sums may differ due to rounding.						

Table 7-2 and Table 7-3 present the net kWh and kW savings summary, by program channel, for the PY2020 CEEP, respectively.

Table 7-2 CEEP Net kWh Savings Summary

Channel	*Ex Ante* Gross kWh Savings	*Ex Post* Gross kWh Savings	Realization Rate - kWh	NTG	*Ex Post* Net kWh Savings
C&I Solutions	14,039,397	13,844,107	99%	100%	13,844,107
SBS	1,757,990	1,758,649	100%	100%	1,758,649
SAGE	2,074,561	2,110,632	102%	100%	2,110,632
Midstream	1,857,304	2,195,538	118%	100%	2,195,538
CEI	204,962	184,500	90%	100%	184,500
RCx	40,841	41,472	102%	100%	41,472
Totals	**19,975,055**	**20,134,899**	**101%**	**100%**	**20,134,899**
Sums may differ due to rounding.					

Table 7-3 CEEP Net kW Savings Summary

Channel	*Ex Ante* Gross kW Savings	*Ex Post* Gross kW Savings	Realization Rate - kW	NTG	*Ex Post* Net kW Savings
C&I Solutions	2,028	2,027	100%	100%	2,027
SBS	321	323	101%	100%	323
SAGE	444	475	107%	100%	475
Midstream	360	408	114%	100%	408
CEI	13	7	54%	100%	7
RCx	5	5	103%	100%	5
Totals	**3,170**	**3,245**	**102%**	**100%**	**3,245**
Sums may differ due to rounding.					

Table 7-4 outlines the verified *ex post* lifetime energy (kWh) savings by channel for the PY2020 CEEP.

Table 7-4 CEEP Gross and Net Lifetime Savings by Channel

Channel	*Ex Post* Gross Savings (kWh)	*Ex Post* Gross Lifetime Energy Savings (kWh)	NTG	*Ex Post* Net Lifetime Savings (kWh)
C&I Solutions	13,844,107	207,943,329	100%	207,943,329
SBS	1,758,649	23,670,222	100%	23,670,222
SAGE	2,110,632	30,103,251	100%	30,103,251
Midstream	2,195,538	27,761,840	100%	27,761,840
CEI	184,500	184,500	100%	184,500
RCx	41,472	414,719	100%	414,719
Totals	**20,134,899**	**290,077,860**	**100%**	**290,077,860**
Sums may differ due to rounding.				

Additional details on the evaluation of the CEEP are provided in the following sections.

7.2 Program Overview

The CEEP provides financial incentives to all commercial and industrial (C&I) customers and includes five channels to participation. The channels are designed to maximize participation among the C&I customer base.

The program seeks to combine the provision of financial inducements with access to technical expertise to maximize program penetration across the range of potential C&I customers. The primary goal of the program is to generate energy and demand savings for large and small commercial and industrial customers through the promotion of high efficiency electric end-use products including (but not limited to): lighting, retrofit of existing equipment, and HVAC replacement. The program provides OG&E's C&I customers with flexibility in choosing how to participate, either self-sponsoring or by working through a third-party service provider to leverage technical expertise. The program has the following additional goals:

- Increase customer awareness of applicable energy saving measures;
- Achieve customer cost savings;
- Increase the market share of commercial grade high efficiency technologies sold through market channels; and
- Increase the installation rate of high efficiency technologies in C&I facilities by businesses that would not have done so absent the program.

The program offers prescriptive incentives for electric energy efficiency equipment upgrades and improvements. Incentives are provided for qualified equipment installed as a retrofit or equipment replacement, and as new construction or major refurbishment. The program also

offers incentives for custom measures that are not included in the program as prescriptive measures.

Energy savings from prescriptive measures are calculated using deemed values and savings algorithms provided in the AR TRM v8.1. Savings from custom projects are calculated using various methods, including on-site monitoring, engineering calculations, whole building energy modeling, billing data regression analysis, etc. Custom projects may use some deemed values from the TRM, but do not necessarily follow savings algorithms.

In 2020, the CEEP was implemented with five program channels. These include:

- **C&I Solutions**: The Large C&I channel of CEEP offers incentives to customers with a peak demand of greater than 150 kW at a single site. Incentives are paid directly to customers who install energy efficient equipment. This channel focuses on five key areas; lighting, retrofit of existing equipment, new constructions built above minimum building code, high efficiency industrial equipment, and HVAC replacement. The Large C&I channel is the largest of the five channels offered through CEEP. In P2020, this channel accounted for 70% of *ex ante* savings. There were 12 custom projects in the Large C&I channel in PY2020, accounting for 42% of *ex ante* channel savings.
- **Small Business Solutions (SBS)**: This channel offers incentives to customers with a peak demand of less than 150 kW at a single site, for lighting audits and equipment installation through approved Trade Allies. During PY2020 this channel accounted for 9% of program *ex ante* savings. No custom projects were incentivized through this channel.
- **Schools & Governmental Entities (SAGE)**: The SAGE channel of CEEP is marketed towards public school districts, private schools, universities and colleges, and all government agencies. This channel includes financial incentives for both lighting and non-lighting measures and both prescriptive and custom projects. The Schools & Governmental channel was the second largest offered through CEEP. In PY2020 this channel accounted for 10% of *ex ante* savings.
- **Midstream**: The Midstream channel of CEEP encourages customers to participate by providing point of sale (POS) discounts on selected products through local lighting distributors. Through this channel, the financial incentives are paid to the lighting distributor to allow reduced costs for the end customer. Energy savings associated with the Midstream channel are calculated using custom calculations developed by the program implementer, CLEAResult. The custom calculations are based on the mix of facility types in the OG&E service territory to determine baseline lamp wattages and the distribution of facility types which allows for deemed hours from the AR TRM v8.1 to be

applied to local market conditions. The combination of baseline lamp wattages blended deemed annual operating hours, and program tracking data of actual counts and wattages of lamps sold allow for custom savings calculations to be performed. This channel accounts for 9% of program *ex ante* kWh savings.

- **Continuous Energy Improvement (CEI)**: In PY2020 the CEEP is offering a behavioral program as an additional channel for participation which was a continuation from prior program years. PY2020 was the first year the CEI program was offered as more than a pilot program. Two customers participated in the CEI program. The CEI is a 36-month behavioral program that provides energy conservation training to all levels of employees within a customer's organization with a focus on low/no cost savings opportunities. The program also offers a facility wide assessment of energy usage and provides customers with continuous energy usage monitoring. PY2020, this channel accounted for 1% of program *ex ante* savings.
- **Retro-Commissioning (RCx)**: In PY202 the CEEP the Retro-Commissioning program is designed to make low to no cost energy efficiency measures. PY2020 was the first year this channel was offered. During PY2020, the RCx channel had one participant. This channel accounted for .20% of program *ex ante* savings.

CLEAResult was contracted to implement all channels of CEEP for PY2020. CLEAResult was responsible for program planning, development of marketing material, quantifying *ex ante* energy savings estimates and paying appropriate incentives to customers. CLEAResult also identified and approved Trade Allies and distributors for participation in the SBS and Midstream Lighting channels of the program. For PY2020, service providers (Trade Allies and distributors) were recruited to participate by submitting rebate applications on behalf of customers implementing qualifying energy efficiency measures.

The results of the M&V efforts for the program are intended to provide ±10% precision at the 90% confidence interval for the overall program based upon site-by-site verification activities. In PY2020, the CEEP resulted in 245 projects being implemented through the program channels. The reported performance of the program is summarized in Table 7-5. The projects completed during PY2020 resulted in a gross *ex ante* savings of 19,975,055 kWh and a peak demand reduction of 3,170 kW. In PY2020 CEEP had $2,371,305 in incentive spending.

Table 7-5 OG&E's PY2020 CEEP Program Summary

Channel	Number of Projects	*Ex Ante* Gross kWh Savings	*Ex Ante* Gross Peak kW Savings	Percent of kWh Savings
C&I Solutions	87	14,039,397	2,028	70%
SBS	103	1,757,990	321	9%
SAGE	21	2,074,561	444	10%
Midstream	29	1,857,304	360	9%
CEI	4	204,962	13	1%
RCx	1	40,841	5	0.20%
Total	**245**	**19,975,055**	**3,170**	**100%**
Sums may differ due to rounding.				

Figure 7-1 below shows the gross *ex ante* savings and completed projects by month for the PY2020 CEEP. The C&I Solutions channel accounted for the largest portion of the reported *ex ante* savings, with the 87 projects totaling 14,039,397 kWh, 70% of the overall program savings. The highest savings during PY2020 occurred during the month of March with only 36 projects being paid, resulting in 5,742,674 kWh. During this month, one participant accounted for 3,948,188 kWh. That was the largest single project in PY2020. The second highest savings during PY2020 occurred during the month of October with 50 projects being paid, resulting in 2,725,105 kWh in *ex ante* savings.

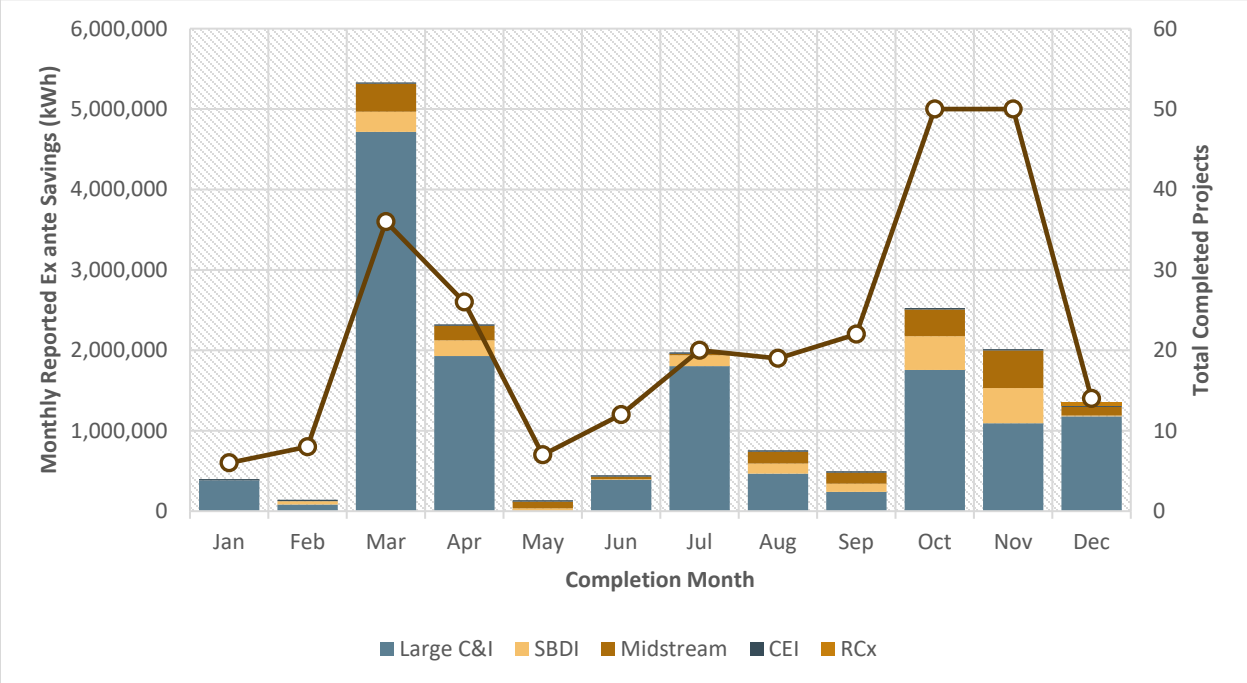


Figure 7-1 PY2020 CEEP Savings and Project by Month

As shown in Figure 7-2, CEEP had participation in seven measure categories: lighting retrofit, custom, lighting new construction, HVAC, CEI, Refrigeration, and RCx. The lighting retrofit measure was the single highest contributor to ex ante savings, accounting for 13,000,975 kWh, 65% of the program savings. Custom projects including air compressors, injection molding machines and VFDs accounted for 5,711,568 kWh, 29% of the program savings. The new construction lighting accounted for 466,412 kWh, 2% of the program savings.

Table 7-6 Contribution Savings by Measure Type per Channels

Measure Types	C&I Solutions	SBS	SAGE	Midstream	CEI	RCx	Total	% Total
Lighting Retrofit	7,675,177	1,685,259	1,783,235	1,857,304	0	0	13,000,975	65%
Custom	5,704,919	0	6,649	0	0	0	5,711,568	29%
Lighting NC	421,737	0	44,675	0	0	0	466,412	2%
HVAC	181,065	0	240,002	0	0	0	421,067	2%
CEI	0	0	0	0	204,962	0	204,962	1%
Refrigeration	56,499	72,731	0	0	0	0	129,230	1%
RCx	0	0	0	0	0	40,841	40,841	0.2%
TOTAL	**14,039,397**	**1,757,990**	**2,074,561**	**1,857,304**	**204,962**	**40,841**	**19,975,055**	**100%**
Sums may differ due to rounding.								

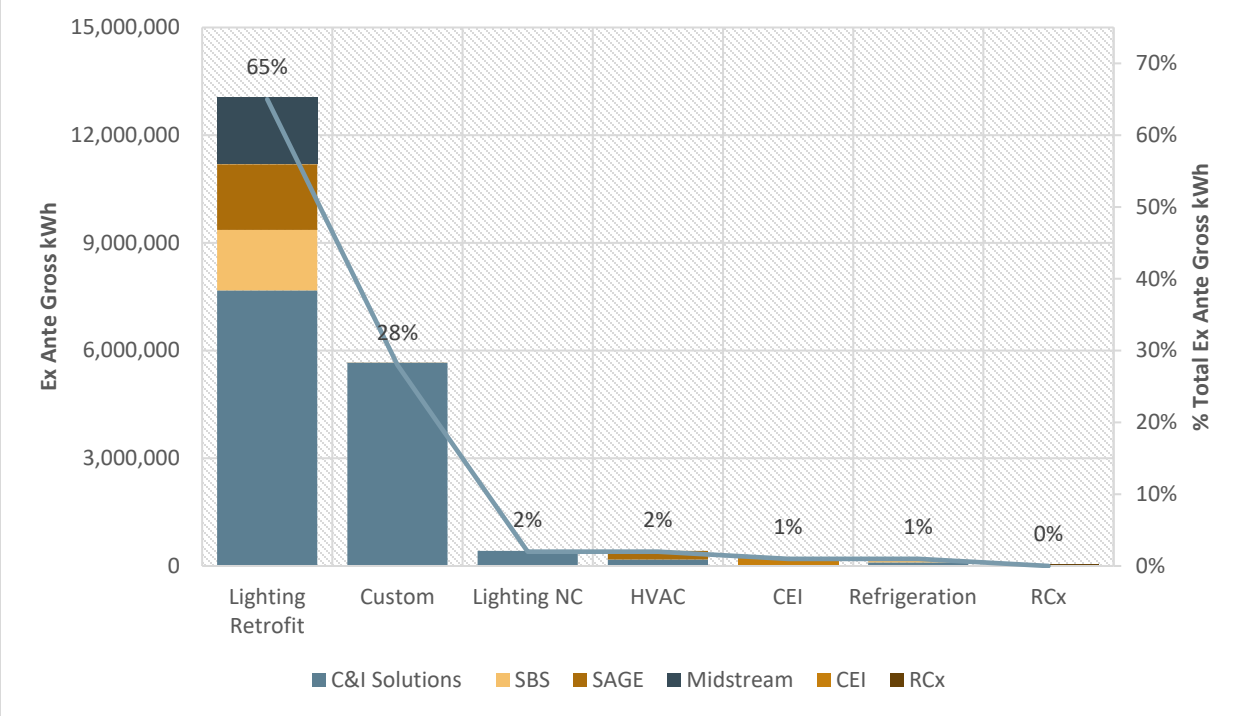


Figure 7-2 Contribution to Savings by Measure

7.3 Gross Impact Evaluation Approach

The evaluation of gross energy savings and peak demand reduction from projects rebated through the CEEP can be broken down into the following steps:

- First, CLEAResult's tracking database was reviewed to determine the scope of the program and to ensure there were no duplicate entries. The tracking database was used to define a discrete set of rebated projects that made up the PY2020 program population. A random sample of projects was then drawn from the population established in the tracking system review. For the PY2020, a total of 55 projects from the C&I Solutions, SBS, SAGE, and RCx program channels were selected for the M&V sample. For the Midstream and Continuous Energy Improvement channels, a database review resulted in a census of projects being reviewed.
- Next, a detailed desk review was conducted for each project sampled for measurement and verification. The desk review process includes a thorough examination of all project materials including invoices, equipment cut sheets, pre- and post-inspection reports, and estimated savings calculators. This review process informed the Evaluators' fieldwork by identifying potential uncertainties, missing data, and sites where monitoring equipment was needed to verify key inputs to the reported savings calculations. Additionally, the review process involved assessing the reasonableness of deemed savings values given in the AR TRM v8.1[47] and calculation input assumptions.
- After reviewing the project materials, detailed desk reviews of the sampled projects in the C&I Solutions, SBS, SAGE, and RCx channels were completed. In a typical year, site visits and on-site verifications would be completed of these sites, however due to the COVID-19 pandemic, site verification was reserved for only custom measure sites when there was missing information in the project documentation.
- Next, the project documents that were reviewed during the desk reviews were used to revise savings calculations, as necessary. For example, if the reported savings calculations relied on certain measure operating hours that were determined inaccurate based on the facility type or the facilities' actual schedule (determined through on-site monitoring), changes were made to reflect actual operating conditions more accurately.
- For the Midstream channel, no on-site inspections were conducted. Instead, the Evaluators reviewed the implementation contractor's database to determine

[47] Many of the deemed or prescriptive *ex ante* savings are based on algorithms provided in the Arkansas TRM, v8.1.

methodologies and assumptions used to determine *ex ante* savings. For this channel, *ex post* savings are determined through the database review process. A more detailed description of the methodology used to determine *ex post* savings for the Midstream channel is included in the following sections.

- For the CEI channel, no on-site inspections were conducted. Instead, the Evaluators conducted whole facility analysis using utility billing regression.
- For the RCx channel, no on-site inspections were conducted. Instead, the Evaluators conducted desk reviews of implementer provided project documentation.
- Finally, after determining the *ex post* savings impacts for each sampled project, results were extrapolated to the program population using project specific sampling weights. This allows for the estimation of program level gross *ex post* energy (kWh) savings with a given amount of sampling precision and confidence. For the CEEP, the sample was designed to ensure ±10% or better relative precision at the 90% confidence level for kWh savings.

7.4 Midstream Impact Evaluation Activities

Ex post savings from the Midstream channel were determined through a review of the database used by CLEAResult for tracking lamps and fixtures sold through the program. The Midstream channel accounted for 9% of CEEP *ex ante* savings. Because of the relatively small amount of savings associated with this channel, the M&V effort was focused on a review of the *ex ante* model used to determine savings. In PY2020, the evaluator used the average in-service rate (ISR) from the previous year for the *ex post* savings model.

The model used to determine *ex ante* savings associated with the Midstream lighting channel uses several sources to determine typical baseline lamp wattage, annual operating hours (AOH), coincident factors (CF), and mix of facility types to allow for calculation of energy savings. Baseline lamp wattages were determined using data from the “2010 U.S. Lighting Market Characterization” study published by the US Department of Energy in January 2012. The results of this study allow for the determination of the number of lamps installed in specific facility types and the energy usage associated with those lamps. This study did not include LED lamps as the research was conducted in 2010 when LEDs had a lower market share.

The annual operating hours, coincidence factors, and facility types were determined using the deemed values provided in the AR TRM v8.1. The 2012 version of the “Commercial Buildings Energy Consumption Survey (CBECS)”, published by the U.S. Energy Information Administration was used to determine the total floor space of commercial buildings, by facility type, in the service territory. The data from the CBECS allowed for CLEAResult to develop a weighted average AOH and CF. Combining these data with the baseline wattage data allowed the models

to estimate a weighted average baseline wattage, AOH, and CF for each lamp type included in the program.

In future years, the Evaluators will employ an engineering analysis to determine the *ex post* verified energy savings. The verified energy savings per fixture or lamp will be calculated with methods developed by the Evaluators and consistent with chapter 6 of *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. The calculations will use the following equations:

$$Annual\ kWh\ savings = \left(\frac{(Wbaseline\ - Wmeasure) * HOU_{annual} * HCIF}{1000}\right)$$

$$Peak\ kW\ savings = \left(\frac{(Wbaseline\ - Wmeasure) * HOU_{annual} * HCIF * CF}{1000}\right)$$

Where:

$W_{baseline}$	= baseline wattage per category determined from sales data supplied by CLEAResult and verified by the Evaluators.
$W_{measure}$	= measure wattage as determined by the average for that measure category in the current program year. This will be calculated based on Point of Sale (POS) data for each program year and will be adjusted as necessary to reflect actual lamps sold.
1000	= conversion factor for Watts per kW
HOU_{annual}	= annual hours of use, calculated using *ex ante* model values
HCIF	= "Heating & Cooling Interactive-effects Factor", determined using deemed values from the appropriate version of the TRM and weighted average facility types.
CF	= Coincidence factor, a ratio between 0.0 and 1.0 that adjusts the change in connected electric load from lighting efficiency projects for electric peak demand savings. CF will be calculated using *ex ante* model values.

7.5 Impact Evaluation Data Collection Activities

Data for the evaluation were collected through review of program materials, on-site inspections (in typical years, in PY2020 on-site inspection did not occur due to COVID-19), end-use metering, and interviews with participating customers and service providers. Based on program tracking data provided by CLEAResult, sample design was developed for M&V data collection.

The central program database, where program activities are tracked, and project documentation is stored, was developed and managed by CLEAResult. The verification and data collection samples were drawn to provide gross impact estimates with ±10% precision or better at the 90% confidence level for the overall program.

Desk reviews of project documentation were used to collect data for gross impact calculations (Site visits were not completed due to COVID-19), to verify measure installation, and to determine measure operating parameters. Typically, projects would be selected for on-site inspections at random, except for those with a higher level of uncertainty (custom sites, etc.). After receiving and reviewing the provided project documentation, if it was determined that the measures or *ex ante* calculations had a higher level of uncertainty, due to the COVID-19 Pandemic, the Evaluators made the decision to conduct an on-site visit on a case by case basis. There were no site visits performed in PY2020. The evaluator was prepared to conduct site level interviews for the sampled projects when sufficient project documentation was not available. In PY2020, no site interviews were needed since all sampled projects had sufficient project documentation. To ensure proper sampling and to supplement sites evaluated through on-site visits, desk reviews (total of 55) were performed on remaining sites included in the M&V sample. When deemed values were used to determine *ex post* energy savings, including equivalent full load hours for heating and cooling projects, or annual operating hours for lighting projects, the Evaluators referred to the AR TRM v8.1.

Table 7-7 below shows the sample design that was used. The 55 projects that were sampled for measurement and verification in the Large C&I, SBS, SAGE, and RCx channels account for approximately 44% of reported *ex ante* kWh savings within these channels. With the inclusion of the census of Midstream Lighting projects and CEI that received M&V, the total program sample accounts for 53% of program *ex ante* savings.

Table 7-7 Sample Design

Stratum Name	Ex ante Gross kWh Savings	Strata Minimum (kWh)	Strata Maximum (kWh)	Population of Projects	Design Sample Size	Desk Review	Site Visit
Large C&I (Certainty)	3,948,188	1,000,000	N/A	1	1	1	0
Large C&I 1	2,591,703	0	150,000	65	16	16	0
Large C&I 2	3,504,323	150,000	430,000	15	7	7	0
Large C&I 3	3,995,183	430,000	1,000,000	6	2	2	0
SBS (Certainty)	102,118	100,000	N/A	1	1	1	0
SBS 1	517,866	0	15,000	66	10	10	0
SBS 2	588,141	15,000	40,000	28	6	6	0
SBS 3	549,865	40,000	100,000	10	4	4	0
SAGE (Certainty)	689,879	200,000	N/A	2	2	2	0
SAGE 1	437,083	0	200,000	12	4	4	0
SAGE 2	947,599	200,000	300,000	7	2	2	0
Midstream	1,857,304	N/A	N/A	29	Census	Census	0
CEI	204,962	N/A	N/A	2	Census	Census	0
RCx	40,841	N/A	N/A	1	Census	Census	0
Total	**19,975,055**			**245**	**55**	**55**	**0**
Sums may differ due to rounding.							

In addition to the desk review activities, in-depth interviews with OG&E and implementation staff members, as well as customer surveys were conducted to provide additional perspectives for the process evaluation. Table 7-8 shows the achieved sample sizes for the different types of data collection employed for this study.

Table 7-8 Sample Sizes for Data Collection Efforts

Data Collection Activity	Sample Size
On-Site M&V visits	0
Desk Review of Project Documentation	55
In-depth Interviews with Implementation Staff	1
In-depth Interviews with Program Staff	1

The achieved sampling precision for CEEP is ±6.4%

7.6 Gross Impact Evaluation Findings

The reported *ex ante* savings for CEEP was 19,975,055 kWh. The Evaluators found *ex post* gross savings of 20,134,899 kWh (101% gross realization). The *ex post* net savings was 20,134,899 kWh which was 120% of the program's net savings goal of 16,718,061 kWh.

The PY2020 sample resulted in *ex post* gross kWh estimates with ±6.4% relative precision at the 90% confidence interval. *Ex post* gross energy savings were relatively close to the original reported values at the program level (101% gross realization rate).

The sample also resulted in *ex post* gross kW estimates with ±13.7% relative precision at the 90% confidence interval.

7.7 Large C&I Gross Impact Findings

The Large C&I channel accounted for the largest portion of *ex ante* and *ex post* energy savings. The Large C&I channel *ex ante* savings was 14,039,397 kWh, 70% of overall program- level savings. The *ex post* verified savings for Large C&I was 13,844,107 kWh and 2,027 kW, resulting in gross realization rates of 99% and 100%, respectively.

The M&V sampling frame for the Large C&I channel included 4 sampling strata. In PY2020, the majority of projects used a prescriptive approach so there was no need to separate custom and prescriptive lighting sampling separately. The certainty strata had one project (PRJ-2489173) reported a realization rate of 103%. This one project accounted for 28% of the *ex ante* claimed savings for the Large C&I channel. The third stratum has the lowest realization rate (88%). PRJ-2,495,972 reported a realization rate of 76%. This project represented 39% of the total *ex ante* savings in this stratum. The remaining two strata had 103% and 103% gross realization rates. The Evaluators randomly sampled 25 sites out of 92 participants in this channel.

7.8 SBS Gross Impact Findings

The SBS channel included an *ex ante* savings of 1,757,990 kWh, accounting for 9% of program-level savings. The *ex post* verified savings for SBS was 1,758,649 kWh (100% gross realization). The *ex post* peak demand savings for this channel were 323 kW (101% gross realization). It included four M&V strata with 21 sites being randomly sampled out of 105 participants.

7.9 SAGE Gross Impact Findings

The SAGE program channel had a total reported *ex ante* savings of 2,074,561 kWh, accounting for 10% of program-level savings. The *ex post* verified savings for SAGE was 2,110,632 kWh (102% gross realization). The Evaluators found an *ex post* peak demand reduction of 475 kW (107% gross realization).

SAGE included 21 total projects that were separated into three M&V sampling strata, with kWh realization rates of 108%, 100% and 100% for the three strata. Eight sites were randomly sampled out of 21 participants.

7.10 Midstream Gross Impact Findings

The Midstream channel accounted for 9% of program-level claimed savings and had *ex ante* savings of 1,857,304 kWh. This channel nearly doubled the savings compare to PY2019. The Evaluators determined *ex post* savings for this channel through a review of the implementation contractor's tracking database. The Evaluators reviewed the database to ensure there were no input errors or repeat entries and verified the savings were calculated as expected. The Evaluators found the implementer used installed bulb and fixture wattage based on the type of fixture where the Evaluators used the actual bulb/fixture wattage from the manufacturer's specification. This program channel had *ex post* verified savings of 2,195,538 kWh which is a 118% gross realization rate for kWh.

7.11 Continuous Energy Improvement Gross Impact Findings

The continuous energy improvement program channel was offered as a full program in PY2020, and it is accounted for 1% of the overall program claimed savings with *ex post* savings of 204,962 kWh. The Evaluators determined *ex post* savings for this channel through a billing regression analysis. The Evaluators found the calculations by program staff to be accurate, however these calculations did not include crossover participation. The Evaluators removed the savings that resulted from the cross participation in other programs. Removing the cross-participation savings resulted in a realization rate 90% for kWh and 54% for kW.

7.12 Retro Commissioning (RCx) Gross Impact Findings

The Retro Commissioning program channel was offered for the first time in PY2020, and it is accounted for 0.20% of the overall program claimed savings with *ex post* savings of 41,472 kWh. The evaluators performed a desk review of project documentation in order to review the sole participant of the RCx program channel. This program channel had an *ex post* verified savings of 41,472 kWh and 5 kW which resulted in realization rates of 102% and 103%.

7.13 Net Impact Evaluation Approach

Details on the CEEP NTG approach and results can be found in Appendix C Net-to-Gross Approach and Outcomes.

7.14 Net Impact Evaluation Findings

The Evaluators conducted new net-to-gross analysis in PY2020.

7.14.1 Large C&I

The Large C&I channel free-ridership was based on surveys was 0%.

Table 7-9 and Table 7-10 summarize the *ex post* gross net kWh savings and peak kW demand reductions of the channel. Net energy savings (kWh) totaled to 13,844,107 kWh and equal 100% of gross program channel level savings. Net peak demand reductions (kW) totaled 2,027 kW and equal 100% of *ex post* gross program channel peak demand reductions.

Table 7-9 Summary of Net Annual Energy Savings (kWh) – Large C&I

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate – kWh	NTG	*Ex post* Net kWh Savings
Large C&I	14,039,397	13,844,107	99%	100%	13,844,107

Table 7-10 Summary of Net Peak Demand Reductions (kW) – Large C&I

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate – kW	NTG	*Ex post* Net kW Savings
Large C&I	2,028	2,027	100%	100%	2,027

7.14.2 SBS

Table 7-11 and Table 7-12 summarize the realized net kWh savings and peak kW demand reductions of the SBS channel. Channel free ridership was based on surveys collected from the previous program year because there were no program changes for PY2020. Program channel free ridership (kWh) is estimated at 0%. Net energy savings (kWh) totaled 1,758,649 and equal 100% of gross program channel savings. Net peak demand reductions (kW) totaled 323 kW and equal 100% of realized gross program channel peak demand reductions. There was no spillover measured in PY2020.

Table 7-11 Summary of Net Annual Energy Savings (kWh) – SBS

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate – kWh	NTG	*Ex post* Net kWh Savings
SBS	1,757,990	1,758,649	100%	100%	1,758,649

Table 7-12 Summary of Net Peak Demand Reductions (kW) – SBS

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate – kW	NTG	*Ex post* Net kW Savings
SBS	321	323	101%	100%	323

7.14.3 SAGE

Table 7-13 and Table 7-14 summarize the realized net kWh savings and peak kW demand reductions of this program channel. The SAGE channel's free ridership was based on the PY2019 surveys and there were no program changes for PY2020. The program channel free ridership of 0% from PY2019 is applied in PY2020. Net energy savings (kWh) totaled to 2,110,632 kWh and equal 100% of gross program channel savings. Net peak demand reductions (kW) totaled 475 kW and equal 100% of realized gross program channel peak demand reductions. There was no spillover measured in PY2020.

Table 7-13 Summary of Net Annual Energy Savings (kWh) – SAGE

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate – kWh	NTG	*Ex post* Net kWh Savings
SAGE	2,074,561	2,110,632	102%	100%	2,110,632

Table 7-14 Summary of Net Peak Demand Reductions (kW) – SAGE

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
SAGE	444	475	107%	100%	475

None of the respondents reported that they installed additional spillover equipment with quantified energy savings because of the program.

7.14.4 Midstream

Channel free ridership was based on surveys collected from downstream respondents. The Midstream NTG will be re-examined in PY2021. In PY2020, the average in-service rate (ISR) from the previous program year was used in *ex post* calculations.

Table 7-15 and Table 7-16 summarize the realized net kWh savings and peak kW demand reductions of the Midstream channel. Net energy savings (kWh) totaled to 2,195,538 kWh and equal 100% of gross program channel savings. Net peak demand reductions (kW) totaled 408

kW and equal 100% of realized gross program channel peak demand reduction. There was no spillover measured in PY2020.

Table 7-15 Summary of Net Annual Energy Savings (kWh) – Midstream Lighting

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate - kWh	NTG	*Ex post* Net kWh Savings
Midstream	1,857,304	2,195,538	118%	100%	2,195,538

Table 7-16 Summary of Net Peak Demand Reductions (kW) – Midstream Lighting

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
Midstream	360	408	114%	100%	408

None of the respondents reported that they installed additional spillover equipment with quantified energy savings because the midstream lighting project was rebated upon the point of sales.

7.14.5 Continuous Energy Improvement

Table 7-17 and Table 7-18 summarize the realized net kWh savings and peak kW demand reductions of the CEI channel. This is the first year this program was offered as more than a pilot program. In PY2020 this channel was credited with a 100% NTG ratio. Net energy savings (kWh) totaled to 184,500 kWh and equal 100% of gross program channel savings. Net peak demand reductions (kW) totaled 4.8 kW and equal 100% of realized gross program channel peak demand reductions.

Table 7-17 Summary of Net Annual Energy Savings (kWh) – CEI

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate - kWh	NTG	*Ex post* Net kWh Savings
CEI	204,962	184,500	90%	100%	184,500

Table 7-18 Summary of Net Demand Reductions (kW) – CEI

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
CEI	13	7	54%	100%	7

All savings impacts were captured via billing analysis for this channel so final savings are inclusive of any potential spillover effects. All savings that are due to cross participation in other programs are then deducted from the *Ex post* savings.

7.14.6 Retro-Commissioning (RCx)

Table 7-19 and Table 7-20 summarize the realized net kWh savings and peak kW demand reductions of this program channel. Net energy savings (kWh) totaled to 41,472 kWh and equal 102% of gross program channel savings. Net peak demand reductions (kW) totaled 4.8 kW and equal 103% of realized gross program channel peak demand reductions.

Table 7-19 Summary of Net Demand Reductions (kWh) – RCx

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
RCx	40,841	41,472	102%	100%	41,472

Table 7-20 Summary of Net Demand Reductions (kW) – RCx

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
RCx	4.7	4.8	103%	100%	4.8

7.14.7 Summary of Net Savings Results

Table 7-21 and Table 7-22 summarize CEEP net savings.

Table 7-21 Summary of CEEP Net Annual Energy Savings (kWh)

Channel	*Ex ante* Gross kWh Savings	*Ex post* Gross kWh Savings	Realization Rate - kWh	NTG	*Ex post* Net kWh Savings
Large C&I	14,039,397	13,844,107	99%	100%	13,844,107
SBS	1,757,990	1,758,649	100%	100%	1,758,649
SAGE	2,074,561	2,110,632	102%	100%	2,110,632
Midstream Lighting	1,857,304	2,195,538	118%	100%	2,195,538
CEI	204,962	184,500	90%	100%	184,500
RCx	40,841	41,472	102%	100%	41,472
Totals	**19,975,055**	**20,134,899**	**101%**	**100%**	**20,134,899**
Sums may differ due to rounding.					

Table 7-22 Summary of CEEP Net Peak Demand Reductions (kW)

Channel	*Ex ante* Gross kW Savings	*Ex post* Gross kW Savings	Realization Rate - kW	NTG	*Ex post* Net kW Savings
Large C&I	2,028	2,027	100%	100%	2,027
SBS	321	323	101%	100%	323
SAGE	444	475	107%	100%	475
Midstream Lighting	360	408	62%	100%	408
CEI	13	7	54%	100%	7
RCx	4.7	4.8	103%	100%	4.8
Totals	**3,170**	**3,245**	**102%**	**100%**	**3,245**
Sums may differ due to rounding.					

7.15 Non-Energy Benefits (NEBs)

Protocol L of the AR TRM v8.1 states that EM&V of demand-side management (DSM) programs in Arkansas must account for NEBs resulting from each program. Specifically, the categories of NEBs that are to be calculated for each DSM program are as follows:

- Benefits of electricity, natural gas, and liquid propane energy savings (i.e. other fuels);
- Benefits of public water and wastewater savings; and
- Benefits of avoided and deferred equipment replacement costs.

As discussed below, the NEBs applicable to the CEEP Program in PY2020 are natural gas savings and avoided replacement costs (ARCs). There were no propane or water savings in PY2020.

Measures with zero entries are included to ensure consistency of table structure and to demonstrate that no measures or potential energy and non-energy impacts were omitted.

7.15.1 Natural Gas Energy Savings

In the CEEP Program, OG&E customers can have either electric or natural gas heating. When a customer has natural gas heating, OG&E can claim the natural gas therms savings as NEBs. The table below presents the *ex post* net natural gas that can be claimed as NEBs for cost-effectiveness purposes. There were no natural gas savings for midstream or CEI.

No Other Fuel NEBs were calculated for strip curtains or refrigeration door gaskets. The IEM requested that these be investigated, but the AR TRM v8.1 does not prescribe a method. In addition, there is significant uncertainty at the project level as it depends upon heating system type and whether the compressor heat is rejected to conditioned or unconditioned space, and the potential savings were too low to warrant the large expense needed to quantify this NEB.

Table 7-23 Natural Gas (NGS) Savings by Measure, for CEEP in PY2020

Channel	Measure	*Ex post* Gross NGS (therms)	*Ex post* Net NGS (therms)	*Ex post* Net Lifetime NGS (therms)	NGS Benefit ($)	NPV NGS ($)
C&I Solutions	Custom - Custom	(42)	(42)	(422)	$ (22)	$ (208)
C&I Solutions	Custom - HVAC	(13)	(13)	(195	$ (7)	$ (91)
C&I Solutions	Custom - Refrigeration Gaskets	(459)	(459)	(1,836)	$ (237)	$ (945)
C&I Solutions	HVAC - AC Tune Up	(412)	(412)	(4,115)	$ (213)	$ (2,029)
C&I Solutions	Lighting NC - LED Exterior	(91)	(91)	(1,362)	$ (47)	$ (634)
C&I Solutions	Lighting NC - LED High Bay	(411)	(411)	(6,166)	$ (212)	$ (2,872)
C&I Solutions	Lighting NC - LED Interior	(2,747)	(2,747)	(41,212)	$ (1,419)	$ (19,198)
C&I Solutions	Lighting NC - Screw-based LED Lamp	(30)	(30)	(120)	$ (15)	$ (62)
C&I Solutions	Lighting Retrofit - Controls	(21)	(21)	(166)	$ (11)	$ (84)
C&I Solutions	Lighting Retrofit - LED Exterior	(3,823)	(3,823)	(57,351)	$ (1,975)	$ (26,716)
C&I Solutions	Lighting Retrofit - LED High Bay	(16,102)	(16,102)	(241,533)	$ (8,319)	$ (112,513)
C&I Solutions	Lighting Retrofit - LED Interior	(1,258)	(1,258)	(18,875)	$ (650)	$ (8,792)
C&I Solutions	Lighting Retrofit - LED Troffers	(7,794)	(7,794)	(116,913)	$ (4,027)	$ (54,462)
C&I Solutions	Lighting Retrofit - Linear LED Lamps	(17,711)	(17,711)	(265,661)	$ (9,150)	$ (123,753)
C&I Solutions	Lighting Retrofit - Screw-based LED Lamp	(618)	(618)	(2,472)	$ (319)	$ (1,272)
SAGE	Custom - LED Exterior	(58)	(58)	(863)	$ (30)	$ (402)
SAGE	HVAC -AC Tune Up	(285)	(285)	(2,849)	$ (147)	$ (1,405)
SAGE	HVAC - Heat Pump	(145)	(145)	(2,179)	$ (75)	$ (1,015)

SAGE	Lighting NC - LED High Bay	(387)	(387)	(5,799)	$ (200)	$ (2,701)
SAGE	Lighting Retrofit - LED Exterior	(1,786)	(1,786)	(26,797)	$ (923)	$ (12,483)
SAGE	Lighting Retrofit - LED High Bay	(2,484)	(2,484)	(37,264)	$ (1,283)	$ (17,359)
SAGE	Lighting Retrofit - LED Interior	(93)	(93)	(1,398)	$ (48)	$ (651)
SAGE	Lighting Retrofit - LED Troffers	(2,484)	(2,484)	(37,257)	$ (1,283)	$ (17,355)
SAGE	Lighting Retrofit - Linear LED Lamps	(6,197)	(6,197)	(92,956)	$ (3,202)	$ (43,301)
SAGE	Lighting Retrofit - Screw-based LED Lamp	(269)	(269)	(1,075)	$ (139)	$ (553)
Midstream	LED Reflector	(102)	(102)	(1,120)	$ (53)	$ (549)
Midstream	Lighting Retrofit - LED High Bay	(6,296)	(6,296)	(76,519)	$ (3,253)	$ (36,456)
Midstream	Lighting Retrofit - LED Troffers	(783)	(783)	(10,717)	$ (405)	$ (5,170)
Midstream	Lighting Retrofit - Linear LED Lamps	(881)	(881)	(11,892)	$ (455)	$ (5,813)
SBS	Fixture Removal - Incandescent Lamp	(10)	(10)	(10)	$ (5)	$ (5)
SBS	Lighting Control Retrofit - Lighting Control	(1)	(1)	(11)	$ (1)	$ (5)
SBS	Lighting Retrofit - LED Exterior	(169)	(169)	(2,532)	$ (87)	$ (1,180)
SBS	Lighting Retrofit - LED High Bay	(1,649)	(1,649)	(24,729)	$ (852)	$ (11,520)
SBS	Lighting Retrofit - LED Interior	(293)	(293)	(4,397)	$ (151)	$ (2,048)
SBS	Lighting Retrofit - LED Troffers	(1,991)	(1,991)	(29,863)	$ (1,029)	$ (13,911)
SBS	Lighting Retrofit - Linear LED Lamps	(5,125)	(5,125)	(76,872)	$ (2,648)	$ (35,809)
SBS	Lighting Retrofit - Screw-based LED Lamp	(1,088)	(1,088)	(4,350)	$ (562)	$ (2,239)
Total		**(84,107)**	**(84,107)**	**(1,209,849)**	**$ (43,453)**	**$ (565,562)**
Sums may differ due to rounding.						

The bullets below outline how the Evaluators determined if there were natural gas savings:

- **Large C&I:** natural gas savings were estimated using heating type information in the project data provided by the TPI.
- **SBS:** natural gas savings were estimated using heating type information in the project data provided by the TPI.

- **Midstream:** there are no natural gas savings in PY2020.
- **SAGE:** natural gas savings were estimated using heating type information in the project data provided by the TPI.
- **CEI:** there are no natural gas savings in PY2020.
- **RCx:** natural gas savings are included in this program so natural gas savings reported are the realized savings.

7.15.2 Propane Savings

When a customer has propane, OG&E can claim the savings as NEBs. There were no propane savings in PY2020 for CEEP.

7.15.3 Water Savings

When a customer installs a water saving device, OG&E can claim the water savings (gallons) as a NEBs. There were no water savings in PY2020 for CEEP.

7.15.4 Avoided and Deferred Replacement Costs

To calculate avoided replacement costs (ARC) and incremental costs for LEDs in the CEEP the AR TRM v8.1 Protocol L calculator was used.

Avoided replacement cost NEBs were calculated for lighting projects by lighting fixture and bulb types. The implementer provided detailed lamp and fixture types for all participants and the Evaluators used that data to estimate avoided replacement cost. Equipment costs were taken from program tracking where available and citing Illinois TRM v8.1[48] where not available.

The AR TRM v8.1 lists the EUL for HID as 16 years and this is longer than EUL of common LED fixtures (15 years) which would result in no avoided replacement cost. The Evaluators reviewed the calculation used to derive the EUL in AR TRM v8.1 and recalculated the EUL because AR TRM v8.1 used the ballast lifetime to calculate EUL. The Evaluators used the lamp life of 15,000 hours for exterior HIDs and 18,000 hours for high/low bay HIDs, divide them by weighted average of 3,205 AOH (the same AOH used to calculate EUL from AR TRM v8.1). The resulting EUL for exterior HID was 4 years and high/low bay HID was 6 years. The value of the avoided replacement cost NEB was determined using a calculator provided by the IEM, which accounts for differences in EULs, changing baseline fixtures in future years (per EISA tiers), and the Net Present Value (NPV) of the avoided replacement cost.

The table below shows the ARCs for the PY2020 CEEP. There were no ARCs for CEI.

[48] Ibid.

Table 7-24 Avoided Replacement Costs (ARCs) by Measure, for CEEP in PY2020

Channel	Measure	*Ex post* Gross ARC ($)	*Ex post* Net ARC ($)	NPV of ARC ($)
C&I Solutions	Lighting New Construction - LED Exterior	$ 1,147	$ 1,147	$ 1,147
C&I Solutions	Lighting New Construction - LED High Bay	$ 23,925	$ 23,925	$ 23,925
C&I Solutions	Lighting New Construction - LED Interior	$ 65,751	$ 65,751	$ 65,751
C&I Solutions	Lighting New Construction - Linear LED Lamps	$ 98	$ 98	$ 98
C&I Solutions	Lighting New Construction - Screw-based LED Lamp	$ 92	$ 92	$ 92
C&I Solutions	Lighting Retrofit - LED Exterior	$ 119,113	$ 119,113	$ 119,113
C&I Solutions	Lighting Retrofit - LED High Bay	$ 304,707	$ 304,707	$ 304,707
C&I Solutions	Lighting Retrofit - LED Interior	$ 58,753	$ 58,753	$ 58,753
C&I Solutions	Lighting Retrofit - LED Troffers	$ 61,383	$ 61,383	$ 61,383
C&I Solutions	Lighting Retrofit - Linear LED Lamps	$ 111,005	$ 111,005	$ 111,005
C&I Solutions	Lighting Retrofit - Screw-based LED Lamp	$ 894	$ 894	$ 894
SAGE	Custom - LED Exterior	$ 287	$ 287	$ 287
SAGE	Lighting New Construction - LED High Bay	$ 8,871	$ 8,871	$ 8,871
SAGE	Lighting Retrofit - LED Exterior	$ 50,598	$ 50,598	$ 50,598
SAGE	Lighting Retrofit - LED High Bay	$ 29,167	$ 29,167	$ 29,167
SAGE	Lighting Retrofit - LED Interior	$ 3,877	$ 3,877	$ 3,877
SAGE	Lighting Retrofit - LED Troffers	$ 22,975	$ 22,975	$ 22,975
SAGE	Lighting Retrofit - Linear LED Lamps	$ 54,043	$ 54,043	$ 54,043
SAGE	Lighting Retrofit - Screw-based LED Lamp	$ 493	$ 493	$ 493
Midstream	LED Reflector	$ 114	$ 114	$ 114
Midstream	Lighting Retrofit - LED Exterior	$ 19,351	$ 19,351	$ 19,351

Midstream	Lighting Retrofit - LED High Bay	$ 133,603	$ 133,603	$ 133,603
Midstream	Lighting Retrofit - LED Troffers	$ 8,878	$ 8,878	$ 8,878
Midstream	Lighting Retrofit - Linear LED Lamps	$ 7,415	$ 7,415	$ 7,415
SBS	Lighting Retrofit - LED Exterior	$ 9,747	$ 9,747	$ 9,747
SBS	Lighting Retrofit - LED High Bay	$ 61,425	$ 61,425	$ 61,425
SBS	Lighting Retrofit - LED Interior	$ 4,581	$ 4,581	$ 4,581
SBS	Lighting Retrofit - LED Troffers	$ 9,570	$ 9,570	$ 9,570
SBS	Lighting Retrofit - Linear LED Lamps	$ 21,819	$ 21,819	$ 21,819
SBS	Lighting Retrofit - Screw-based LED Lamp	$ 1,226	$ 1,226	$ 1,226
Total		**$ 1,194,908**	**$ 1,194,908**	**$ 1,194,908**
Sums may differ due to rounding.				

7.15.5 NEBs Summary

The table below summarizes the NPV of NEBs attributable to CEEP, including natural gas savings, water savings, propane, and avoided replacement cost. There were no propane savings (gallons), no water savings (gallons) and no DRCs in the PY2020 CEEP.

Table 7-25 PY2020 CEEP Non-Energy Benefits (NEBs) Summary, OG&E

Channel	Measure	NPV NGS ($)	NPV ARC ($)	Total NPV ($)
C&I Solutions	Custom - Custom	$ -	$ -	$ -
C&I Solutions	Custom - HVAC	$ (208)	$ -	$ (208)
C&I Solutions	Custom - Refrigeration Gaskets	$ (91)	$ -	$ (91)
C&I Solutions	HVAC - AC Tune Up	$ -	$ -	$ -
C&I Solutions	Lighting New Construction - LED Exterior	$ -	$ 1,147	$ -
C&I Solutions	Lighting New Construction - LED High Bay	$ (945)	$ 23,925	$ (945)
C&I Solutions	Lighting New Construction - LED Interior	$ -	$ 65,751	$ -
C&I Solutions	Lighting New Construction - Linear LED Lamps	$ (2,029)	$ 98	$ (2,029)
C&I Solutions	Lighting New Construction - Screw-based LED Lamp	$ -	$ 92	$ -

C&I Solutions	Lighting Retrofit - Controls	$ -	$ -	$ -
C&I Solutions	Lighting Retrofit - LED Exterior	$ (634)	$ 119,113	$ 512
C&I Solutions	Lighting Retrofit - LED High Bay	$ (2,872)	$ 304,707	$ 21,053
C&I Solutions	Lighting Retrofit - LED Interior	$ (19,198)	$ 58,753	$ 46,553
C&I Solutions	Lighting Retrofit - LED Troffers	$ -	$ 61,383	$ 98
C&I Solutions	Lighting Retrofit - Linear LED Lamps	$ (62)	$ 111,005	$ 30
C&I Solutions	Lighting Retrofit - Screw-based LED Lamp	$ (84)	$ 894	$ (84)
SAGE	Custom - LED Exterior	$ (26,716)	$ 287	$ 92,397
SAGE	HVAC -AC Tune Up	$ (112,513)	$ -	$ 192,194
SAGE	HVAC - Heat Pump	$ (8,792)	$ -	$ 49,961
SAGE	Lighting New Construction - LED High Bay	$ (54,462)	$ 8,871	$ 6,921
SAGE	Lighting Retrofit - LED Exterior	$ 123,753)	$ 50,598	$ (12,748)
SAGE	Lighting Retrofit - LED High Bay	$ (1,272)	$ 29,167	$ (378)
SAGE	Lighting Retrofit - LED Interior	$ -	$ 3,877	$ -
SAGE	Lighting Retrofit - LED Troffers	$ -	$ 22,975	$ -
SAGE	Lighting Retrofit - Linear LED Lamps	$ (402)	$ 54,043	$ (115)
SAGE	Lighting Retrofit - Screw-based LED Lamp	$ (1,405)	$ 493	$ (1,405)
Midstream	LED Reflector	$ (1,015)	$ 114	$ (1,015)
Midstream	Lighting Retrofit - LED Exterior	$ (2,701)	$ 19,351	$ 6,170
Midstream	Lighting Retrofit - LED High Bay	$ (12,483)	$ 133,603	$ 38,115
Midstream	Lighting Retrofit - LED Troffers	$ (17,359)	$ 8,878	$ 11,808
Midstream	Lighting Retrofit - Linear LED Lamps	$ (651)	$ 7,415	$ 3,225
SBS	Fixture Removal - Incandescent Lamp	$ (17,355)	$ -	$ 5,619
SBS	Lighting Control Retrofit	$ (43,301)	$ -	$ 10,742
SBS	Lighting Retrofit - LED Exterior	$ (553)	$ 9,747	$ (60)
SBS	Lighting Retrofit - LED High Bay	$ (549)	$ 61,425	$ (435)
SBS	Lighting Retrofit - LED Interior	$ -	$ 4,581	$ 19,351
SBS	Lighting Retrofit - LED Troffers	$ (36,456)	$ 9,570	$ 97,147
SBS	Lighting Retrofit - Linear LED Lamps	$ (5,170)	$ 21,819	$ 3,708
SBS	Lighting Retrofit - Screw-based LED Lamp	$ (5,813)	$ 1,226	$ 1,602
Total		**$ (565,562)**	**$ 1,194,908**	**$ 629,346**
Sums may differ due to rounding.				

7.16 Process Evaluation

The AR TRM v8.1 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the program in the context of these requirements.

Table 7-26 Determining Process Evaluation Timing

Variable Name	Variable Type
New and Innovative Components	Yes. The program has added a retrocommissioning channel (RCx)
No Previous Process Evaluation	No. The program received a process evaluations in prior program years.
Less than Expected Energy Savings or Accomplishments	No. CEEP has exceeded energy savings expectations in prior program years.
Participant Reported Problems or Low Participant Satisfaction	No. Participants have consistently reported high satisfaction.
New Vendor or Contractor	No. The program continues to be implemented by CLEAResult.
Energy Savings are being Achieved Slower than Expected	No. Energy savings are being achieved at a rate that is consistent with program expectations.

Table 7-27 Determining Process Evaluation Conditions

Component	Status
Impact problems	No. CEEP has consistently high realization rates.
Informational/educational objectives	Addressed. CEEP has met program goals for outreach and education of OG&E customers and Trade Allies.
Participation problems	No. CEEP has consistently met participation targets.
Operational challenges	None identified thus far.
Cost-effectiveness issues	No. The program is highly cost-effective. Prescriptive measures are screened during triennial planning and custom measures are screened for cost-effectiveness.
Negative feedback	No. Participants and Trade Allies have consistently provided positive feedback about their program experience.
Market effects	Addressed. Staff interviews and contractor interviews determined that CEEP offering resulted in minor market effects where vendors have changed stocking practices. This manifests especially as a result of the Midstream channel.

The last full process evaluation for CEEP was in PY2017. The program received a partial process evaluation in PY2020 and will receive a full process evaluation for PY2021.

7.16.1 Program Staff Interviews

The evaluation team completed in-depth interviews with the AR CEEP program manager at OG&E and two staff at CLEAResult, the program implementer. The evaluation team used these program staff interviews to identify program updates or changes in PY2020. Further, these interviews explored energy efficiency staff roles and responsibilities, program communications and marketing, the overall program delivery processes in place during PY2020.

7.16.1.1 Program Design and Performance

In PY2020, OG&E met all goals in the commercial programs. The success is due to a strong communication pipeline that was established in the first quarter of the program year. This pipeline allowed adjustments to be made over the year to minimize negative impacts. However, even with this pipeline in place and channel adjustments being made, Small Business Solutions was forced to lower its savings goal.

In PY2020 OG&E changed the CEI channel from a pilot channel to a full channel under CEEP. There were two participating organizations in PY2020 (during the pilot phase there was one participant). Schools that participated in CEI were affected by COVI-19 in the beginning of PY2020, but program performance improved later in the PY2020. In PY2020, OG&E also introduced the RCx channel, which provides non-capital-intensive approach to energy efficiency.

OG&E staff stated that their quality control and assurance process involve checking with customers on the process of the program and checking if they have any issues or concerns. OG&E staff has no concerns about CLEAResult's quality control and assurance processes. There are Quality Assurance & Quality Control mechanisms in place. These include a pre-construction inspection and a post construction inspection. The contractors and customers are also required to supply the implementer spec sheets and cut sheets, so that it can be verified that the measures meet program qualification requirements.

7.16.1.2 Program Marketing and Education

Marketing for CEEP is done mostly by word-of-mouth communication or through the OG&E website. All other marketing for OG&E's CEEP program is done by CLEAResult. OG&E began mailing informative thank you letters in the beginning of PY2020 with rebate incentive payments. The letter provided the participants with updated program information and information for all the programs that OG&E offers. The website for OG&E is used for marketing but there is difficulty updating the website and printed literature with the latest program information. Program Staff acknowledges that there are delays in updating OG&E's website

and printed materials. Program staff are working with their internal department to update marketing materials as needed.

7.16.1.3 Quality Assurance and Control

All SAGE and C&I channel projects receive quality assurance before and after project completion. For the SBS channel, quality assurance is conducted for the first five projects new contractor completed and the first five projects of the year for contractors that have worked with the program previously. After the first five projects of the year, the quality assurance rate for each contractor is 20%. For all potential projects generating savings greater that 300 kWh, CLEAResult staff worked with the Evaluators to determine appropriate savings calculation methodology.

7.16.1.4 COVID-19 Adjustments

Due to COVID-19 and related restrictions OG&E staff changed their methods of communication to be more phone and virtual-conferencing based. OG&E staff were able to develop a strong pipeline in the beginning of PY2020, which reduced the impact COVID-19 had on the programs. In-person OG&E monitoring was replaced by phone and virtual meetings, walk-throughs of facilities by facility staff using cameras, and by the individual companies taking a more active role in monitoring their activities as they applied to CEEP.

7.16.2 OG&E CEEP Participant Surveys

Six participants in OG&E's CEEP program were surveyed. The respondents were asked how they first heard of the OG&E CEEP program, most of participants reported first learning of the program through friends or colleagues, or from a contractor. Some reported first learning of the program through OG&E's website or from an OG&E account representative.

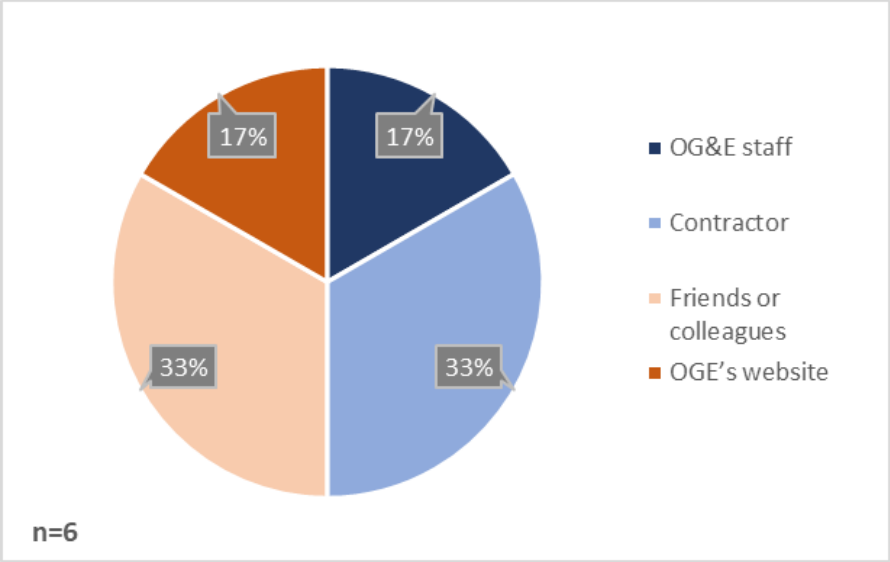


Figure 7-3 Program Awareness

Additionally, the participants were asked if they viewed any program marketing materials, such as brochures, when they were learning about the program. 50% of the respondents said they viewed the marketing material.

Next, of the respondents who did view program marketing material were asked to gauge how influential it was in their decision to participate in the program. Every respondent stated that the program marketing material was influential in their decision to participate.

The participants were asked if they had received any technical services from the program that helped them identify or select equipment, which may have included a facility assessment completed by program staff or a participating contractor. Four out of the five respondents replied that they did receive these technical services.

The participants were asked how to rate how well the range of incentive options offered through the program fit their needs and all of them reported either “Completely” or “Almost Completely”.

Sixty percent of the respondents reported that they worked with a contractor to install the equipment that received the OG&E incentive, while forty percent stated they did not work with a contractor.

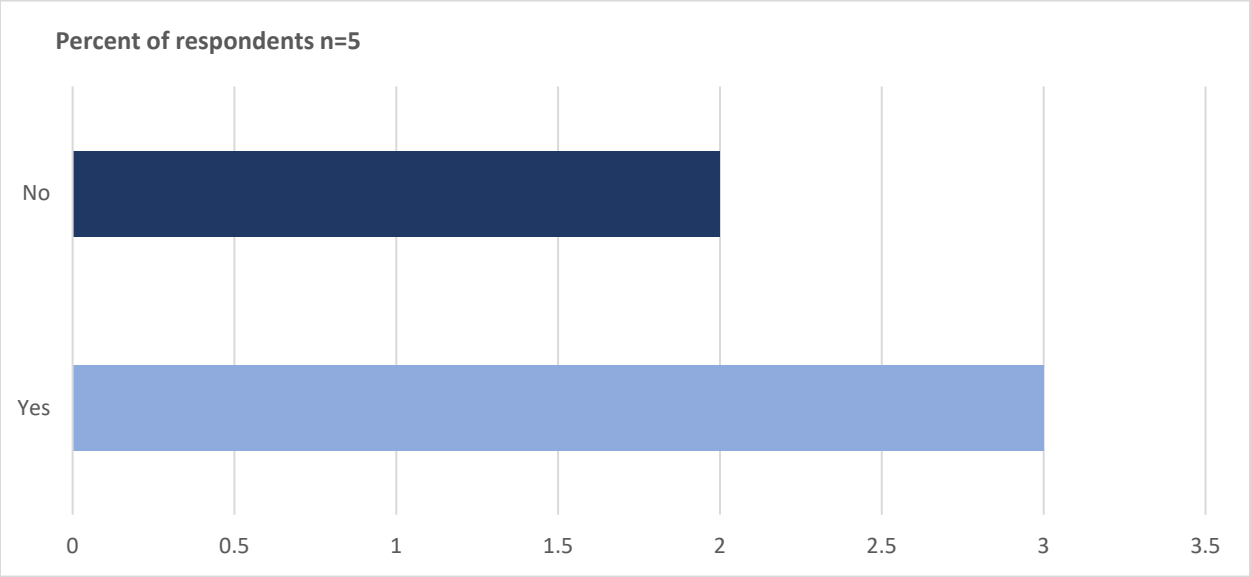


Figure 7-4 Contractor Collaboration

Furthermore, they were asked if they received bids from multiple contractors when they were selecting a contractor for the project. Sixty-seven percent reported that they did not get multiple bids while thirty-three percent reported they did. Sixty percent of the participants said that in the past they had worked with the contractor that installed the equipment, and forty percent said they had not previously worked with the contractor.

Overall, the participants were pleased with the application process and did not have any complaints to lodge. One hundred percent of the respondents reported that they had a clear sense of whom they could go to for assistance with the application process, additionally they all reported the information on how to complete the application to be clear. Some of the participants reported other parties other than themselves to have helped in the application process.

The participants all reported the incentive amount to be either about what they expected, somewhat more than they expected, or much more than they expected.

7.16.2.1 Key Findings

Overall, the survey participants were satisfied with their experiences in the OG&E CEEP program. Here are some key takeaways from the survey.

- Most participants became aware of OG&E's CEEP through friends or colleagues or a contractor.
- Program marketing material was very influential in their decision to participate.
- The participants found the application process to participate in the program to be very clear and straightforward.
- The incentive levels either exceeded all the participants expectations or met their expectations.
- The CEEP program was a major influence on the participants decision to implement the energy efficiency measures, were it not for CEEP many of the participants would not have implemented the measures.

7.17 Deviations from the AR TRM v8.1

The following are deviations from the AR TRM v8.1.

- The AR TRM v8.1 lists the EUL for HID as 16 years and this is longer than EUL of common LED fixtures (15 years) which would result in no avoided replacement cost. The Evaluators reviewed the calculation used to derive the EUL in AR TRM v8.1 and recalculated the EUL because AR TRM v8.1 used the ballast lifetime to calculate EUL. The Evaluators used the lamp life of 15,000 hours for exterior HIDs and 18,000 hours for high/low bay HIDs, divide them by weighted average of 3,205 AOH (the same AOH used to calculate EUL from AR TRM v8.1). The resulting EUL for exterior HID was 4 years and high/low bay HID was 6 years.
- Protocols for midstream lighting measures are not available in AR TRM and conventional lighting retrofit protocols cannot be used because the incentive was provided at the point of sale without a site inspection to verify preexisting fixtures. Baselines were estimated based on a market saturation study completed by the DOE. The Evaluators reviewed the proposed approach from the implementation contractor which has been approved by IEM.

7.18 Adherence to Protocol A

The tracking system in the database conforms reasonably well to the tracking system protocol developed for use in Arkansas. While data included in the tracking system is relatively limited, it does provide the data necessary for the evaluation. The bullets below show a summary of how well the CLEAResult program tracking systems meets the components of the protocol.

- **Participating Customer Information** – Includes all information required including customer contact information, customer identifier (account number), location of the project, and date completed.
- **Measure Specific Information** – Generally includes the type of measures installed but did not include detailed information for all projects. Most of the projects listed in the database were missing detailed information, including; equipment type, equipment fuel, equipment size, and equipment efficiency. The database, in general, has the fields necessary for verification of TRM compliance, but few of the fields are populated.
- **Vendor Specific Information** – The database included a "Payee", but did not list a contact name, nor contact information for the Contractor associated with the project, if applicable. The Payee data field could be used to determine if a third-party contractor received the payment for the project, but no other identifying information was provided.
- **Program Tracking Information** – Generally all program tracking information was provided in the database. Incentive amounts and paid dates were both included in the database.
- **Program Costs** – While the main database used to track program progress did not include overall budgets or expenditures to date, these data were available from the Implementation Contractor or OG&E throughout the year.
- **Marketing and Outreach Activities** – Similar to program costs, these data were not tracked in the main program database used for EM&V purposes. Additional data was provided by the implementer or OG&E when requested.

7.19 Progress on PY2019 Evaluation Recommendations

OG&E responded to the Evaluators' PY2019 recommendations. The status of these recommendations is summarized in Table 7-28.

Table 7-28 Status of Recommendations from PY2019 Evaluation

2019 Recommendations	Status	Comment
Include baseline fixture type and wattage for all lighting projects in the program tracking database	Accepted	This recommendation has been implemented.
Itemize projects by measures in the program tracking database	Accepted	This recommendation has been implemented.
Improving incremental measure cost calculation	In Progress	Implementer will conduct internal training among CEEP team members to explain what incremental measure costs is, how to calculate it, and when it is appropriate to use when compared to full or total project cost.
Utilizing all columns in the tracking database	Accepted	The building type, annual operating hours, heating/cooling type, and quantities columns are populated in the 2020 data sets for Large C&I, SAGE, and SBS channels. Midstream data set is also pulling in more information in 2020 than in previous year's systems.

7.20 Planned Program Changes

There are no significant changes for this program in PY2020.

7.21 Conclusions and Recommendations

7.21.1 Conclusions

Based on the findings from the PY2020 evaluation of the CEEP program, the evaluation team has developed the following conclusions:

- **Program design remains largely unchanged.** The most significant design changes in PY2020 was the addition of the Retro-commissioning (RCx) program and the Continuous Energy Improvement (CEI) program was moved from Pilot to full program-channel implementation.
- **Staff are actively engaged with participating Trade Allies.** OG&E staff have regular daily interactions with Trade Allies to answer questions and provide training.

CLEAResult staff has regular one-on-one communications with Trade Allies about submitted projects. Information about program changes is generally provided to Trade Allies through the project review process.

7.21.2 Recommendations

Based on the findings from the PY2020 evaluation of the CEEP program, the evaluation team has developed the following recommendations:

- **Include baseline fixture type and wattage for all lighting projects in the program tracking database:** In the PY2020 program year, commercial screw-in LED bulbs are subject to tier savings as the EISA baseline of CFL must be applied in lifetime savings. The existing project tracking database contains the row to keep track of both measure and baseline lighting fixture types but does not have columns for wattage. Please include measure and baseline fixture types and wattage in the tracking database for all channels in the PY2020.
- **Improving incremental measure cost calculation:** The Evaluators reviewed the tracking database and found 49 measures within 15 projects that displayed abnormal incremental costs. These costs were first flagged as outliers in terms of customer acquisition cost per kWh (measure cost / kWh savings) and rebate coverage (incentive / incremental cost). Most of the projects were minor errors such as labor costs being included in the project cost and multi-year project including the cost from the previous year's project. As a result, outliers were more common among new construction projects as these projects are more likely to have invoices that include costs not generated by nature of the project being high efficiency (such as fundamental electrical work that would be part of any new lighting system). The implementer has significantly improved calculation of the incremental cost compared to PY2019 and the evaluators would like to see further improvement in the PY2020. Key areas to flag for review include:
    - New construction lighting (to account for unintended inclusion of non-project costs);
    - Replacement of HVAC and compressed air systems (to align cost basis with savings basis, i.e., normal versus early replacement);
    - Multiple facilities from the same customer (not an issue in PY2020 but was found in PY2019, where cross-cutting costs are duplicated among multiple project invoices); and
    - Multi-phase projects (aligning costs to specific project outcomes for large facilities with phased retrofits).

- **Utilizing all columns in the tracking database:** The tracking database has informative columns that the evaluators can utilize if they are filled for all projects, if applicable. Items such as building type, annual operating hours, heating/cooling type, and quantities. In PY2020, three channels, Large C&I, SAGE, and Midstream channels had numerous projects with missing and or severely simplified reporting on the tracking database.
- **Consistency in Project Naming**: During the program year the implementer will reach out to the evaluator with large kWh savings projects to have them go through a pre-review process. Often the project name during the pre-review process is different than the project name that is submitted with the ex-ante claim (facility name vs. installing contractor name). The inconsistency in project names can cause confusion between implementers and evaluators. The evaluators recommend being more consistent in project naming.
- **Measure Identification:** Often when a non-prescriptive project or non-lighting project is reported, all that is listed in the tracking database for efficient measure is “Custom”. The evaluator recommends reporting the efficient measure description for all measures and projects.
- **Cross Participation:** The CEI program is based around low- to no-cost measures. When a CEI participant participates in another CEEP program, the savings that are due to the other program’s measures are subtracted out from the CEI savings. In PY2020 the CEI program had a 90% kWh realization rate due to cross participation. The Evaluators recommend more stringent cross participation screening to prevent these lower realization rates.

Appendix A. Portfolio Cost-Effectiveness

Overview

The Evaluators estimated the cost-effectiveness for the overall energy efficiency and demand response portfolio of programs, based on PY2020 costs and savings estimates provided by OG&E and their third-party implementers, AM Conservation and CLEAResult. This appendix provides the cost-effectiveness results, as well as a brief overview of the approach taken by the Evaluators. The portfolio and energy efficiency programs pass all the cost-effectiveness tests except the RIM test. The table below presents the cost-effectiveness results for the PY2020 portfolio.

Table A-1 PY2020 Cost-effectiveness Results

Program	TRC	UCT	RIM	PCT	TRC Net Benefits
Home Energy Efficiency Program (HEEP)	4.59	3.62	0.54	14.91	$ 2,982,054
Consistent Weatherization Approach (CWA)	2.12	1.64	0.52	4.39	$ 2,106,886
Commercial Energy Efficiency Program (CEEP)	2.30	3.17	0.51	5.47	$ 7,500,340
Energy Efficiency Arkansas (EEA)	0.00	0.00	0.00	0.00	$ (22,170)
Total	**2.48**	**2.77**	**0.52**	**5.81**	**$ 12,567,109**

Approach

The California Standard Practice Model was used as a guideline for the calculations, along with guidance from the AR TRM v8.1. The cost-effectiveness analysis methods that were used in this analysis are among the set of standard methods used in this industry and include the Utility Cost Test (UCT)[49], Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), and Participant Cost Test (PCT). All tests weigh monetized benefits against costs. These monetized amounts are presented as NPV evaluated over the lifespan of the measure. The benefits and costs differ for each test based on the perspective of the test. The definitions below are taken from the California Standard Practice Manual.

The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.

[49] The UCT is also referred to as the Program Administrator Cost Test (PACT).

The UCT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.

The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.

The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills would go up if revenues collected after program implementation is less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

A common misperception is that there is a single best perspective for evaluation of cost-effectiveness. Each test is useful and accurate, but the results of each test are intended to answer a different set of questions. The questions to be addressed by each cost test are shown in the table below.[50]

[50] http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf

Table A-2 Questions Addressed by the Various Cost Tests

Cost Test	Questions Addressed
Participant Cost Test (PCT)	▪ Is it worth it to the customer to install energy efficiency?
	▪ Is it likely that the customer wants to participate in a utility program that promotes energy efficiency?
Ratepayer Impact Measure (RIM)	▪ What is the impact of the energy efficiency project on the utility's operating margin?
	▪ Would the project require an increase in rates to reach the same operating margin?
Utility Cost Test (UCT)	▪ Do total utility costs increase or decrease?
	▪ What is the change in total customer bills required to keep the utility whole?
Total Resource Cost Test (TRC)	▪ What is the regional benefit of the energy efficiency project (including the net costs and benefits to the utility and its customers)?
	▪ Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)?
	▪ Is more or less money required by the region to pay for energy needs?

Overall, the results of all four cost-effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC cost test addresses whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM address whether the selection of measures and design of the program are balanced from the perspective of the participants, utilities, and non-participants. The scope of the benefit and cost components included in each test are summarized in the table below.[51]

[51] Ibid.

Table A-3 Benefits and Costs Included in each Cost-Effectiveness Test

Test	Benefits	Costs
PCT (Benefits and costs from the perspective of the customer installing the measure)	▪ Incentive payments ▪ Bill Savings ▪ Applicable tax credits or incentives	▪ Incremental equipment costs ▪ Incremental installation costs
UCT (Perspective of utility, government agency, or third party implementing the program	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Utility/program administrator incentive costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ▪ Additional resource savings ▪ Monetized non-energy benefits as outlined by the TRM version 8.0	▪ Program overhead costs ▪ Program installation costs ▪ Incremental measure costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Lost revenue due to reduced energy bills ▪ Utility/program administrator installation costs

Non-Energy Benefits

In Arkansas, the IEM, in collaboration with OG&E and the other investor-owned utilities (IOUs) and other stakeholders through the Parties Working Collaboratively (PWC), have developed a uniform set of benefits to be associated with measures implemented in the portfolio. These Non-Energy Benefits (NEBs) are an addition to programs under the authorization of Arkansas TRM v8.1. Volume 1 - Protocol L. After reviewing the guidance from the PWC, the Arkansas Public Service Commission (Commission) issued Order No. 30 on December 10, 2015, which

provided direction and guidance regarding the inclusion of NEBs in the Technical Reference Forum, as follows.[52]

> *"The Commission therefore orders and directs that the following three categories of NEBs be consistently and transparently accounted for in all applications of the TRC test, as it is applied to measures, programs, and portfolios:*
>
> *o benefits of electricity, natural gas, and propane energy savings (i.e., other fuels);*
>
> *o benefits of public water and wastewater savings; and*
>
> *o benefits of avoided and deferred equipment replacement costs as conditioned herein."*

In response to the Commission Order for NEBs outlined above, Protocol L was added to the Arkansas TRM in version 6.0, which encompasses NEBs:

- Protocol L1: Non-Energy Benefits for Electricity, Natural gas, and Liquid Propane ("other fuels")
- Protocol L2: Non-Energy Benefits for Water Savings
- Protocol L3: Non-Energy Benefits of Avoided and Deferred Equipment Replacement Costs.

This recommended approach has been developed jointly by the IEM and the PWC for each category as directed by the Commission. Below is a summary of the NEBs that were calculated in each program in PY2020.

- **HEEP**: this program captured propane (LivingWise® Schools Outreach), natural gas (Residential Solutions, Consumer Products and LivingWise® Schools Outreach), water (Residential Solutions and LivingWise® Schools Outreach) and ARCs (Residential Solutions, Consumer Products and LivingWise® Schools Outreach).
- **CWA**: this program captured natural gas, propane, water and ARCs.
- **CEEP**: this program captured natural gas (C&I Solutions, SAGE, Midstream and Small Business Solutions) and ARCs (C&I Solutions, SAGE, Midstream and Small Business Solutions).

Methodologies and measure-level results for each NEB are found in each of the program chapters within this report.

52 Arkansas TRM version 8.0, Protocol L.

Economic Inputs for Cost Effectiveness Analysis

The Evaluators used the economic inputs provided by OG&E for the cost benefit analysis, this included avoided costs that were estimated using the Real Economic Carrying Charge (RECC) approach.

Marginal line losses, provided by OG&E, were utilized in the PY2020 evaluation.

The rates utilized for avoided water and avoided propane use were from Protocol L in the Arkansas TRM v8.1.

The Evaluators used the discount rates provided by OG&E to perform the cost benefit analysis, and these values align with the rates used in the PY2020 Plan. The Weighted Average Cost of Capital (WACC) was utilized for the TRC, UCT and RIM tests.

Table A-4 outlines the economic inputs used in the cost benefit analysis.

Table A-4 PY2020 Economic Inputs for Cost Effectiveness Analysis

Discount Rates	
Utility (TRC)	5.42%
Utility (UCT)	5.42%
Utility (RIM)	5.42%
Societal (SCT)	1.29%
Participant (PCT)	6.04%
Marginal Line Losses	
Line Losses (demand)	7.83%
Line Losses (energy)	7.25%
Line Losses (therm)	2.67%
Escalation rate	2.20%
Avoided Costs	
Avoided Energy ($/kWh)	$ 0.03
Avoided Demand ($/kW)	$ 95
Avoided Natural Gas ($/therm)	$ 0.517
Avoided Water ($/gallon)	$ 0.008
Avoided Propane ($/gallon)	$ 2

Results

The tables below outline the results for each test, for both the programs and the portfolio as a whole. Summations may differ by $1 due to rounding.

Table A-5 PY2020 Cost-Effectiveness Results by Program

Program	TRC	UCT	RIM	PCT
HEEP	4.59	3.62	0.54	14.91
CWA	2.12	1.64	0.52	4.39
CEEP	2.30	3.17	0.51	5.47
EEA	0.00	0.00	0.00	0.00
Total	**2.48**	**2.77**	**0.52**	**5.81**

Table A-6 PY2020 Cost-Effectiveness Benefits by Program

Program	TRC Benefits	UCT Benefits	RIM Benefits	PCT Benefits
HEEP	$ 3,812,424	$ 3,129,643	$ 3,129,643	$ 5,783,260
CWA	$ 3,991,158	$ 3,287,481	$ 3,287,481	$ 6,612,728
CEEP	$ 13,248,358	$ 12,619,012	$ 12,619,012	$ 22,667,019
EEA	$ -	$ -	$ -	$ -
Total	**$ 21,051,940**	**$ 19,036,136**	**$ 19,036,136**	**$ 35,063,007**

Table A-7 PY2020 Cost-Effectiveness Costs by Program

Program	TRC Costs	UCT Costs	RIM Costs	PCT Costs
HEEP	$ 830,371	$ 864,631	$ 5,766,118	$ 387,785
CWA	$ 1,884,272	$ 2,003,327	$ 6,374,650	$ 1,507,643
CEEP	$ 5,748,018	$ 3,976,594	$ 24,673,085	$ 4,142,729
EEA	$ 22,170	$ 22,170	$ 22,170	$ -
Total	**$ 8,484,831**	**$ 6,866,723**	**$ 36,836,024**	**$ 6,038,156**

Table A-8 PY2020 Cost-Effectiveness Net Benefits by Program

Program	TRC Net Benefits	UCT Net Benefits	RIM Net Benefits	PCT Net Benefits
HEEP	$ 2,982,054	$ 2,265,011	$ (2,636,476)	$ 5,395,475
CWA	$ 2,106,886	$ 1,284,154	$ (3,087,169)	$ 5,105,085
CEEP	$ 7,500,340	$ 8,642,418	$ (12,054,073)	$ 18,524,290
EEA	$ (22,170)	$ (22,170)	$ (22,170)	$ -
Total	**$ 12,567,109**	**$ 12,169,413**	**$ (17,799,888)**	**$ 29,024,851**

Appendix B. CEEP Custom Project Site Reports

ADM Site Report: PRJ-2495972

Executive Summary

This facility is a manufacturing facility that replaced six older injection molding machines with energy efficient injection molding machines. The Ex-Ante claimed savings for this project are 651,627 kWh and a peak coincidence savings of 29 kW. The realization rate for the project is 65% and the peak coincidence kW realization rate is 136%.

Project Description

This project includes the installation of:

- (2) MA2500 Injection Molding Machine
- (2) MA3200 Injection Molding Machine
- (2) MA6000 Injection Molding Machine

Measurement and Verification Effort

ADM performed a desk review of the project. The implementor provided 25 days of pre installation power monitoring and 16 days of post installation power monitoring for three machines, the implementer only logged one of each of the new machines claiming that the baseline and post logged data for these reflects the other three not logged. During the pre-monitoring period it was reported that across the three logged machines a total of 21.33 days of non-typical downtime. These days were excluded from the analysis.

ADM used the pre-project trend data and pre-project production data to calculate a kWh per piece of product produced on the machines to obtain a baseline and then followed the same method using post-project trend data and post-project production to obtain the new kWh per product produced. The following formula was used:

$$System\ Efficiency = \frac{Total\ kWh}{Product\ Produced}$$

The following formula was used to calculate the annual kWh savings:

$$kWh_{Savings} = Production\ Rate_{Baseline} \times (System\ Efficiency_{Baseline} - System\ Efficiency_{New})$$

The following table shows the pre and post data for the two different production lines:

Pre and Post data identified by the Original Machine Model Number

	MA6000	MA2500	MA3200
Logged Time Pre (Days)	23	15	180
Logged Time Post (Days)	16	16.	16
Logged Period kWh (Pre)	17,378	6,244	7,436
Logged Period kWh (Post)	1,625	2,358	2,809
Production Weight lbs. (Pre)	12,767	12,409	11,510
Production Weight lbs. (Post)	10,960	4,467	9,267
Annual Production Pre	136,250	198,512	154,074
Annual Production Post	167,002	68,023	141,166
Energy intensity Pre (kWh/lb.)	1.36	0.50	0.65
Energy intensity Post (kWh/lb.)	0.15	0.53	0.30
Energy Intensity Savings	1.21	(0.02)	0.34
Yearly Savings (kWh)	330,518.95	(9,840.34)	105,668

Results

The calculated *ex post* savings are shown in the summary table below.

Verified Gross Savings/Realization Rates

SUMMARY			
Metric	**Expected**	**Measured**	**Realization Rate:**
Coincident Peak kW:	29.48	40.00	136%
Annual kWh:	651,627	426,346	65%

The kWh realization rate for both projects are 65% and the peak coincidence kW realization rate is 136%.

The low realization rate is a result of the implementor stating the facility operates 24 hours a day, five days a week with approximately 15 days of scheduled downtime a year (245 days per year) but they used 350 days per year in their analysis.

ADM in an attempt to clean up the power monitoring data re-calculated the kW and kWh data on all machines, this resulted in a slightly higher post energy intensity per pound of material on one machine which resulted in a negative impact on the gross savings.

ADM Site Report: PRJ-2489173

Executive Summary

This facility is a manufacturing facility which constructed a new building and installed multiple VFDs to control fans on production equipment. The project had a verified annual energy savings of 4,062,489 kWh and a peak demand savings of 488.50 kW resulting ins realization of 103% and 105% respectively.

Project Description

This project includes six process related fans at the facility:

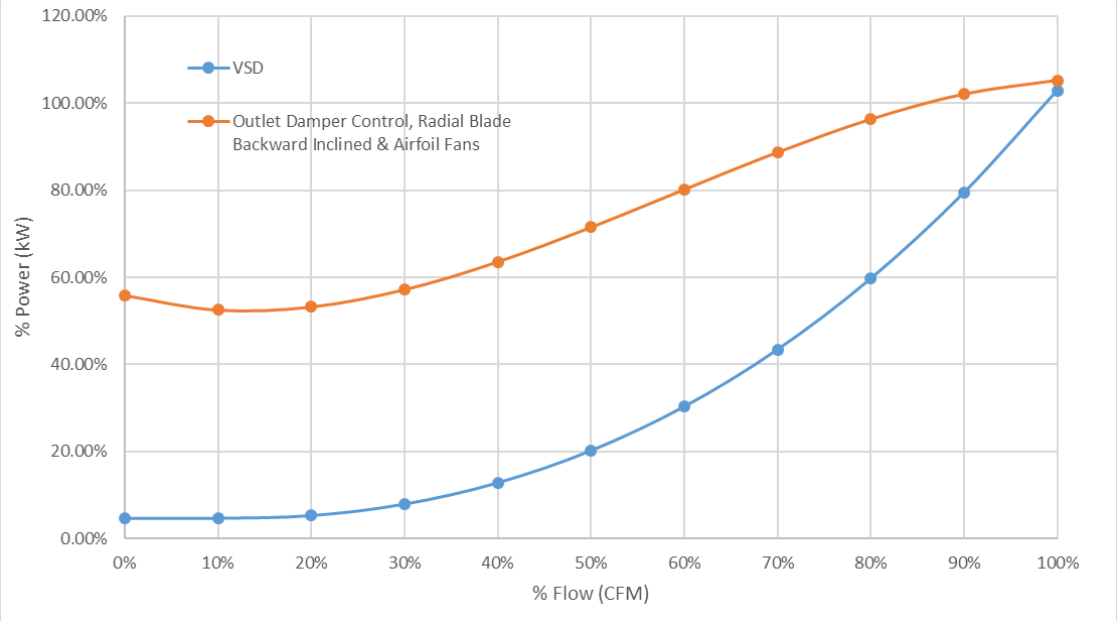
- 150 HP Fans
- (7) 100 HP Fan
- 75 HP Fan
- 60 HP Fan
- (6) 40 HP Fans

Measurement and Verification Effort

ADM performed a desk review to evaluate the project based on trended data. The implementer provided 14 days of post-installation trend data. The facility is new construction, so the baseline for this project is assumed to be typical industrial baseline practices which is to use outlet dampers on the fan to control flow. ADM assumed the facility operates steadily throughout the year and the trended data was extrapolated to the entire year. The trended data showed nearly continuous operation and the facility claimed to shut down the facility for 12 hours on every 3rd Thursday.

ADM used a default fan curve method according to the Uniform Methods Project to calculate energy savings from this project in addition to trended data from the facility. This would qualify as IMPVP option A, partial measure retrofit isolation. Both the as-built and baseline fan curves are shown in the figure below.

Baseline and As-Built Fan Curves



The following table shows the average percent flow, baseline kW, and as-built kW over 2 weeks of the post-installation monitoring period.

Average Flow and Power Consumption During the Monitoring Period

Measure Equipment	% Flow	Baseline kW	As-Built kW
150 HP Fan	74.48%	110.12	51.50
100 HP Fan	81.58%	69.01	30.14
100 HP Fan	20.10%	40.28	35.25
100 HP Fan	20.10%	40.28	35.25
100 HP Fan	72.47%	90.69	47.94
100 HP Fan	74.81%	92.44	47.70
100 HP Fan	71.81%	90.20	48.08
100 HP Fan	71.01%	89.54	48.01
75 HP Fan	50.71%	38.44	23.99
75 HP Fan	50.47%	38.41	23.93
60 HP Fan	50.55%	38.31	23.89
40 HP Fan	66.59%	24.80	12.58
40 HP Fan	74.25%	26.41	11.73
40 HP Fan	19.70%	17.31	12.44
40 HP Fan	53.46%	21.70	12.99
40 HP Fan	68.01%	25.11	12.46
40 HP Fan	78.70%	27.19	10.63

The following equations were used to calculate the annual energy savings from the retrofit:

$$\text{kWh}_{\text{Savings}} = \frac{\sum_{hour}\left[[kW_{hour}]_{pre} - [kW_{hour}]_{post}\right]}{Hr} \times AOH$$

$$\text{kW}_{\text{Savings}} = \overline{kW_{pre}} - \overline{kW_{post}}$$

Where:

$kWh_{savings}$	*= Annual energy savings*
$kW_{savings}$	*= Peak energy demand reduction*
kW_{hour}	*= Fan energy demand at hours of the week*
Hr	*= The total number of monitored hours*
AOH	*= Annual operating hours based on monitoring data, the table below*
$\overline{kW}$	*= The average energy demand during monitoring period*
pre	*= Denotes pre-installation state*
post	*= Denotes post-installation state*

The following table shows AOH of each fan based on monitoring data, accounting for 12 hours of downtime on every 3rd Thursday of the month, average savings per hour, and annual savings for each measure equipment.

Annual Savings per Measure Equipment

Measure Equipment	AOH	Average Savings (kW)	Annual Savings (kWh)
150 HP Fan	8474	52	436,380
100 HP Fan	8346	30	251,576
100 HP Fan	7668	35	270,286
100 HP Fan	7668	35	270,286
100 HP Fan	8519	48	408,433
100 HP Fan	8597	48	410,127
100 HP Fan	8542	48	410,662
100 HP Fan	8519	48	408,973
75 HP Fan	8572	24	205,616
75 HP Fan	8574	24	205,145
60 HP Fan	8573	24	204,788
40 HP Fan	7932	13	99,748
40 HP Fan	7947	12	93,256
40 HP Fan	8110	12	100,888

40 HP Fan	7932	13	102,994
40 HP Fan	7932	12	98,816
40 HP Fan	7947	11	84,515
Total		**489**	**4,062,489**

Results

The calculated *ex post* savings for this project is shown in the summary table below.

Verified Gross Savings/Realization Rates

Summary			
Metric	**Ex-Ante**	**Ex-Post**	**Realization Rate:**
Coincident Peak kW:	467	489	103%
Annual kWh:	3,948,188	4,062,489	105%

The kWh realization rate for both projects are 103% and the peak coincidence kW realization rate is 105%.

The ex-post savings have a higher realization rate due to ADM's method of calculating the AOH for the fan motors. On average, the verified AOH was two percent lower than what the implementor had claimed.

ADM Site Report: PRJ-2743208

Executive Summary

This facility is a manufacturing facility which installed VFDs to control fans and pumps on production equipment. The project had a verified annual energy savings of 365,316 kWh and a peak demand savings of 58.54 kW resulting ins realization of 99% and 99% respectively.

Project Description

This project includes six process related fans at the facility:

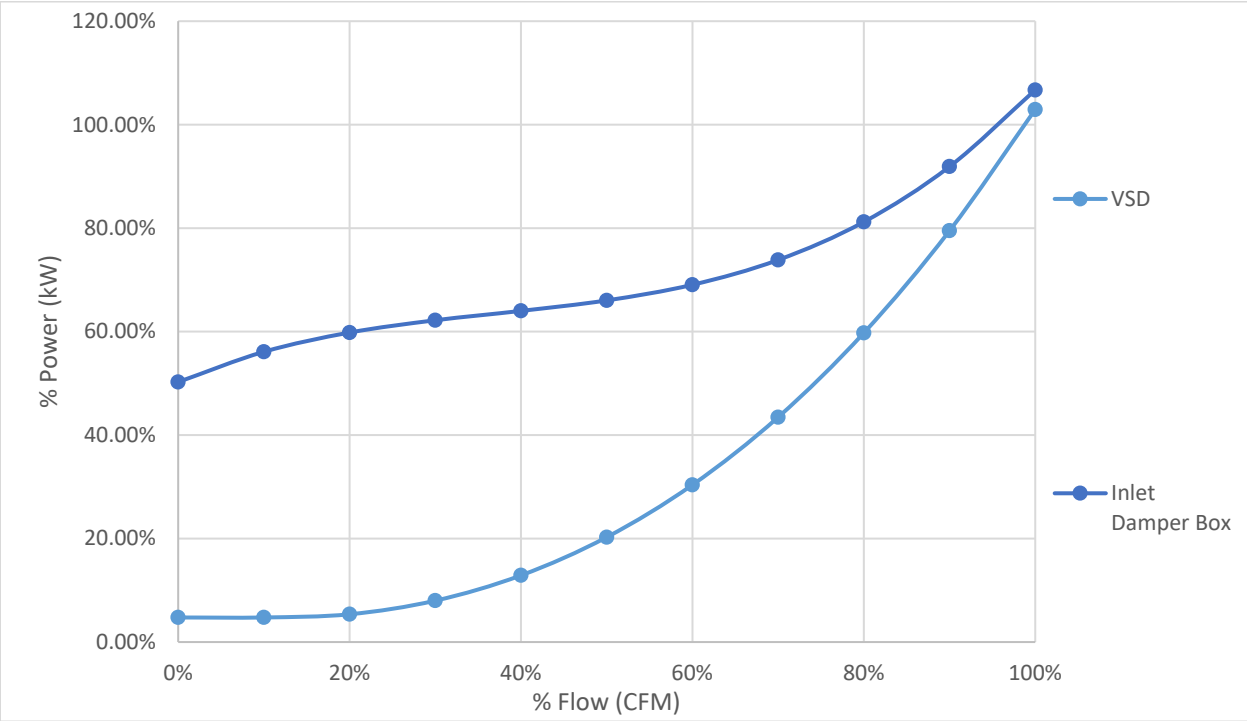
- (1) 150 HP Fan
- (1) 100 HP Fan
- (1) 1-HP Pump
- (1) 1/3-HP Pump

Measurement and Verification Effort

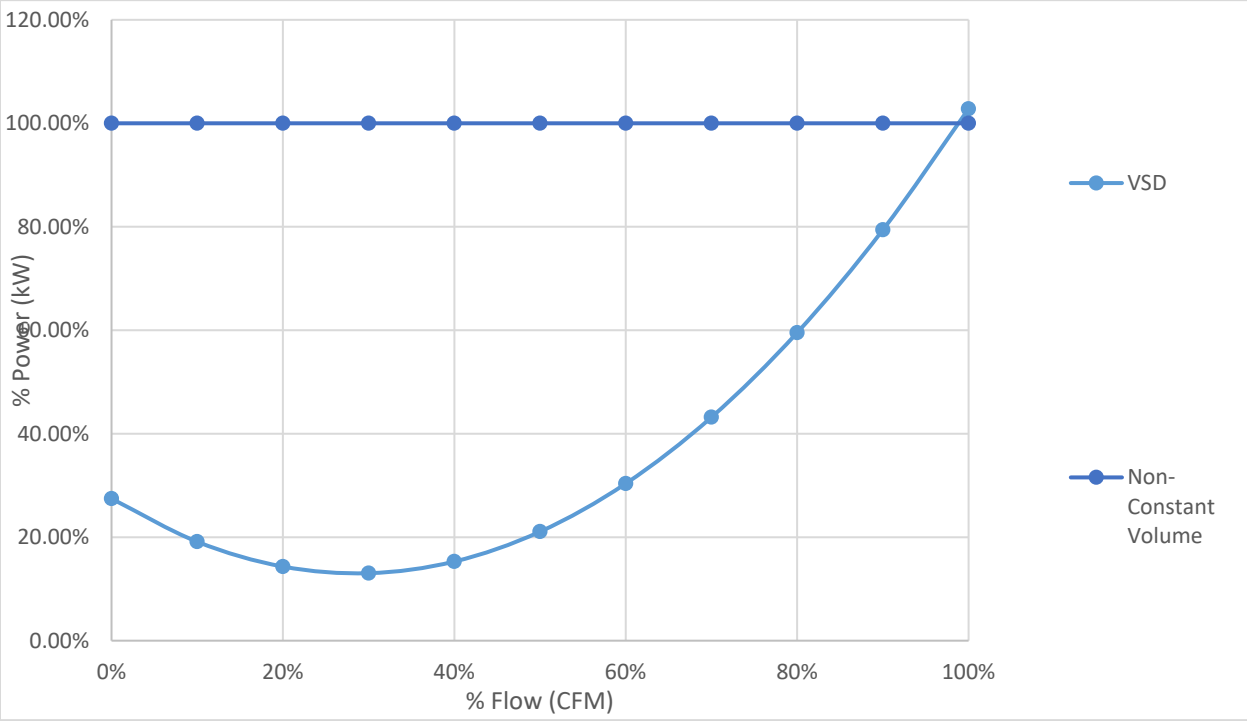
ADM performed a desk review to evaluate the project based on Uniform Methods Project to calculate energy savings for this project. The implementer provided name plate information for the retrofitted equipment as well as annual hours of use for the facility and the facilities equipment. The baseline control type for the fans were known so the equivalent fan and pump curve from the UMP was used to calculate a baseline energy usage.

ADM used a default fan curve method according to the Uniform Methods Project to calculate energy savings from this project. This would qualify as IMPVP option A, partial measure retrofit isolation. Both the as-built and baseline fan curves are shown in the figure below.

Baseline and As-Built Fan Curve



Baseline and As-Built Pump Curve



The below tables show the saving calculations for each retrofitted pump and fan.

Fan 150HP								
Part Load Performance		Baseline			Post-Retrofit			Savings kWh
% Flow Required	AOH	Full Load Power	kW	kWh	Full Load Power	kW	kWh	
0%	0	50%	47	-	5%	4	-	-
10%	0	56%	52	-	5%	4	-	-
20%	0	60%	56	-	5%	5	-	-
30%	312	62%	58	18,133	8%	7	2,332	15,800
40%	624	64%	60	37,321	13%	12	7,516	29,805
50%	1248	66%	62	77,006	20%	19	23,639	53,368
60%	1872	69%	65	120,797	30%	28	53,143	67,654
70%	1248	74%	69	86,128	43%	41	50,683	35,445
80%	624	81%	76	47,352	60%	56	34,840	12,512
90%	312	92%	86	26,793	80%	74	23,178	3,615
100%	0	107%	100	-	1023%	96	-	-
				413,530.41			195,331	218,199

Fan 100HP								
Part Load Performance		Baseline			Post-Retrofit			Savings kWh
% Flow Required	AOH	Full Load Power	kW	kWh	Full Load Power	kW	kWh	
0%	0	50%	31	-	5%	3	-	-
10%	0	56%	35	-	5%	3	-	-
20%	0	60%	37	-	5%	3	-	-
30%	312	62%	38	11,976	8%	5	1,540	10,436
40%	624	64%	40	24,649	13%	8	4,964	19,685
50%	1248	66%	41	50,860	20%	13	15,612	35,247
60%	1872	69%	43	79,782	30%	19	35,099	44,683
70%	1248	74%	46	56,884	43%	27	33,474	23,410
80%	624	81%	50	31,274	60%	37	23,010	8,264
90%	312	92%	57	17,696	80%	49	15,308	2,388
100%	0	107%	66	-	1033%	634	-	-
				273,121				144,112

Pump 1 HP								
Part Load Performance		Baseline			Post-Retrofit			Savings kWh
% Flow Required	AOH	Full Load Power	kW	kWh	Full Load Power	kW	kWh	
0%	0	100%	.70	-	27%	.19	-	0
10%	0	100%	.70	-	19%	.13	-	0
20%	0	100%	.70	-	14%	.10	-	0
30%	0	100%	.70	-	13%	.09	-	0
40%	624	100%	.70	436	15%	.11	67	369
50%	936	100%	.70	653	21%	.15	138	516
60%	936	100%	.70	653	30%	.21	198	455
70%	1248	100%	.70	871	43%	.30	376	495
80%	936	100%	.70	653	60%	.42	389	264
90%	936	100%	.70	653	79%	.55	519	135
100%	624	100%	.70	436	103%	.72	448	-12
				4,356			2,134	2,221

Pump 1/3 HP								
Part Load Performance		Baseline			Post-Retrofit			Savings kWh
% Flow Required	AOH	Full Load Power	kW	kWh	Full Load Power	kW	kWh	
0%	0	100%	.25	-	27%	.07	-	0
10%	0	100%	.25	-	19%	.05	-	0
20%	0	100%	.25	-	14%	.04	-	0
30%	0	100%	.25	-	13%	.03	-	0
40%	624	100%	.25	154	15%	.04	24	130
50%	936	100%	.25	2302	21%	.05	49	182
60%	936	100%	.25	232	30%	.07	70	160
70%	1248	100%	.25	307	43%	.11	133	175
80%	936	100%	.25	230	60%	.15	137	93
90%	936	100%	.25	230	79%	.20	183	47
100%	624	100%	.25	154	103%	.25	158	-4
				1,536			753	783

Results

The calculated *ex post* savings for this project is shown in the summary table below.

Verified Gross Savings/Realization Rates

Summary			
Metric	**Ex-Ante**	**Ex-Post**	**Realization Rate**
Coincident Peak kW:	59	59	99%
Annual kWh:	365,659	365,317	99%

The kWh realization rate for both kWh and Peak Demand are 99%.

The ex-post savings have a slightly lower realization rate due to a slightly lower full load kW for each motor.

Appendix C. Net-to-Gross Survey Outcomes

HEEP RSOL Single Family

Had you purchased and installed any [DIMEASURE] before you received them for free through the program?	HEEP SF (n=18)
Yes	61%
No	39%
Don't know	0%
Refused	0%

Did you have plans to purchase and install [DIMEASURE] before you learned about the [PATHWAY_NAME] Program?	HEEP SF (n=19)
Yes	21%
No	74%
Don't know	5%
Refused	0%

How many of the [DIMEASURE]'s that you received had you already planned to purchase?	HEEP SF (n=1)
Yes	0%
No	100%
Don't know	0%
Refused	0%

If you had not received the free [DIMEASURE], how likely is it that you would have installed them anyway within 12 months of when you received them? Would you say…	HEEP SF (n=19)
Very likely	16%
Somewhat likely	5%
Neither particularly likely nor unlikely	26%
Somewhat unlikely	21%
Very unlikely	32%
Don't know	0%
Refused	0%

HEEP RSOL Multifamily Property Managers

Would you have been financially able to install the [Measure] without the financial assistance provided through the program?	HEEP MF (n=2)
Yes	0%
No	50%
Don't know	50%
Refused	0%

Prior to learning about the [PATHWAY_NAME] program, did you have plans to [INSTALL] the [EFF_MEASURE]?	HEEP MF (n=2)
Yes	0%
No	50%
Don't know	50%
Refused	0%

Did you install the [EFF_MEASURE] sooner than you would have if the information and financial assistance from the program had not been available?	HEEP MF (n=2)
Yes	0%
No	50%
Don't know	50%
Refused	0%

How likely is it that you would have installed the same [EFF_MEASURE] within a year of when you received it if the financial assistance was not available? Would you say…	HEEP MF (n=2)
Very likely	0%
Somewhat likely	0%
Neither particularly likely nor unlikely	50%
Somewhat unlikely	50%
Very unlikely	0%
Don't know	0%
Refused	0%

Did the contractor that you worked with provide you with a recommendation to [INSTALL] the [EFF_MEASURE]?	HEEP MF (n=2)
Yes	0%
No	50%
Don't know	50%
Refused	0%

CWA Major Measures

Would you have been financially able to install the [Measure] without the financial assistance provided through the program?	CWA (n=83)
Yes	16%
No	78%
Don't know	6%
Refused	0%

Prior to learning about the [PATHWAY_NAME] program, did you have plans to [INSTALL] the [EFF_MEASURE]?	CWA (n=83)
Yes	22%
No	72%
Don't know	6%
Refused	0%

Just to be clear, did you have plans to install a [EFF_MEASURE] as opposed to a standard efficiency [STAND_MEASURE]?	CWA (n=18)
Yes	50%
No	0%
Don't know	50%
Refused	0%

Did you install the [EFF_MEASURE] sooner than you would have if the information and financial assistance from the program had not been available?	CWA (n=83)
Yes	47%
No	50%
Don't know	3%
Refused	0%

When might you have installed the same [EFF_MEASURE] if you had not participated in the program? Would you say…	CWA (n=39)
Within 6 months of when you purchased/installed	0%
Between 6 months and 1 year	13%
In more than 1 year to 2 years	20%
In 2 to 3 years	27%
In more than 3 years	27%
Never	7%
Don't know	7%
Refused	0%

How likely is it that you would have installed the same [EFF_MEASURE] within a year of when you received it if the financial assistance was not available? Would you say…	CWA (n=83)
Very likely	3%
Somewhat likely	16%
Neither particularly likely nor unlikely	3%
Somewhat unlikely	16%
Very unlikely	50%
Don't know	13%
Refused	0%

Did the contractor that you worked with provide you with a recommendation to [INSTALL] the [EFF_MEASURE]?	CWA (n=83)
Yes	69%
No	19%
Don't know	13%
Refused	0%

On a scale where 0 means "not at all influential" and 10 means "extremely influential," how influential was the recommendation provided by this contractor in your decision to purchase the [EFF_MEASURE]?	CWA (n=57)
0 - Not at all Influential	0%
1	0%
2	0%
3	5%
4	0%
5	0%
6	0%
7	5%
8	14%
9	14%
10	46%
Don't know	18%
Refused	0%

CWA DI Measures

Had you purchased and installed any [DIMEASURE] before you received them for free through the program?	CWA (n=67)
Yes	44%
No	53%
Don't know	0%
Refused	0%

Did you have plans to purchase and install [DIMEASURE] before you learned about the [PATHWAY_NAME] Program?	CWA (n=67)
Yes	44%
No	53%
Don't know	5%
Refused	0%

If you had not received the free [DIMEASURE], how likely is it that you would have installed them anyway within 12 months of when you received them? Would you say…	CWA (n=67)
Very likely	42%
Somewhat likely	19%
Neither particularly likely nor unlikely	6%
Somewhat unlikely	0%
Very unlikely	17%
Don’t know	17%
Refused	0%

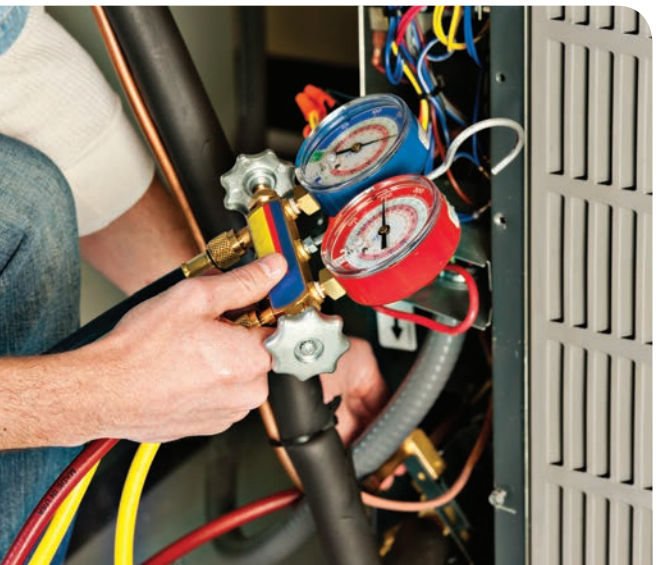
Attachment B:
Samples of OG&E Promotional and Educational Materials

RESIDENTIAL OFFERINGS

Residential Solutions Program
This program identifies energy-saving improvements in your home by providing a free online Home Energy Profile and walkthrough In-Home Energy Assessment. The online profile takes only a few minutes and your assessment includes free installations of energy-saving items.

Rebates
To offset the costs of energy efficiency improvements, OG&E offers rebates toward a number of energy efficiency improvements, including air sealing, insulation, duct sealing, ENERGY STAR® windows and pool pumps.

Multi-Family Efficiency Program
Own or live in a residential apartment or multi-family unit? OG&E offers many of the same rebates for multi-family customers, such as property assessments, air sealing, duct sealing, A/C tune-ups, and more.



Consumer products
This program offers instant in-store discounts at select retailers on ENERGY STAR LED lighting. Additionally a mail-in rebate for qualified Wi-Fi enabled smart thermostats is also available.

HVAC replacement & tune-up
OG&E offers incentives and rebates toward A/C tune-ups and replacements to offset project costs and lower your energy bill.

Weatherization
This program provides free energy efficiency upgrades for customers who own or rent a single-family home or duplex. These upgrades will help lower energy costs and increase comfort and safety in your home.

Student Energy Education LivingWise
Got a sixth grader at home? OG&E teams up with local schools to provide them with educational kits, at no cost, that can teach them how to save energy at home and in the classroom.

OG&E®

COMMERCIAL OFFERINGS

Large Commercial & Industrial Solutions
When completed on a large scale, a few energy-saving upgrades can have an enormous impact on a business' bottom line. This program helps business owners identify the most cost-effective energy efficiency opportunities and provides incentives based on how much is saved.

Small Business Solutions
For smaller commercial facilities, we cover up to 90 percent of the cost of qualifying energy-efficient lighting upgrades. It all starts with a free walkthrough evaluation.

COMMERCIAL OFFERINGS (continued)

Commercial Midstream Instant Incentive

OG&E provides commercial customers with instant rebates on select LED lighting at participating lighting distributors.

Schools and Government Efficiency Program

From walkthrough audits to benchmarking and energy master planning workshops, we provide educational and government facilities with everything you need to get smart about energy use.

POSITIVE ENERGY TOGETHER®

The energy-saving possibilities are endless.

With rates among the lowest in the country, OG&E will never stop finding ways to help Arkansas save energy and money.

Get started.

To learn more about all the ways OG&E can help you save energy, visit oge.com or call 844 413 3065 today.

OG&E®

ARKANSAS

ENERGY EFFICIENCY PROGRAMS

With a wide variety of programs, services and incentives designed to help you save energy, OG&E is your go-to source for all things efficiency.

POSITIVE ENERGY TOGETHER® | OG&E® OGE.COM

*LOWER **YOUR COSTS**, INCREASE **YOUR COMFORT***

OG&E®
We Energize Life

ARKANSAS

Increase the comfort of your home and make your energy bill more manageable at no additional cost with the OG&E Weatherization Program.

Our trained crews have worked to improve the homes of more than 50,000 customers over the years and they're not stopping now! Valued at approximately $3,000, the OG&E Weatherization Program covers a wide range of improvements that may include but are not limited to:

- Adding insulation to the attic
- Duct sealing
- Caulking windows to eliminate air leakage and drafts
- Weatherstripping around doors
- Installing energy-saving LED light bulbs
- Sealing air leaks throughout the home
- Other thermal improvements

This program is available to eligible OG&E Arkansas residential customers who meet the following criteria*:

- Current OG&E or AOG residential customer
- Own or rent** a single-family home or duplex built prior to 2010

Spots are limited so if you or someone you know could benefit from home weatherization improvements at no additional cost, don't wait!

Visit **oge.com/weatherization** to see if you're eligible and to enroll in OG&E's Weatherization Program. You can also contact our call center at 800-272-9741 from 8 a.m. to 5 p.m., Monday through Friday.

* Certain limitations and state-mandated guidelines may apply.
** Weatherization services are available to rental properties if an eligible customer lives in the home and has approval from the property owner.

OGE.COM

OG&E® WEATHERIZATION PROGRAM

OG&E®

Energía para la Vida

*REDUZCA SUS **COSTOS**, AUMENTE SU **COMODIDAD***

ARKANSAS

Aumente la comodidad de su hogar y tenga un mayor manejo de su factura de energía sin ningún costo adicional con el Programa de Climatización de OG&E.

Nuestro personal capacitado ha trabajado para mejorar los hogares de más de 50,000 clientes a través de los años, ¡y no piensan detenerse ahora! Con un valor aproximado de $3,000, el Programa de Climatización de OG&E cubre una amplia variedad de mejoras, las cuales pueden incluir, pero no limitarse a:

- Añadir aislamiento al ático
- Sellado de ductos
- Sellado de ventanas para eliminar fugas y corrientes de aire
- Colocación de burletes (cintas protectoras) alrededor de las puertas
- Instalación de focos LED ahorradores de energía
- Sellado de fugas de aire a través del hogar
- Otras mejoras térmicas

Este programa está disponible para los clientes residenciales de OG&E en Arkansas quienes cumplan con los siguientes requisitos*:

- Ser cliente residencial actual de OG&E o AOG
- Ser propietario o rentar** una casa unifamiliar o dúplex construida antes del 2010

La disponibilidad es limitada, por lo que si usted o alguien que conoce puede beneficiarse de mejoras de climatización del hogar sin costo adicional, ¡no espere más!

Visite **oge.com/weatherization** para ver si usted es elegible y para inscribirse en el Programa de Climatización de OG&E. También puede contactar a nuestro Centro de Atención al Cliente llamando al 800-272-9741 de 8 a.m. a 5 p.m., de Lunes a Viernes.

*Se podrán aplicar ciertas limitaciones y reglas establecidas por el Estado.
**Los servicios de climatización estarán disponibles para las propiedades en renta si un cliente elegible vive en el hogar y cuenta con la aprobación del propietario.

OGE.COM

OG&E® PROGRAMA DE CLIMATIZACIÓN

SAVINGS FOR ALL SEASONS

POSITIVE ENERGY TOGETHER®

OG&E®

Arkansas weather may be unpredictable, but these savings are built to last. Take advantage of the energy-saving upgrades offered through our Weatherization Program to keep your home comfortable and efficient all year long.

Available at no additional cost to you:

- Attic insulation
- Air sealing
- Window caulking
- Door weatherstripping
- LED bulbs

START SAVING.

Call **800-272-9741** (all other areas), or visit **oge.com/weatherization**.

The OG&E Weatherization Program provides home energy efficiency upgrades—at no out-of-pocket cost—to current OG&E residential customers residing in Arkansas, whose homes were built prior to 2010.

IMPROVE YOUR HOME, NO WALLET REQUIRED.

The simple path to savings starts with 10 easy questions. Take the eScore™ quiz to see if you qualify for an In-Home Assessment that may include:

- An expert walk-through analysis of your home's energy use
- Up to 15 LED bulbs
- Advanced power strips (as needed)
- A custom Home Energy Report with recommended improvements

Our Advanced A/C Tune-up offers another cool way to save. Schedule yours to boost your A/C unit's energy efficiency by up to 30 percent. Access to professional support, rebates and products all at no out-of-pocket cost.

START SAVING.

Discover all the ways we can help you save at **oge.com/arheep**, or call us at **844-413-3065**.

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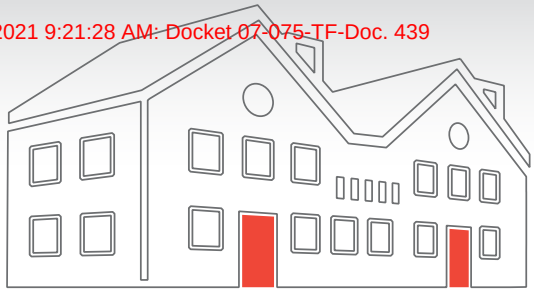
OG&E®

MULTI-FAMILY
ENERGY EFFICIENCY

ADD VALUE TO YOUR PROPERTY WITH REBATES FROM OG&E.



The OG&E Home Energy Efficiency Program offers multi-family property owners and managers the following benefits to you and your tenants:

- Add value to your property while reducing electricity and water costs
- Lower tenant turnover due to increased comfort and lower utility bills
- Reducing energy use by 15 percent in a typical 250-unit individually metered community will increase net operating income and can enhance asset value by over $200,000 annually*

**Multi-Family Fact Sheet, EnergyStar.gov*

MULTI-FAMILY EFFICIENCY PROGRAM

Through the Home Energy Efficiency Program, qualified participating contractors will install energy-saving products including LED light bulbs, energy-efficient showerheads and faucet aerators and advanced power strips at no cost. In addition, units may qualify for duct and air-sealing work to increase efficiency of the unit.

Air Infiltration

During an air infiltration service, OG&E's qualified contractors use diagnostic testing equipment to identify and properly seal air leaks, which helps save energy and remove dust, allergens and pollutants from the air in your tenant's home.

Duct Sealing

Qualified OG&E contractors will evaluate your tenant's duct system, seal leaks and repair or replace damaged ducts, which can greatly improve home comfort and reduce heating and cooling costs by as much as 20 percent.

PROGRAM PROCESS

- No-cost installation by a participating OG&E contractor
- Installation scheduled by the participating contractor at the property's convenience
- Labor and materials supplied by the participating contractor
- Replaced fixtures removed by participating contractor
- Participating contractor submits rebate paperwork to the program
- Rebate checks mailed in 4 to 6 weeks

To speak with an energy advisor, call 844.413.3065 or email residential.ar@oge.com.

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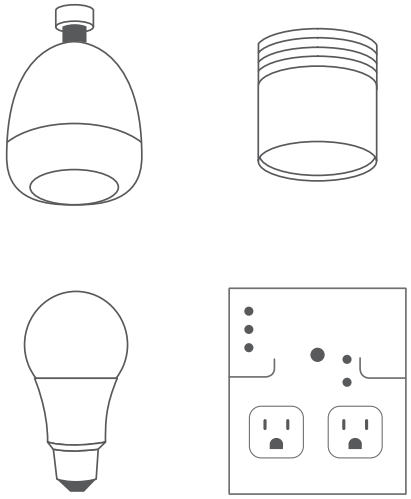
OGE.COM

MULTI-FAMILY EFFICIENCY PROGRAM

PROGRAM PARTICIPANTS RECEIVE THESE UPGRADES

- Energy-efficient faucet aerators (kitchen and bath)
- Energy-efficient showerheads
- Advanced power strips
- LED bulbs
- Air and duct leakage improvements



NEXT STEPS

There are more opportunities to save money on improvements. To speak with an energy advisor, call 844.413.3065 or email residential.ar@oge.com.

SAVINGS BY THE NUMBERS

A 100-unit apartment complex with all upgrades installed can see savings of:

450,000 kWh
annually

362,700 gallons
of water annually

$1,000
incentive

POSITIVE ENERGY TOGETHER®

OG&E®
OGE.COM

GIVE YOUR HOME SOME EXTRA LOVE.

POSITIVE ENERGY TOGETHER®

With no out-of-pocket cost required, an In-Home Energy Assessment just might be the smartest way to save this year.

Valued at over $250, your assessment includes:

- An expert walk-through analysis of your home's energy use
- Up to 15 LED bulbs
- Advanced power strips (as needed)
- Up to two showerheads and aerators (as needed)
- A custom Home Energy Report with recommended improvements

Call **844-882-5746** to schedule your assessment today.

OG&E®

WE'RE HERE TO HELP YOU SAVE ENERGY.

POSITIVE ENERGY TOGETHER®

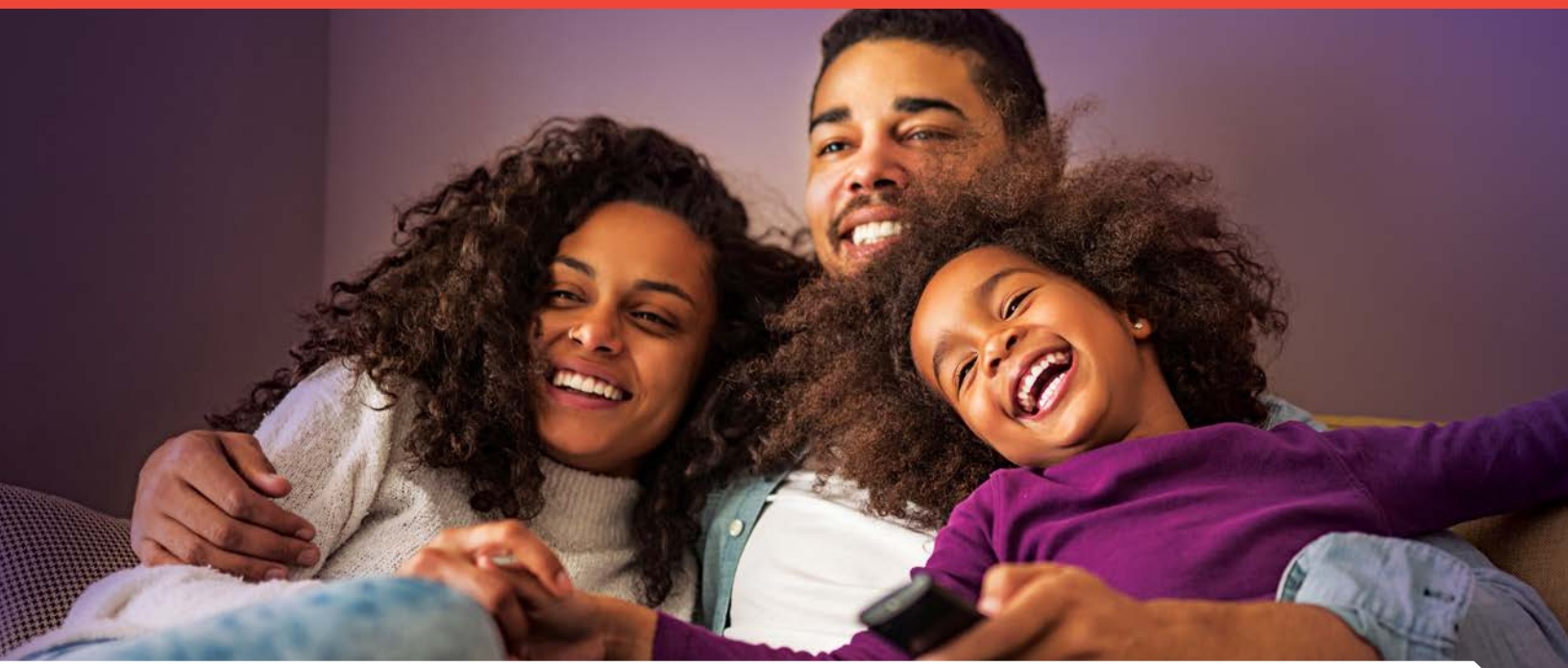
OG&E®

Simply put, our goal is to help customers like you save energy.

From our eScore™ energy management tool to energy efficiency rebates, we offer a variety of programs, technology and incentives to help manage your energy use and costs.

See them all at **oge.com/arheep**.

Higher efficiency, lower costs



At OG&E, our goal is to help customers save energy and live more comfortably.

That's why our Home Energy Efficiency Program provides energy-saving tools, programs and incentives to all our neighbors across Arkansas. From attic to basement, we'll help you discover which upgrades work best for your home and budget—and be there to help you every step of the way.

BRING HOME **EASY SAVINGS**

Lowering your energy consumption is now easier than ever—and it all starts with our simple-to-use online eScore™ tool. With just a few questions, eScore identifies trouble spots in your home and provides customized tips on how to improve your comfort and lower your energy costs.

Get started on the path toward a more comfortable, energy-efficient home at **oge.com/arheep**.

YOUR ENERGY EFFICIENCY **TOOLBOX**

Complete your online eScore profile to see if your home could benefit from our In-Home Assessment. Valued at $250, the assessment includes all the following with no out-of-pocket costs required:

- An expert walkthrough analysis of your home's energy efficiency
- Up to 15 LED bulbs
- Advanced power strips (up to two as needed)
- Up to two showerheads and aerators (as needed)
- A custom Home Energy Report with recommended improvements
- Access to additional services, incentives and offerings to help you manage energy costs

TUNE UP YOUR **ENERGY COSTS**

A cooler, more efficient summer starts with an OG&E A/C Tune-up.

Schedule yours today to boost your A/C unit's efficiency by up to 30 percent. Valued at $175, the tune-up requires no out-of-pocket costs from qualifying customers.*

Benefits:

- Longer-lasting, better-working equipment
- Great energy efficiency
- Improved comfort and humidity control
- Access to potential incentives for a high-efficiency replacement, if needed

*Additional charges may apply.

INSTANT **INCENTIVES**

Look for "Special Pricing from OG&E" signs at your local retailer for special deals on energy-efficient products.

EVEN MORE **WAYS TO SAVE**

Want to become a more energy-conscious consumer? OG&E rebates and incentives let you pay less for the technology that saves you more.**

Insulation
We offer rebates for professionally installed insulation.

Rebates: $0.15/sq. ft. for attic insulation; $0.50/sq. ft. for wall insulation

Windows
We offer a $50 rebate for each professionally installed ENERGY STAR® certified window (limit 7).

Pool Pumps
ENERGY STAR certified multi-speed (≥ 1 hp) and variable-speed (≥ 0.5 hp) pool pumps qualify for a $300 rebate.

Air Sealing
We offer rebates for professionally installed air sealing.

Rebates: $100 for ≥ 15 percent reduction in air leakage; $150 for ≥ 30 percent reduction in air leakage

A/C or Heat Pump Replacement
We offer rebates for high-performance A/C and heat pump replacement systems.

Rebates: $80/ton for 16 SEER; $100/ton for 17 SEER; $120/ton for 18 SEER

**Incentive funds are limited. Please call 844-413-3065 to confirm fund availability and schedule work.

For more ways OG&E can help you manage your energy costs, visit oge.com/arheep or contact us at 844-413-3065.

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OG&E ARKANSAS

In-Home Assessment Social Media Campaign

FACEBOOK POST OPTIONS

FACEBOOK POST 1

OG&E
Sponsored
Like Page

From assessments to rebates, OG&E offers the safety and expertise you need to sweat less and save more.

Save all summer.
Start your Home Review.
OGE.COM/ARHEEP
Learn More

20 562 Comments 311 Shares
Like Comment Share

FACEBOOK POST 2

OG&E
Sponsored
Like Page

You're just minutes away from energy enlightenment. See if you qualify for our safe and easy In-Home Energy Assessment.

LEDs, rebates and more.
No out-of-pocket costs for you
OGE.COM/ARHEEP
Learn More

20 562 Comments 311 Shares
Like Comment Share

FACEBOOK POST 3

OG&E
Sponsored
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Energy bills don't have to be a bummer. Stay safe and save with OG&E's energy-saving tools and rebates.

Keep cool and save.
Summer's no bummer with OG&E.
OGE.COM/ARHEEP
Learn More

20 562 Comments 311 Shares
Like Comment Share

FACEBOOK POST 4

OG&E
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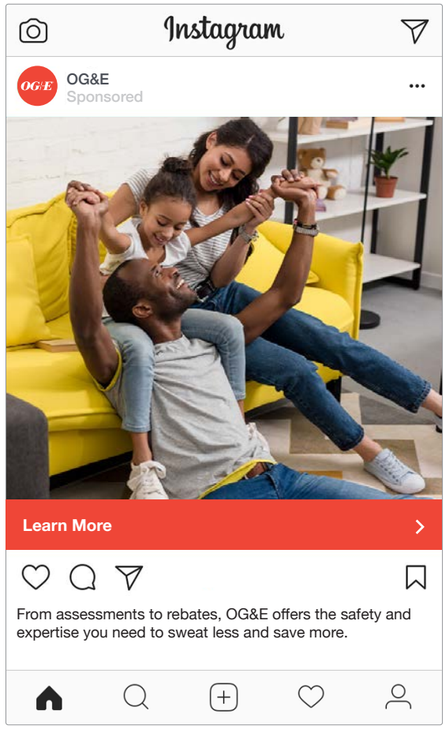
Pop quiz: Do you know how much OG&E can help you save on home energy improvements? Find out right here 👇

How much can you save?
Start your Home Review now.
OGE.COM/ARHEEP
Learn More

20 562 Comments 311 Shares
Like Comment Share

INSTAGRAM POST OPTIONS

INSTAGRAM POST 1



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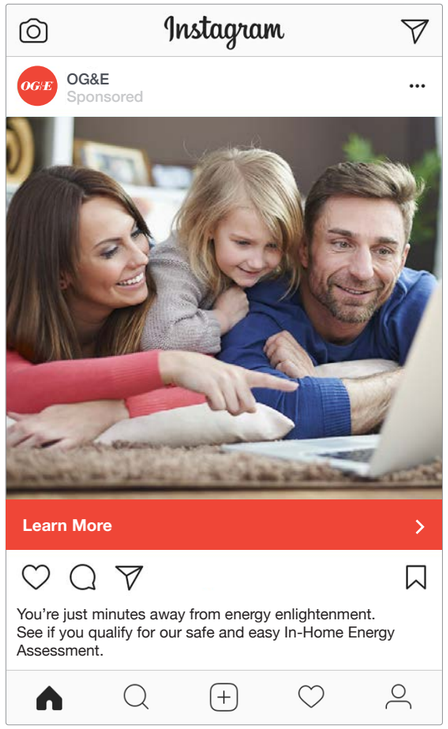

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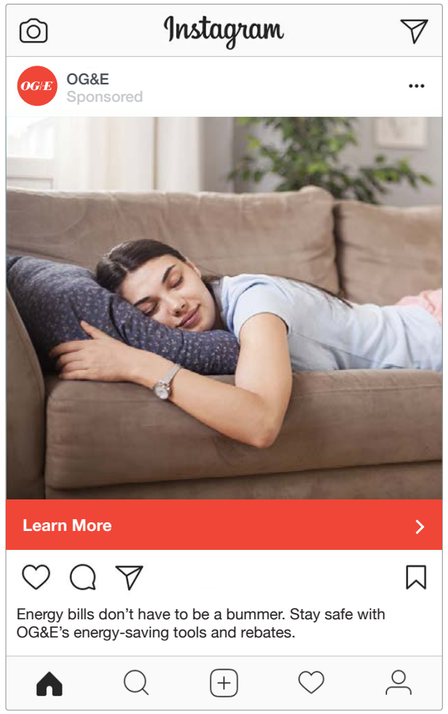

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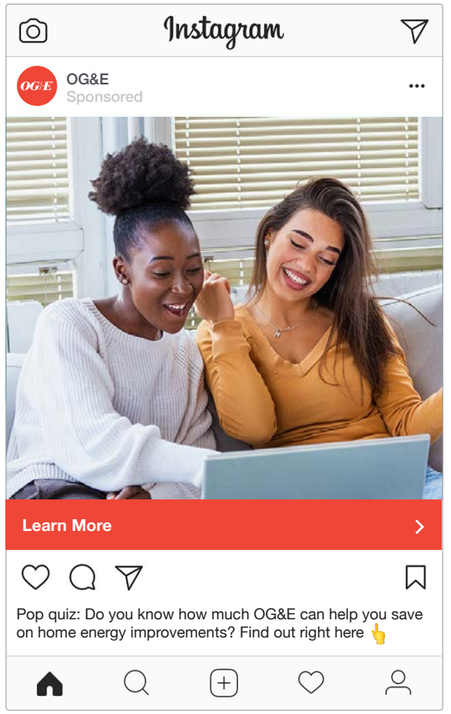

CLEAResult®

THANK YOU!

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INSTANT REBATES FOR SMALL BUSINESS
LONG-TERM SAVINGS

LEDS	
LED Pin-Base CFL Direct Replacement Lamp	$5

LED REFLECTORS			
R/BR30	$3	PAR16	$5
R/BR20	$3	PAR30	$4
R/BR40	$3	MR16	$5
PAR20	$5	PAR38	$4

LED LINEAR FIXTURES	
2X2 LED Linear Fixture	$20
2X2 LED Linear Fixture w/ Integrated Sensor	$25
2X4 LED Linear Fixture	$30
2X4 LED Linear Fixture w/ Integrated Sensor	$35

LED WALL PACK/ FLOOD/ POLE MOUNT	
LED Wall Pack/Flood 7 W – 29 W	$20
LED Wall Pack/Flood 30 W – 80 W	$50
LED Wall Pack/Flood 80 W +	$80

LINEAR	
LED 8' tube	$12
LED T8 Replacement	$3
LED T5 Replacement	$5

LED LOWBAY/HIGHBAY	
LED Lowbay/Highbay 30 W – 60 W	$65
LED Lowbay/Highbay 61 W – 100 W	$75
LED Lowbay/Highbay 100 + W	$100

OTHER REBATES	
LED Downlight/Trim Kit	$8
Wall Sensor	$20
Ceiling Sensor	$30

Ask our sales staff for more details.

DISTRIBUTOR LOGO AREA

Sample Company Name
XXX-XXX-XXXX
samplecompanyname.com

Contact us for more information:
ogemidstreamar@clearesult.com or
oge.com/ceep or call: 479-414-2071

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BUSINESS SUCCESS
OG&E EFFICIENCY PARTNER

Funds are limited and available on a first-come, first-served basis.

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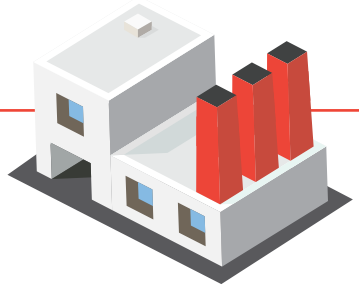
ENERGY SAVINGS THAT WORK HARD FOR YOU

OG&E Commercial Energy Efficiency Program offers financial incentives when energy efficiency measures are implemented at large commercial facilities like yours. We'll provide an energy assessment for no out of pocket costs to help you identify and financially qualify potential energy-saving projects that could even include solutions with little or no cost.

To make reducing your energy costs even easier, we also offer significant incentives for each energy efficiency upgrade installed. Incentives are available for the following measures:

- HVAC – DX Retrofit
- HVAC – DX New Construction
- Chiller Retrofit
- Chiller New Construction
- PC Power Management
- LED Lighting Retrofit
- Lighting New Construction
- Vending Misers
- Door Heater Controls
- ECM Evaporator Fan
- Electronic Defrost Controls
- Solid Door Reach-Ins
- Strip Curtains
- Night Covers
- Cooler Door Gaskets
- Lighting Controls
- Lodging Occupancy Controls
- Compressed Air
- Combined Custom Measures
- Retrocommissioning
- Operational
- Variable Frequency Drives



MORE WAYS TO SAVE

CONTACT US FOR MORE INFORMATION:

844-413-3065
commercial.ar@oge.com

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OG&E EFFICIENCY PARTNER

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SCHOOLS AND GOVERNMENT EFFICIENCY PROGRAM

Design
OG&E provides incentive funding for energy-efficient upgrades and retrofits to all educational and publicly funded facilities within our service territory. Based on the energy-efficient measures you choose, we'll help you secure the largest incentives available. Free educational activities are also available, which are designed to help administrative personnel at facilities to identify and quantify energy efficiency opportunities.

Goals
The program could cover up to one half the cost of each project. Over the long term, we're here to help participants save money on utility bills, improve comfort and protect the environment through education, increased efficiency and responsible energy consumption.

Implementation
Program representatives will help facilities with participation in all our available services, and help determine what energy efficiency measures will work best for them.

At your request, our building science team can perform a no-cost walk-through of your facilities and recommend energy-saving improvements. Your facilities may also be compared to others that operate similarly in a benchmark study.

Recognition
Realizing energy and fiscal savings is an important milestone that's worth celebrating. OG&E will partner with you to help make sure you have an opportunity to publicly share your success through a variety of media channels.

Eligibility
All publicly funded facilities located within the OG&E service territory are eligible to participate.

Timeframe
Participation is based on a first-come, first-served basis now through December 15 of the current program year, or while funds last.

MORE WAYS TO SAVE

CONTACT US FOR MORE INFORMATION:

844-413-3065
commercial.ar@oge.com

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Available incentives

Planning an energy efficiency project? Get with the program. Our Small Business Efficiency Program offers incentives that can cover up to 90 percent of the cost of a project.

Incentive rates:

- $0.15/kWh reduced for eligible LED lighting fixtures & tube lamp measures
- $0.14/kWh reduced for eligible LED lighting screw in bulbs (A19, BR30, etc.)
- $0.12/kWh reduced for refrigeration door gaskets

Eligible projects

Incentives are available for a wide variety of energy efficiency projects, including:

- LED lighting upgrades* (tube lights, bulbs, fixtures)
- Occupancy sensor installations
- LED exit sign retrofits
- Refrigerator door gaskets
- Refrigerator anti-sweat heater controls
- And more!

LED retrofits must be either DesignLights Consortium® approved or ENERGY STAR® certified to receive incentives.

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OGE.COM

Take control of your energy use—and your bottom line.

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To get started, contact a program representative by email at

oge.ar.sbdi@clearesult.com

OR CALL

844-413-3065

Products and services are provided solely by approved participating Service Providers. OG&E does not sell goods or services in its energy efficiency programs.

Big savings for your small business

OG&E offers energy-efficient solutions for small business customers.

SMALL BUSINESS EFFICIENCY PROGRAM

Program benefits

We'll provide everything you need to help your business achieve long-term energy savings, including:

- A no-out-of-pocket cost no-obligation lighting assessment to identify energy-saving opportunities
- Recommendations and estimates for energy savings, project costs and payback periods
- Installation of approved energy-saving equipment by a local, pre-qualified contractor
- Incentives paid directly to the contractor by the program to reduce your upfront cost

It's with programs like this that OG&E is able to keep rates among the lowest in the country.

Eligibility

The program is open to any small commercial customers with a valid OG&E account meter and no more than 100 kW peak demand at any one facility.

Get started today

1. Email oge.ar.sbdi@clearesult.com or call 844-413-3065 for a list of participating contractors and select a contractor.
2. Contact the contractor you selected and provide your customer account number to verify your eligibility.
3. The participating contractor will provide a no-cost walk-through assessment of your facility.
4. Review your energy-saving proposal and sign the customer proposal to approve the recommended measures.
5. The participating contractor will install the approved measures within 60 days of receiving the signed agreement.

Typical project scenario

To give you an idea of the potential savings available through the program, below is an example of some commonly proposed retrofits. The projected savings and costs for these retrofits are on the right.

EXISTING INTERIOR LIGHTING:

32 4 ft. 4-lamp fluorescent fixtures
16 60W incandescent bulbs
2 exit signs

INTERIOR LIGHTING RETROFIT:

32 4 ft. 36W LED fixtures
16 10W LEDs
2 LED exit signs

Incentives, actual savings and payback periods vary depending on the equipment installed, building characteristics, energy-use patterns, age of existing equipment, location and other parameters specific to the project.

OG&E®

Example project by the numbers

11,638 kWh
total energy savings

3.28 kW
total peak demand savings

$3,712
estimated incentives

$1,979
net cost to customer

$4,712
estimated project cost

1.7 years
project payback

$1,163.84
estimated annual savings

POSITIVE ENERGY TOGETHER®

TEACH YOUR OLDER BUILDING NEW TRICKS.

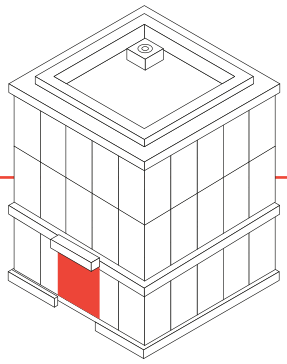
Just like a car, the typical small-to-midsize building requires regular maintenance to avoid costly repairs and ensure it's operating as efficiently as possible. This service is a Building Tune-up, also known as Retrocommissioning Lite (RCx Lite). OG&E's new Building Tune-up service determines the most effective energy-saving improvements to your facility—and covers up to 80 percent of the recommended project costs.

How it works

1. A participating contractor works with you to determine if your building could benefit from a tune-up.
2. At no out-of-pocket cost, the contractor performs an on-site survey of your facility (a $2,500–$5,000 value) to identify potential energy-efficient improvements.
3. You can then work with your contractor to complete those improvements, which will determine your bill savings and incentives.
4. OG&E incentives ($0.11 per kWh saved) cover up to 80 percent of your project cost.

What is a Building Tune-up?

Our **Building Tune-up** service looks at your building as a whole system to optimize its energy use. Typical projects include heating and cooling, ventilation, economizers, actuators and thermostat scheduling setbacks.



READY
FOR YOUR TUNE-UP?

Call **844-413-3065**
to learn more, or visit
commercial.ar@oge.com
for details.

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LEARN HOW TO SAVE ENERGY LIKE AN EXPERT

TURN YOUR ORGANIZATION INTO A FINELY TUNED, COST-SAVING MACHINE

OG&E's Continuous Energy Improvement (CEI) Program provides tools, training and technical resources that can help you reduce your organization's energy costs by up to 25 percent.

Through workshop sessions and one-on-one coaching, we'll teach you to identify and implement simple, low-cost savings opportunities across your organization. We'll also help you take advantage of incredible financial incentives offered through our Commercial Energy Efficiency Program.

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 will help you influence your culture and engage your organization toward wise energy use and reduced energy waste.

From training to mentoring support, our team of energy experts is ready to help you save—all at no financial cost to you.

ELIGIBILITY

Participation is limited to 8-12 industrial, public sector and commercial organizations that use significant amounts of energy.

BENEFITS

- Energy cost savings
- Identify low-cost energy saving opportunities and quick payback energy projects
- Statistical energy model(s) for tracking performance and forecasting
- Network with and learn best practices from other participants
- Technical and coaching resources
- Tools and educational materials
- Umbrella support to maximize savings through OG&E programs
- Incentive bonus for low-cost savings ($0.02 per annual kWh saved)

"The OG&E Continuous Energy Improvement (CEI) Program has really benefited Johnson Controls by helping us achieve our corporate continuous improvement energy goals this year. Involvement in the CEI Program, 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. After a successful first year, we look forward to partnering again with OG&E and continuing to save energy through the CEI Program."

Matt Truitt
UPG EHS Manager
Building Efficiency
Johnson Controls

"The CEI program fit perfectly with the core values of OU Medicine in the area of stewardship. The program tied in seamlessly with our sustainability efforts on campus and reinforced the use of continuous improvement methods to develop a robust energy program for our hospitals."

Joshua Ashlock, MBA, CHFM, CHC
Director of Facilities Engineering
OU Medical Center

POSITIVE ENERGY TOGETHER®

COMPANY-WIDE SAVINGS ARE IN SESSION

FIRST YEAR—WORKSHOPS AND ACTIVITIES

	DESCRIPTION	TYPE	TIMING	LOCATION
1	Kickoff and building a foundation	Group	Month 1	OG&E
2	Site review and opportunity assessment	Individual	Months 1–2	Participant's Site
3	Energy modeling and measurement	Group	Month 3	Host Site
4	Review and prioritize opportunities	Individual	Months 2-4	Participant's Site
5	Engage your organization in saving energy	Group	Month 5	Host Site
6	Executive sponsor update and energy model handoff	Individual	Months 5–7	Participant's Site
7	Technical forums for saving energy	Group	Month 7	Host Site
8	Energy saving coworker engagement event	Individual	Months 6–12	Participant's Site
9	Energy management assessment & executive sponsor update	Individual	Months 9–12	Participant's Site
10	Report out/celebration	Group	Month 12	OG&E
11	Graduate to alumni cohort - continue CEI		Ongoing	

Ready to get started?
Contact Jason Bland today at **479-459-4369** or **jason.bland@clearesult.com**.

LivingWise® Program Contents

Each program includes the following materials:

Student Materials

- *Student Guide*
- *Student Workbook*
- *LivingWise Kit (shown below)*
- *Parent Letter/Pledge Form*
- *Student Survey Form*
- *Certificate of Achievement*
- *Unlimited Website Access*
- *Toll-Free HELP Line*
- *"OG&E" Wristband*

Teacher Materials

- *Teacher Book*
- *Step-by-Step Program Checklist*
- *Five-day Teaching Unit Plan*
- *State Education Standard Correlation Chart*
- *Electricity, Water and Natural Gas Posters for classroom*
- *Teacher Survey Form*
- *Unlimited Website Access*
- *Toll-Free HELP line*
- *Self-Addressed Postage-Paid Envelope*

LivingWise Kit*

- *High-Efficiency Showerhead*
- *Two LED Light Bulbs*
- *Kitchen Faucet Aerator*
- *Bathroom Faucet Aerator*
- *Digital Thermometer*
- *LED Night Light*
- *Flow Rate Test Bag*
- *Parent/Guardian Program Evaluation*
- *Quick Start Guide*
- *Installation Instruction Booklet*
- *Spanish Translated Materials*

*Actual kit items may vary.

2468, 2469

Hurry and enroll today - spots are filling up fast!

We know you are busy so we've made enrolling a snap. Choose the ONE option that works best for you!

- **Fax this completed form to 1-800-544-8051**
- **Call toll free 1-888-438-9473**
- **Email the information requested below to info@getwise.org**
- **Enroll online at www.getwise.org/enroll**

LIVINGWISE®
PROGRAM

A SPECIAL $50.00 MINI GRANT FOR YOUR CLASSROOM

$50.00

when 80% of the completed Surveys are submitted by February 1, 2021

YES! Please enroll me in the FREE LivingWise® Program!
I have verified that the contact information below is correct.

Contact Name:_____

School Name:_____

City:_____ State:_____ Zip Code:_____

School Phone:_____ Fax:_____

Email:_____

Phone (alternative):_____ Grade Level: 5th

What month would you like to use the materials? (Circle one)

# of students:_____ **Sept** **Oct** **Nov** **Dec**

I would like to be contacted via : (circle all that apply)

School phone Alternative phone Fax Email

Please enroll the following additional teachers to participate in the FREE Program. These teachers will also receive a $50.00 Mini Grant once they have submitted at least 80% of the completed classroom Surveys by February 1, 2021.

Name_____ # of Students_____

Name_____ # of Students_____

Name_____ # of Students_____

Three reasons to enroll your classroom in LivingWise today!

1. Each student receives a **FREE** LivingWise kit that contains educational materials and water efficient products that can be installed in the students' homes! For your convenience we have enclosed a flier that describes the products.

2. Each participating teacher will receive a $50.00 Mini Grant when returning 80% of their students' completed Surveys by February 1, 2021.

3. Each teacher receives a **FREE** LivingWise® kit to take home and use too!

SUPPORTS STATE ACADEMIC STANDARDS

How do Teachers Benefit?

- NOTHING TO ADD - the program is meant as an enhancement to your current curriculum.
- The rigorous curriculum provided by this program adheres to the academic standards set for: ELA, Math, Next Generation Science, Technology, and College and Career Readiness.
- Program comes complete with a teacher manual and FREE LivingWise kits for each student.
- Implementation time is minimal and the time frame is flexible – you set the pace!
- Encourages PARENTS to be directly involved in their child's education.
- Teaches students how they can help their FAMILIES save electricity, natural gas, and water.
- The FREE kits and exciting projects engage students, making learning more fun!
- Builds partnerships with the community and creates support for schools.

P: 1-888-438-9473
F: 1-800-544-8051
www.getwise.org/enroll

LIVINGWISE®
PROGRAM

OGE®

POSITIVE ENERGY TOGETHER®
www.oge.com

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DON'T LET TIME RUN OUT

Simply return 80% of your completed surveys by February 1, 2021, and you'll receive a **$50.00** Mini Grant for your classroom!

And don't forget to give a wristband reward to your students when they return their completed surveys to you!

Offer open only to teachers participating in the program. Certain restrictions may apply. Good while supplies last. Offer ends February 1, 2021. 80% return rate of completed participant survey forms required for eligibility. For more information call 1-888-GET-WISE or contact us online at www.getwise.org.

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ARKANSAS ACADEMIC STANDARDS*
GRADE 6

LANGUAGE ARTS

READING IN SCIENCE AND TECHNICAL SUBJECTS

RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to Grades 6–8 texts and topics.
RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

READING: INFORMATIONAL TEXT

RI.6.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.6.2	Examine a grade-appropriate informational text. Provide an objective summary. Determine a central idea and how it is conveyed through particular details.
RI.6.3	Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text.
RI.6.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
RI.6.5	Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.
RI.6.6	Determine an author's point of view, perspective, and/or purpose in a text and explain how it is conveyed in the text.
RI.6.7	Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
RI.6.8	Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
RI.6.10	By the end of the year, read and comprehend literary nonfiction in the Grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

**State Academic Standards derived from multiple, independent sources exhibit the most current information available to date.*

ARKANSAS ACADEMIC STANDARDS*
GRADE 6

LANGUAGE ARTS	
WRITING	
W.6.1	Write arguments to support claims with clear reasons and relevant evidence.
W.6.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.6.3	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
W.6.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.9	Draw evidence from literary and/or informational texts to support analysis, reflection, and research.
W.6.10	Write routinely over extended time frames and shorter time frames for research, reflection, and revision and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.
SPEAKING AND LISTENING	
SL.6.1	Engage effectively in a range of collaborative discussions one-on-one, in groups, and teacher-led with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
LANGUAGE	
L.6.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on Grade 6 reading and content, choosing flexibly from a range of effective strategies.
L.6.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
WRITING IN SCIENCE AND TECHNICAL SUBJECTS	
WHST.6-8.1	Write arguments focused on discipline-specific content.
WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
WHST.6-8.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.
WHST.6-8.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

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ARKANSAS ACADEMIC STANDARDS*
GRADE 6

MATHEMATICS	
RATIOS AND PROPORTIONAL RELATIONSHIPS	
6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.
6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).
THE NUMBER SYSTEM	
6.NS.B.2	Use computational fluency to divide multi-digit numbers using a standard algorithm.
6.NS.B.3	Use computational fluency to add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation.
6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values, explaining the meaning of 0 (e.g., temperature above/below zero).
EXPRESSIONS AND EQUATIONS	
6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number or any number in a specified set.
GEOMETRY	
6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
STATISTICS AND PROBABILITY	
6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5	Summarize numerical data sets in relation to their context, such as by: reporting the number of observations and describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

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ARKANSAS ACADEMIC STANDARDS*
GRADE 6

SCIENCE	
PHYSICAL SCIENCES	
6-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
6-PS3-4.	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
6-PS3-5.	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
EARTH AND SPACE SCIENCES	
6-ESS2-4.	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
6-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
6-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
ENGINEERING DESIGN	
6-ETS1-1.	Define the criteria and constraints of a design problem, accounting for scientific principles and impacts on people and the natural environment that may limit possible solutions.
6-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
6-ETS1-3.	Analyze data to determine similarities and differences to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
6-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

**State Academic Standards derived from multiple, independent sources exhibit the most current information available to date.*

TEACHER SURVEY

Your feedback is greatly appreciated.

Program brought to you by:

OG&E®

Date: _____

School: _____

Teacher name: _____

E-mail: _____

Number of Student Survey Forms returned: _____

Teacher Signature: _____

Please assess the LivingWise® Program by filling out this *Teacher Survey Form*. Upon completion, return this survey, your Student Survey Forms, student thank-you notes, and a letter from you to **Oklahoma Gas & Electric** in the postage-paid return envelope provided.

PLEASE FILL IN THE CIRCLE THAT BEST DESCRIBES YOUR OPINION:

1. Did you install any of the products from your kit?

❍ Yes ❍ No

2. The products in the kit were easy for students to use.

❍ Strongly Agree ❍ Agree ❍ Disagree ❍ Strongly Disagree

3. Did you use the curriculum materials to teach in class?

❍ Yes ❍ No

4. Students indicated that their parents supported the program.

❍ Yes ❍ No

5. Would you conduct this program again?

❍ Yes ❍ No

6. Would you recommend this program to other colleagues?

❍ Yes ❍ No

7. Did you distribute the student surveys to your students?

❍ Yes ❍ No

8. What did students like best about the program? Explain.

9. What did you like best about the program? Explain.

10. What would you change about the program? Explain.

GET YOUR $50.00 MINI GRANT!

Return the following by February 1, 2021

- 80% of Student Survey Forms
- This Survey Form
- Student thank-you notes
- A letter from you

Teacher Survey

OG&E®

WELCOME

Thank you for choosing to participate! The LivingWise Program will help your students and their families learn the importance of natural resources and immediately lower their utility bills. **Oklahoma Gas & Electric** has fully paid for and provided this program for your class.

Program materials are developed by teachers just like you. Materials include:

- **TEACHER MATERIALS.** The *Teacher Book* has been designed to include a Five-day Teaching Unit Plan, chapters, lessons, hands-on classroom activities and teaching ideas.
- **STUDENT MATERIALS.** The *Student Guide* has been redesigned to include easy-to-use chapters and lessons, more visual aids, new charts and graphs, vocabulary exercises, engagement exercises, and "think and apply" discussion topics.
- **PARENT MATERIALS.** The introduction letter to parents and the kit contain information specifically designed to engage parents. Materials reinforce the concepts taught and will effectively help parents become an active participant in their child's education.
- **SUPPORT OF MORE STATE STANDARDS.** The materials support state and academic standards in science and math as well as language arts.

To ensure program success and your eligibility for a Mini Grant, please do the following:

- **HAVE YOUR STUDENTS INSTALL ALL OF THE PRODUCTS IN THE KIT.** Installation of all of the products is essential for learning how to conserve at home. The more products that are installed, the higher probability that the program will be available in future years.
- **IMPLEMENT THE PROGRAM.** Most teachers find that they can implement the program in two weeks or less. Find a time to fully implement the program so that students and their families have the best opportunity to save natural resources and money on the utility bill.
- **RETURN PROGRAM RESULTS.** Make sure that each student completes a Student Survey Form and thank-you note. Return the Survey Forms, thank-you notes, the Teacher Survey Form (located on the reverse side of this letter) and a letter from you in the postage-paid envelope provided.

Questions? Call 1-888-GET-WISE or visit www.getwise.org.

PARENTS

OG/E®
POSITIVE ENERGY TOGETHER®

CONGRATULATIONS!

Your child's class has been selected to participate in the exciting LivingWise Program. The program is designed to teach your child the value of water and energy and help you save money on your utility bills. This program is being provided by **Oklahoma Gas & Electric** at NO COST to you, your child's school or the school district.

The average U.S. household pays at least $2,200 per year in utility bills and can reduce these costs with just a few simple changes. Your child will be given a kit which includes FREE high quality energy and water saving products that utilize the latest efficiency technology. This kit is valued at over $50 and will provide you with the ability to make these changes.

To participate, please do the following:

- Have your child talk to you about the ways they would like to save energy and water and complete the Pledge Form located on the next page.
- Install all of the kit items. You and your child can do most of the activities in less than 15 minutes. If you need additional help installing the kit items, visit www.getwise.org to view installation videos or call 1-888-GET-WISE.
- Work with your child to answer all of the survey questions in the Student Workbook.

The LivingWise Program will be an easy and fun experience for your entire family. Not only will it allow your child the chance to be a leader in your home and community, but also your family will immediately benefit from lower utility bills. Thank you for your participation.

LET'S GET STARTED!

QUESTIONS? • 1-888-GET-WISE • www.getwise.org

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PADRES

OG/E®
POSITIVE ENERGY TOGETHER®

¡FELICITACIONES!

La clase de su hijo ha sido seleccionada para participar en el fascinante Programa LivingWise. El programa está diseñado para enseñarle a su hijo el valor del agua y de la energía y para ayudarle a usted a ahorrar dinero en sus facturas de servicios públicos. Este programa lo provee **Oklahoma Gas & Electric** SIN COSTO para usted, la escuela de su hijo ni el distrito escolar.

La vivienda promedio estadounidense paga por la mínima $2,200 por año en facturas de servicios públicos y puede reducir estos costos simplemente con algunos cambios sencillos. A su hijo se le dará un kit LivingWise que incluye productos GRATUITOS de alta calidad para el ahorro de agua y energía que utilizan la tecnología de ahorro más moderna. Este kit tiene un valor de más de $50 y le dará a usted la habilidad de implementar estos cambios.

Para participar, por favor haga lo siguiente:

- Haga que su hijo hable con usted sobre las formas en las que le gustaría ahorrar agua y energía y complete el Formulario de Compromiso ubicado en la próxima página.
- Instale todos los artículos del kit. Usted y su hijo pueden hacer la mayoría de las actividades en menos de 15 minutos. Si necesita ayuda adicional con la instalación de los artículos del kit, visite www.getwise.org para ver videos de instalación o llame al 1-888-GET-WISE.
- Trabaje con su hijo para responder todas las preguntas de la encuesta en el Libro de Trabajo del Estudiante.

El Programa LivingWise será una experiencia sencilla y divertida para toda su familia. No sólo le permitirá a su hijo la posibilidad de ser un líder en su hogar y en su comunidad, sino que también su familia se beneficiará inmediatamente por las facturas más bajas de los servicios públicos. Gracias por su participación.

PREGUNTAS? • 1-888-GET-WISE • www.getwise.org

STUDENTS

PLEDGE FORM

Name:	Date:
School:	Teacher:

Pledging to save energy and water is an important step in conserving our natural resources and will save your family money on utility bills. As you go through the Program, you will learn why it is important to conserve energy and water. The Program will teach you simple ways to save energy, water, and money. Taking the Pledge shows that you want to be more energy and water efficient to reduce your family's utility bills.

TAKE THE PLEDGE

We have helped you out by writing your first pledge. All you have to do to complete the first pledge is install the items from your kit. Now, write two more pledges describing how you will be more energy and water efficient at home. Remember, a pledge is a *promise*.

1. **I pledge** to do my part by installing all of the items in my kit to save energy and water as well as reduce my family's utility bills.
2. _____
3. _____

SIGN THE PLEDGE

I have written and reviewed my pledges above and by signing this form, I promise to use energy and water more efficiently at home.

Student Signature

Parent Signature

These kits are made possible by:

OG&E®

Developed by:

FRANKLIN ENERGY

102 N. Franklin Street • Port Washington WI 53074
www.franklinenergy.com • (888) 438-9473

ESTUDIANTES

FORMULARIO DE COMPROMISO

Nombre:	Fecha:
Escuela:	Docente:

Comprometerse a ahorrar energía y agua es un paso importante para conservar nuestros naturales y le ahorrará dinero a su familia en las facturas de servicios públicos. A medida que atraviesa por el Programa, aprenderá por qué es importante ahorrar energía y agua. El Programa le enseñará formas sencillas de ahorrar energía, agua y dinero. Asumir el Compromiso muestra que usted quiere ahorrar más energía y agua para reducir las facturas de los servicios públicos de su familia.

ASUMIR EL COMPROMISO

Le hemos ayudado a escribir su primer compromiso. Todo lo que tiene que hacer para completar el primer compromiso es instalar los artículos de su kit. Ahora, escriba dos compromisos más que describan cómo ahorrará energía y agua en el hogar. Recuerde, un compromiso es una promesa.

1. **Me comprometo** a hacer mi parte instalando todos los artículos de mi kit para ahorrar energía y agua así como para reducir las facturas de servicios públicos de mi familia.
2. _____
3. _____

FIRMAR EL COMPROMISO

He escrito y revisado mis anteriores compromisos y al firmar este formulario, prometo usar la energía y el agua de manera más eficiente en casa.

Firma del Estudiante

Firma del Padre

Estos kits son posibles gracias a:

OG&E®

Developed by:

FRANKLIN ENERGY

102 N. Franklin Street • Port Washington WI 53074
www.franklinenergy.com • (888) 438-9473

POSITIVE
ENERGY
TOGETHER®

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OGE.COM

CERTIFICATE OF ACHIEVEMENT

Awarded to

_____

for making a difference in your community
by successfully completing the LivingWise® Program.

Diane Sumner

Diane Sumner, Ed.D., Director of Education

Developed by:

FRANKLIN ENERGY

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