Summit Utilities Oklahoma, Inc
Demand Side Management Programs
Annual Report
2025 Program Year

Filed: May 1, 2026

Table of Contents

Executive Summary....2
§ 165:45-23-7(c)(1): Demand Programs by Customer Category....8
§ 165:45-23-7(c)(2): Programs and Date Started....9
§ 165:45-23-7(c)(3): Customer Participation....10
165:45-23-7(c)(4-6): Projected & Actual Energy Savings....10
§ 165:45-23-7(c)(7): Education Programs....12
§ 165:45-23-7(c)(8): Levelized Cost....12
§ 165:45-23-7(c)(9): Reduced Emissions and Water Consumption....13
§ 165:45-23-7(c)(10): Portfolio Budget & Total Annual Gas Revenue....15
§ 165:45-23-7(c)(11): Portfolio Energy Savings & Annual Gas Usage....15
§ 165:45-23-7(c)(12): Projected Program Costs....15
§ 165:45-23-7(c)(13): Actual Program Costs....16
§ 165:45-23-7(c)(14-15): Incentives....17
§ 165:45-23-7(c)(16): Utility growth or reduction....18
§ 165:45-23-7(c)(17): Market Conditions....19
§ 165:45-23-7(c)(18): Summary of Spending by Demand Program....20
§ 165:45-23-7(c)(19): Funds Planned versus Funds Expended....20
§ 165:45-23-7(c)(20): Description of Each Demand Program....21
§ 165:45-23-7(b)(21): Research and Development Activities....25
§ 165:45-23-7(c)(22): Program Implementers....25
Conclusion....28
Appendix A – EM&V Report....1
Appendix B – Marketing Samples....2

Executive Summary

On October 7, 2010, CenterPoint Energy Resources Corp. d/b/a CenterPoint Energy Oklahoma Gas ("CenterPoint Oklahoma" or the "Company") proposed a comprehensive portfolio of Conservation Improvement Programs ("CIP," and as a whole, the "CIP Portfolio") in response to the Oklahoma Corporation Commission's ("OCC" or the "Commission") Rules for Demand Programs, OAC § 165:45-23-1 et seq. On March 25, 2011, the Commission approved the program portfolio in Order No. 583869 in Cause No. PUD 201000148, and CenterPoint Oklahoma began to implement the program portfolio thereafter in 2011. On February 1, 2012, the Commission approved modifications and additions to the Company's previously approved CIP portfolio in Order No. 593649 in Cause No. PUD 201100149. On August 13, 2013, the Commission approved an updated CIP portfolio for program years ("PY") 2014 - 2016 in Order No. 616573 in Cause No. PUD 201300085. On October 26, 2016, the Commission approved an updated CIP portfolio for PY 2017 - 2019, in Order No. 657250 in Cause No. PUD 201600263. On August 8, 2019, the Company requested approval of an updated comprehensive CIP Portfolio for PY 2020 - 2022. The OCC approved this request on December 10, and CenterPoint Oklahoma began delivery of this CIP Portfolio on January 1, 2020, in Order No. 706092 in Cause No. PUD 201900060. As of January 10, 2022, CenterPoint Energy Oklahoma was acquired by Summit Utilities, Inc. ("Summit") and is now operating as Summit Utilities Oklahoma, Inc ("Summit Utilities Oklahoma" , "SUO" or " the Company"). On September 19, 2022, Summit Utilities Oklahoma filed an application for an updated comprehensive Demand Side Management ("DSM," or "DSM Portfolio") Portfolio for PY 2023 - 2025. The OCC approved this request on January 12, 2023, in Order No. 732328 in Cause No. PUD 202200087 and Summit Utilities Oklahoma began delivery of this DSM Portfolio the same day.

This report is filed in response to the Commission's reporting requirements specified in OAC § 165:45-23-7, which requires SUO to report the performance of its energy efficiency programs for the preceding program year. Consistent with the requirements, this report will outline the activities and results of the Company's DSM Portfolio performance for PY 2025.

Summit Oklahoma implemented and administered the following DSM programs in PY 2025:

- **Summit Utilities Education Program ("SUEP")** - The SUEP is intended to educate residential and commercial customers to help them understand their natural gas energy usage and learn about ways to conserve energy. The SUEP program promotes general awareness and customer education while also helping to promote the overall awareness of Summit Utilities Oklahoma's Demand Side Management offerings.
- **Residential Solutions ("RSOL") Program –** A suite of DSM channels designed to help residential customers reduce their energy costs and carbon emissions.

- **The Natural Gas Equipment Channel** is designed to promote high efficiency equipment solutions for residential, commercial, and multifamily customers and developers. Rebate inducements are offered to consumers and developers to encourage the purchase and installation of new high efficiency natural gas water heaters, furnaces, clothes dryers, gas ranges, and thermostats.
- **The High Efficiency Home Channel** provides financial inducements to encourage builders to construct new homes that are equipped with efficient natural gas appliances.
- **The Do-It-Yourself ("DIY") Channel** provides no or low-cost energy saving measures to Summit Utilities Oklahoma consumers. The low flow showerheads, aerators, smart thermostats, and other energy savings products are available for order at Summit Utilities' marketplace. Customers are given the option to request multiples of each energy-saving product within prescribed limits.
- **The Home Energy Reports ("HERs") Channel** is an educational and behavioral change program which provides individualized information and recommendations regarding energy usage through Home Energy Reports, sent to select Summit Utilities customers. The direct mail Home Energy Reports utilize energy usage data with customer demographic, housing, and GIS data to develop specific, targeted recommendations that educate and motivate customers to reduce their energy consumption.

- **Access to Affordable Energy and Conservation ("AAEC") Program –** The Summit Utilities Oklahoma's AAEC Program is designed to provide low to moderate ("LMI") income customers and severely energy burdened customers the opportunity to save energy and money by leveraging several channels designed to encourage hard-to-reach customers to participate in the Company's conservation programs. Weatherization, DIY, behavioral energy reports, elementary conservation education, and equipment rebate channels are designed specifically to remove barriers to participating in DSM programs by identifying high risk customers and engaging them with comprehensive channels to meet each household's specific needs. These channels are also designed to reach a spectrum of age groups starting with conservation education for fifth or sixth graders to behavioral and weatherization measures for age 65+ households. This comprehensive suite of channels will make certain all LMI and severely energy burdened customers have full access to affordable, comprehensive energy and conservation services.
  - **Low-Income Saving Homes ("LISH") Channel** is designed to provide weatherization retrofits that will improve the efficiency and comfort of Summit Utilities Oklahoma's low-income and hard to reach residential customers. In partnership with Public Service Company of Oklahoma ("PSO"), weatherization measures are performed by a contractor and paid for by both Summit Utilities

Oklahoma and PSO. The measures include a health and safety evaluation, air infiltration reduction, attic insulation, duct blasting and sealing, and water heater jackets and hot water pipe insulation.

- **LMI DIY Channel** offers an identical channel to the Do-It-Yourself Program, offering low flow showerheads, aerators, smart thermostats, and other energy savings measures, with the addition of health and safety measures such as smoke and carbon monoxide detectors, and home-sealing measures to low to moderate income customers. LMI customers will be identified and marketing campaigns crafted to maximize LMI customer engagement.
- **LMI HERs Channel** offers an identical channel to Home Energy Reports to customers that meet the criteria determined for low to moderate income. Customers receive specific messages that encourage LMI customers to reduce energy consumption and provides additional DSM information and offerings. The Home Energy Reporting System is a unique software platform that combines energy usage data with customer demographic, housing, and GIS data to develop specific, targeted recommendations that educate and motivate consumers to reduce their energy consumption.
- **LMI LivingWise Channel** is designed to provide Title I School teachers with a curated curriculum for students that promotes conservation. Elementary school children will be provided with a kit of energy and water saving measures to take home. These kits will also include instructions on how to track the effectiveness of conservation equipment by instructing the student to measure consumption before and after the equipment is installed. Parents are encouraged to participate with their children to maximize learning.
- **Affordable Housing Equipment Rebate ("AHER") Channel Pilot** is designed to promote high efficiency equipment solutions in residential, commercial, and multifamily properties. Enhanced rebate inducements will be offered to affordable housing landlords and property managers to encourage the purchase and installation of new high efficiency natural gas water heaters and furnaces.

Natural Gas Commercial Solutions ("NGCS") Program

- **C&I Custom Channel** is administered by CLEAResult and provides financial incentives and technical consulting assistance designed to help commercial and industrial customers identify, develop, and implement cost effective energy efficiency solutions at their facilities.
    - No-Cost Facility Audit - Program representatives perform a valuable no-cost facility audit, to determine if any natural gas is being used inefficiently

and help identify cost-effective solutions to reduce energy waste and save money.

- Custom Project Measures - target commercial and industrial customers. Projects identified are eligible for custom incentives based on final program design, after applying documented and defensible calculated energy savings.

- **C&I Direct Install Channel** targets small to mid-size commercial customers and is also administered by CLEAResult. It is a turnkey equipment replacement program designed to reduce customer energy usage costs through the installation of low-flow pre-rinse spray valves, faucet aerators, showerheads, weather-stripping, and steam traps.

- **Commercial Food Service Channel** promotes the reduction of natural gas energy usage for commercial food service customers via inducements ranging from $500 to $2,400 for the purchase and installation of qualified new energy efficient food service equipment. This program is also administered by CLEAResult.

- **Commercial Boiler Channel** encourages commercial customers to install efficient natural gas comfort heating boilers via inducements ranging from $1,400 to $2,000 per MMBTU of input for the purchase of qualified new energy efficient boilers. This program is also administered by CLEAResult.

Portfolio Insights

The DSM Portfolio produced net energy savings of 100,872 Mcf. The programs generated a Total Resource Cost ("TRC") test net benefit of $2.43 million and a Utility Cost Test ("UCT") net benefit of $1.86 million and helped participants save money through a combination of prescriptive and custom rebates, direct-install measures, energy usage reports, and weatherization services.

Key insights from PY 2025 program delivery include:

- **Natural Gas Equipment Channel** – Program Year 2025 was challenging for the Natural Gas Equipment Channel which experienced a decline in participation. The program continues to adapt by emphasizing the strengths of high-efficiency natural gas solutions and supporting informed decision making. The high cost of natural gas furnaces and water heaters continue to make it more difficult for customers to afford replacement equipment, opting instead to repair aging equipment. Another factor impacting the Channel is interest rates, which continue to remain elevated. While financing replacement equipment is typically an option, it can be difficult for customers who may not have the financial capacity to assume higher monthly payment obligations. In the last quarter of the year, Summit Utilities Oklahoma increased the equipment rebate amount to match the new three-year plan spanning 2026-2028. SUO made a request to the Commission and received

approval to implement this change to encourage customers and trade allies to submit their rebates before the end of the year and not hold them till the new program year.

- **High Efficiency Homes Channel -** The High Efficiency Homes Channel proved to be more resilient this year despite the rising cost of equipment and high interest rates. Within this environment, the program sustained engagement by emphasizing the performance, affordability, and reliability of high-efficiency natural gas technologies. Continued positioning and education efforts are expected to strengthen participation moving forward. The new construction market remains steady with new housing starts continuing its pace in PY 2025.
- **Natural Gas Commercial Solutions Program** – In PY 2025, the C&I Custom and C&I Direct Install pathways performed at or above expectations and were the primary drivers of commercial portfolio savings. The C&I Custom Pathway delivered 56,038 annual therms, achieving 100 percent realization and reflecting well-defined, site-specific projects evaluated using International Performance Measure and Verification Protocol ("IPMVP")-consistent methods. The C&I Direct Install Pathway generated approximately 540,000 annual therms, also at 100 percent realization, and represented the single largest source of commercial savings, driven largely by low-cost, high-impact measures. Collectively, these pathways accounted for most NGCS net savings, reinforcing their effectiveness and central role in Summit's commercial DSM strategy.
- **Home Energy Reports and LMI Home Energy Reports Channels** – The HERs channel, long recognized as a high-performing component of the portfolio for driving energy-saving behavior, has undergone a series of structural and strategic changes. Approaching and into PY2025, the channels experienced lower than expected energy savings. This decline was hypothesized to result from an over-segmentation of control and recipient groups relative to the territory's population size. Accordingly, PY2025 efforts were largely focused on implementing action plans to preserve and enhance savings performance, including a partial re-randomization executed late in the third quarter. Since this re-randomization, the updated group has demonstrated positive early results, serving as a strong indicator of future success. Additionally, LMI eligibility was broadened to include more customers, which improved savings.
- **Affordable Housing Equipment Rebate Pilot Channel** – In the affordable housing market, landlords and rental property managers typically install standard efficiency equipment due to low rental margins. To improve participation, access to the program was expanded in the first quarter of PY 2025, from landlords and property management companies, to also include homeowners, who qualify by age or income. Participation in the affordable housing market showed encouraging growth in PY 2025, reflecting increased awareness and engagement among housing authorities and customers.

LivingWise Channel – The LivingWise channel continues to play a vital role in educating fifth and sixth grade students on the importance of energy conservation.

Offered to Title I schools at no cost, the channel supports classroom learning while extending energy-saving practices into students' homes, engaging both students and their families in meaningful conservation behavior. In PY 2025, 5th grade enrollment remained active while 6th grade participation was suspended due to concerns regarding channel saturation. Looking ahead, the channel is expected to remain strong and effective as 6th grade enrollment resumes. The LivingWise channel continues to generate positive interest and engagement among teachers and the broader education community.

- **DIY and LMI DIY Channels -** The DIY channels remain an integral part of the portfolio, enabling participants to select water-saving measures and smart thermostats that align with their needs, reduce costs, and enhance overall home comfort. In PY2025, performance was primarily driven by holiday promotions and targeted social media campaigns. The LMI DIY channel achieved increased traction through comprehensive outreach to housing authorities. These efforts supported the distribution of approximately 317 energy efficiency bundles across the housing authority properties.

Figure 1: Energy Savings by Program Year

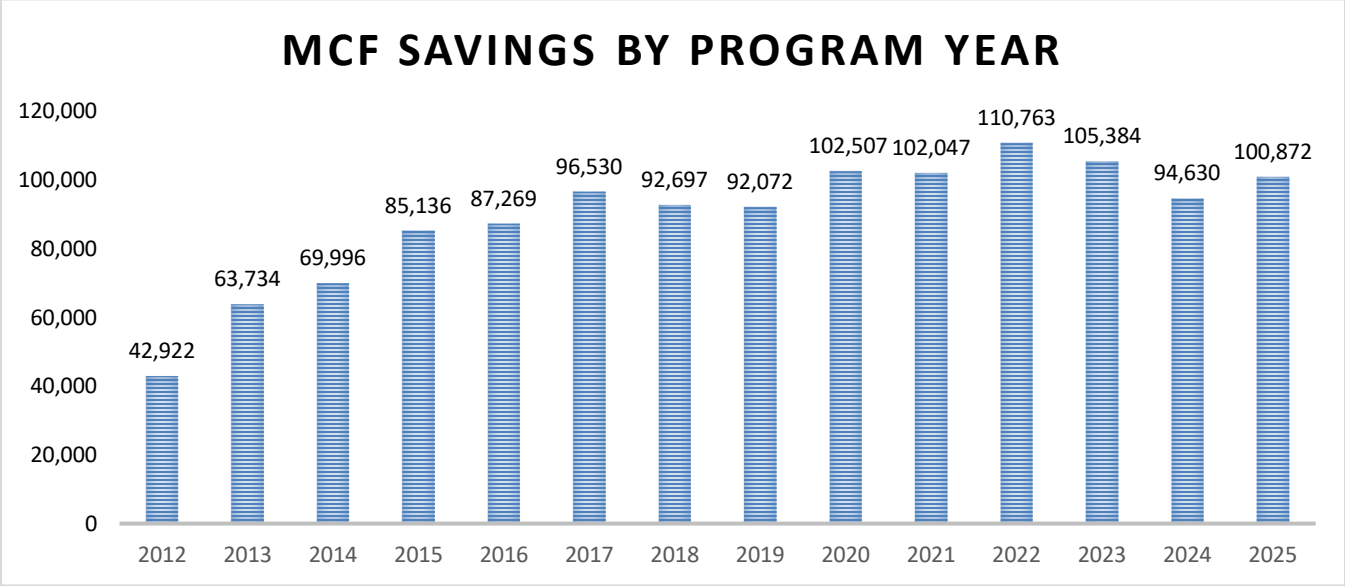
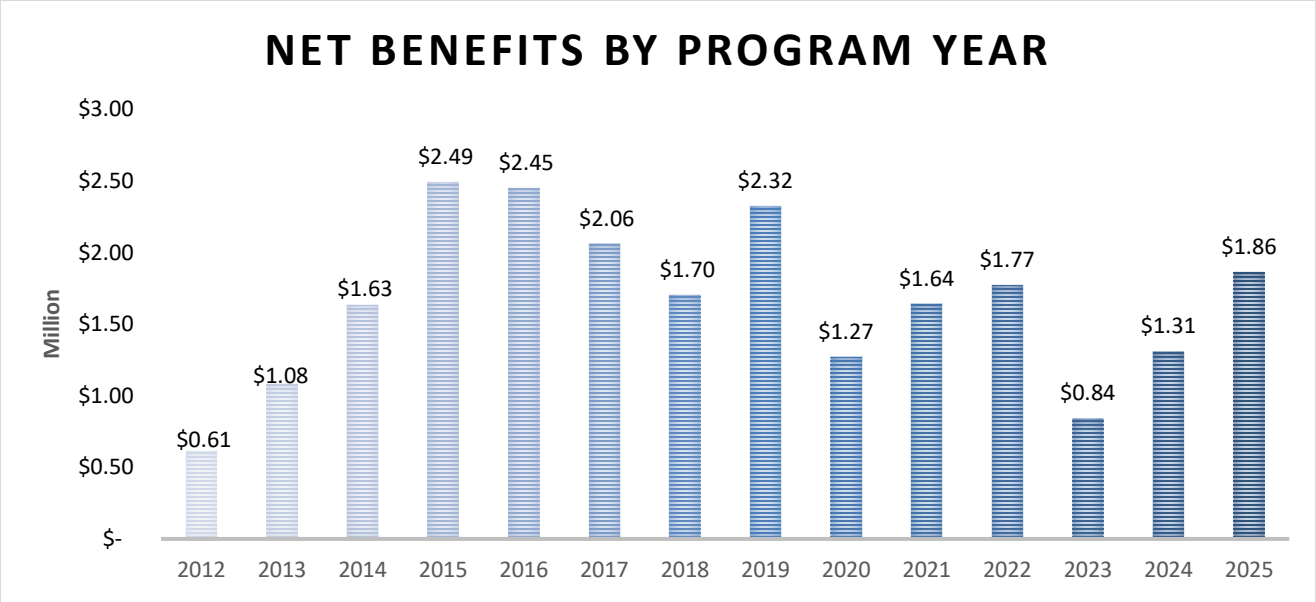


Figure 2: Net Benefits by Program Year



The remainder of this report is organized according to the OCC's reporting requirements specified in OAC § 165:45-23-7(c).

§ 165:45-23-7(c)(1): Demand Programs by Customer Category

OAC § 165:45-23-7(c)(1): The name of Demand Program listed by Category

Table 1 lists the customer categories (by class) served by each Conservation Improvement Program delivered by Summit Utilities Oklahoma in PY 2025.

Table 1: Programs & Customer Categories

Program	Customer Category Served			
	Residential	Commercial (GS)	Commercial (CS)	Commercial (LCS)
Residential Solutions Program	✓	✓	✓	✓
Access to Affordable Energy & Conservation (AAEC) Program	✓			
Natural Gas Commercial & Industrial Solutions (C&I) Program		✓	✓	✓
Summit Utilities Education (SUEP) Program	✓	✓	✓	✓

§ 165:45-23-7(c)(2): Programs and Date Started

OAC § 165:45-23-7(c)(2): a list of all programs and the date each program started.

Upon OCC approval of the first DSM Portfolio on March 25, 2011, Summit Utilities Oklahoma began the delivery of the following energy efficiency programs:

- CenterPoint Energy Education Program ("CEEP")
- Residential Home Energy Reports
- Water Heating
- Space Heating Systems
- Low-Flow Showerhead and Faucet Aerator
- Commercial Boiler
- Commercial Food Service

The OCC approved a modified DSM Portfolio on February 1, 2012, and CenterPoint Energy began the delivery of the following programs for 2012:

- Multi-Unit Market Transformation
- Clothes Dryer

On August 13, 2013, the OCC approved a new DSM Portfolio triennial plan for PY 2014 - 2016. In January of 2014, CenterPoint Oklahoma began implementing this triennial plan, which included the previously approved programs along with the following additional programs and program updates:

- Electronic Ignition Hearth
- Cooking Range
- New Home Construction
- Residential Energy Audit
- Furnace Tune Ups (addition to Space Heating Program)

On October 26, 2016, the OCC approved a new DSM Portfolio triennial plan for PY 2017 - 2019. In January of 2017, CenterPoint Oklahoma began implementing this new triennial plan, which includes modifications to previously approved programs and discontinues implementation of the Electronic Ignition Hearth and Residential Energy Audit Programs delivered in 2014-2016.

On December 10, 2019, the OCC approved a new DSM Portfolio triennial plan for PY 2020 - 2022. On January 1, 2020, CenterPoint Oklahoma began implementation of the new triennial plan, which included the consolidation of the natural gas clothes dryer, natural gas cooking range, and multifamily program into the Natural Gas Equipment program as measures. A residential low-

income program was also added to the portfolio. Finally, the boiler and foodservice programs were consolidated into the Commercial and Industrial Program as measures.

On January 10, 2022, Summit Utilities Inc. acquired CenterPoint Energy's Oklahoma assets and is now recognized as Summit Utilities Oklahoma.

On February 22, 2023, The OCC approved Summit Utilities Oklahoma's PY 2023-2025 DSM Portfolio. Highlights of the Summit Utilities Oklahoma DSM Portfolio include the consolidation of programs, as channels, under three customer categories: residential, low to moderate income, and commercial customers. The following new channels were added to the AAEC Program: LMI DIY, LMI HERs, LMI LivingWise, and Affordable Housing Rebate Program.

§ 165:45-23-7(c)(3): Customer Participation

OAC § 165:45-23-7(c)(3): The number of Participating Customers per Demand Program.

Listed on Table 2 are Summit Utilities Oklahoma PY 2025 DSM Portfolio participation results which had a total of participants and measures installed.

Table 2: Participation by Program

Program	Participants
Residential Solutions (RSOL) Program	35,599
Access to Affordable Energy and Conservation (AAEC) Program	9,271
Natural Gas Commercial Solutions (NGCS) Program	74
Summit Utilities Education Program (SUEP)	0
Total	**44,944**

Listed on Table 3 is Summit Utilities Oklahoma PY 2025 DSM Portfolio with total number of eligible customers and distinct customer totals by program and with percentage analysis of district customers who participated and did not participate in the programs.

165:45-23-7(c)(4-6): Projected & Actual Energy Savings

OAC § 165:45-23-7(c)(4): By Demand Program, approved projected energy savings (in decatherms) as approved;

OAC § 165:45-23-7(c)(5): The gross energy savings (in decatherms) and performance of each Demand program; and

OAC § 165:45-23-7(c)(6): The verified energy savings (in decatherms) by Demand Program and methods used to verify.

Table 3 compares the projected savings to the gross and net savings achieved in 2025 for each program.

Table 3: Projected, Gross, and Net Energy Savings by Program

Program	2025 Projected Annual Savings (MCF)	2025 Annual Gross Savings Achieved (MCF)	2025 Annual Net Savings Achieved (MCF)
Residential Solutions (RSOL) Program	36,358	23,316	22,516
Access to Affordable Energy and Conservation (AAEC) Program	22,429	15,557	15,557
Natural Gas Commercial Solutions (NGCS) Program	53,844	63,310	62,799
Summit Utilities Education Program (SUEP)	0	0	0
Total	112,631	102,183	100,872

Energy Savings and Methodology

The energy savings methodologies and inputs outlined in the Arkansas Technical Reference Manual ("TRM") were used to calculate energy savings for all programs resulting in energy savings. The TRM can be found on the Arkansas Public Service Commission's website.[1] All the weather zones in Summit Utilities Oklahoma's service territory are included in the TRM, so any climate differences between the two states have been appropriately considered.

Summit Utilities Oklahoma also modified the data and methodologies provided in the Arkansas TRM to calculate energy savings from fuel switching activities. The energy savings utilized in electric to gas applications consider the full fuel cycle of energy and account for the source of the fuel in addition to the site emissions. The Arkansas TRM was used to calculate site and baseline emissions. For heating systems, the electric baseline was an air source heat pump ("HSPF 8.2") with back-up electric resistance heating used for 11% of the heating load. For water heating systems, the standard electric water heater efficiencies were utilized.

In PY 2025, ADM Associates, a Qualus Company ("ADM") conducted the Evaluation, Measurement, and Verification ("EM&V") of Summit Utilities Oklahoma DSM Portfolio. ADM's review included a process evaluation and an impact evaluation to determine the verified

[1] http://www.apscservices.info/EFilings/Docket_Search_Documents.asp?Docket=10-100-R&DocNumVal=199

and net savings attributable to the Company's PY 2025 program activities. The 2025 EM&V Report completed by ADM can be found in Appendix A of this report.

§ 165:45-23-7(c)(7): Education Programs

OAC § 165:45-23-7(c)(7): For Education Programs measurements of outreach efforts, including pre-program and post-program results and copies of evaluations, surveys, focus group results, and other measurement techniques used to gauge the effectiveness of education efforts.

As part of their PY 2025 EM&V effort, ADM conducted participant surveys to determine how customers became aware of the Company's programs. These survey results are provided in ADM's EM&V Report, and they provide insights on which outreach efforts were the most effective at creating program awareness.

§ 165:45-23-7(c)(8): Levelized Cost

OAC § 165:45-23-7(c)(8): The levelized cost per decatherm for the Demand Portfolio, Demand Programs, and by customer sector, including all assumptions used to make the calculation.

The levelized cost for the Company's PY 2025 DSM Portfolio was $2.08 per Mcf. Summit Utilities Oklahoma used the following methodology to calculate the levelized cost:

Levelized TRC Cost =

$$\frac{\textit{Capital Recovery Factor} * (\textit{Total Program Administrator Costs} + \textit{Total Participant Costs (net of incentives)})}{\textit{Annual Energy Savings (MCF)}}$$

Where:

Capital Recovery Factor = $[A * (1 + A)^{(B)}]/[(1 + A)^{(B)} - 1]$

A = *Discount Rate (Societal Rate)*

B *= Weighted Average Life of Savings*

Tables 4 and 5 provide details on the levelized cost at the program, customer sector, and portfolio levels.

Table 4: Levelized Cost by Program

		Total Resource Cost Test (TRC)					
		Annual Net Lifetime Energy Savings	Total Cost	Total Net Benefits	TRC	Measure Life	TRC Levelized Cost
Program	Savings Type	MCF	$	$	Ratio	Years	($/MCF)
Residential Solutions (RSOL) Program	Natural Gas	147,611	$785,419	$181,654	1.28	6.56	$5.32
Access to Affordable Energy and Conservation (AAEC) Program	Natural Gas	195,083	$571,001	$626,771	1.96	12.54	$2.93
Natural Gas Commercial Solutions (NGCS) Program	Natural Gas	717,643	$823,222	$1,940,792	3.08	11.43	$1.15
Summit Utilities Education Program (SUEP)	Educational Program	0	$28,294	($314,021)	0.00	0	
Total Portfolio		**1,060,337**	**$2,207,936**	**$2,435,196**	**1.96**	**10.51**	**$2.08**

Table 5: Levelized Cost by Customer Sector

Total Resource Cost Test and TRC Levelized Cost By Customer Sector	Net Energy Savings	Total Resource Cost Test (TRC)		
	Annual Net Lifetime Energy Savings	Total Net Benefits	TRC	Levelized Cost
ɔector	Therms	$	Ratio	($/therms)
Residential	342,694	$627,769	1.28	$3.72
Commercial GS-1	467,339	$1,464,683	1.96	$0.98
Commercial CS-1	245,120	$332,225	3.08	$1.91
Commercial LCS	5,184	$10,519	0.00	$1.58
Total Portfolio	**1,060,337**	**$2,435,196**	**1.96**	**$2.08**

§ 165:45-23-7(c)(9): Reduced Emissions and Water Consumption

OAC § 165:45-23-7(c)(9): The amount of reduced emissions and water consumption experienced by the utility, including all assumptions and calculation details, during the Demand Program period for the current program year.

Reduced Emissions

Summit Utilities Oklahoma used the United States Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator[2] to estimate the impact of reduced emissions attributable to the 100,873 in Mcf savings delivered through the PY 2025 DSM Portfolio. Overall, the Company's programs reduced carbon dioxide (CO_2) emissions by 5,529 metric tons. This is equivalent to:

Greenhouse gas emissions from:

- 1,290 passenger vehicles driven for one year; or
- 14,080,766 miles driven by an average passenger vehicle.

Carbon dioxide emissions from:

- Annual energy use of 743 homes;
- 6,0142,061 pounds of coal burned; or
- 622,182 gallons of gasoline consumed.

Reduced Water Consumption

Table 6 Summit Utilities Oklahoma calculated the reduction in water consumption within the three programs. Water savings were calculated in gallons based on the equipment measure count and weather zone.

Table 6: Reduced Water Consumption

Annual Water Savings	
Program	Net Water Savings (Gallons)
RSOL	310,580
AAEC	4,795,574
NGCS	19,010

[2] epa.gov/energy/greenhouse-gas-equivalencies-calculator?unit=MCF&amount=102,507

§ 165:45-23-7(c)(10): Portfolio Budget & Total Annual Gas Revenue

OAC § 165:45-23-7(c)(10): The Demand Portfolio funding as a percent of total annual gas revenue

Table 7 displays the PY 2025 DSM Portfolio budget as a percentage of Summit Utilities Oklahoma 2025 revenue.

Table 7: Demand Portfolio Funding as a Percent of Total Annual Gas Revenue

2025 Portfolio Budget	2025 Revenue	Demand Portfolio Funding % Total Revenue
$2,621,344	$98,455,496	2.66%

§ 165:45-23-7(c)(11): Portfolio Energy Savings & Annual Gas Usage

OAC § 165:45-23-7(c)(11): The Demand Portfolio Net source energy savings as a percent of total gas annual usage

Table 8 displays the PY 2025 DSM Portfolio net energy savings as a percentage of Summit Utilities Oklahoma 2025 natural gas throughput.

Table 8: Demand Portfolio Savings as a Percent of Total Natural Gas Usage

2025 Net Energy Savings (MCF)	2025 Natural Gas Usage (MCF)	Energy Savings %Annual Gas Usage
100,872.6	12,471,199	0.81%

§ 165:45-23-7(c)(12): Projected Program Costs

OAC § 165:45-23-7(c)(12): The projected program costs;

These costs should be separated into the following categories to allow review of spending:

(i) Administrative costs;

(ii) Inducements: direct payments and other inducements
(iii) Educations and marketing costs;
(iv) Program delivery costs; and
(v) EM&V costs

Table 9 provides the PY 2025 budgets for each program by cost category.

Table 9: Program Budgets by Category

Program	Admin/Internal Delivery	Rebate & Incentive	Marketing	Delivery	Evaluation	Total Program
Residential Solutions (RSOL) Program	$244,090	$812,840	$75,000	$178,775	$51,000	$1,361,705
Access to Affordable Energy & Conservation (AAEC) Program	$88,682	$326,000	$35,000	$89,758	$18,000	$557,440
Natural Gas Commercial Solutions (NGCS) Program	$184,459	$387,220	$40,000	$0	$35,000	$646,679
Summit Utilities Education Program (SUEP)	$520	$0	$55,000	$0	$0	$55,520
Total Program Costs	**$517,751**	**$1,526,060**	**$205,000**	**$268,533**	**$104,000**	**$2,621,344**

§ 165:45-23-7(c)(13): Actual Program Costs

OAC § 165:45-23-7(c)(13): The projected program costs;

These costs should be separated into the following categories to allow review of spending:

(i) Administrative costs;
(ii) Inducements: direct payments and other inducements
(iii) Education and marketing costs;
(iv) Program delivery costs; and
(v) EM&V costs

Table 10 provides the actual PY 2025 expenditures for each program by cost category.

Table 10: Program Spending by Category

Program	Admin/Internal Delivery	Rebate & Incentive	Marketing	Delivery	Evaluation	Total Program
Residential Solutions (RSOL) Program	$42,589	$376,321	$36,913	$279,529	$50,067	$785,419
Access to Affordable Energy & Conservation (AAEC) Program	$23,300	$434,559	$1,529	$102,162	$9,452	$571,001
Natural Gas Commercial Solutions (NGCS) Program	$48,463	$509,200	$22,950	$177,705	$64,903	$823,222
Summit Utilities Education Program (SUEP)	$137	$0	$26,409	$1,749	$0	$28,294
Total Program Costs	**$114,488**	**$1,320,080**	**$87,801**	**$561,145**	**$124,421**	**$2,207,936**

§ 165:45-23-7(c)(14-15): Incentives

OAC § 165:45-23-7(c)(14): Projected incentives – including projected cost effectiveness tests;

OAC § 165:45-23-7(c)(15): Actual calculated incentives – including workpapers and working spreadsheets (formulas, calculations, linkages, and assumptions) or for updated cost effectiveness tests, in sufficient detail to allow review of cost effectiveness calculations.

Summit Utilities Oklahoma calculated incentive is based on the results of its PY 2025 DSM Portfolio. Pursuant to OAC § 165:45-23-8, eligibility to receive an incentive requires that the Company's Demand Portfolio reach a goal ratio (Verified savings divided by Projected Savings) of at least 80% and achieve a total resource cost test benefit/cost ratio of greater than one. For PY 2025, the Company is eligible for an incentive because Summit Utilities Oklahoma DSM portfolio goal ratio was 90% and it achieved a cost/benefit ratio of 1.96.

Table 11 provides the calculation for the requested 2025 DSM Portfolio incentive.

Table 11: Incentive Calculation

Incentive Calculation		
Line No.	**Incentive Calculation Input**	
1	Projected Energy Savings (MCF)	112,631
2	Actual Portfolio Energy Savings (MCF)	100,872
3	Program Expenditure	$2,207,936
4	TRC Ratio	1.96
5	Portfolio Net Benefits	$1,856,637
6	Maximum Incentive, Percentage Net Benefits	15%
7	Goal Ratio (Line 2/Line 1)	90.00%
8	Maximum Eligible Incentive $ (Line 5 X Line 6 X Line 7)	$278,496
9	Incentive Cap Percentage Portfolio Expenditure	8%
10	Incentive Cap (Line 3 X Line 9)	$331,190
11	2025 Incentive	$250,646

§ 165:45-23-7(c)(16): Utility growth or reduction

OAC § 165:45-23-7(c)(16): The utility's annual growth or reduction in metered natural gas for the previous three years, with a calculation of the average growth or reduction rate over that entire period.

Summit Utilities Oklahoma metered sales volumes are provided by customer class in Table 12.

Table 12: Metered Sales Volumes (CCF) per Customer Class

Customer Class	2022	2023	2024	2025	Average Rate of Change Per Year
Residential	48,469,243	44,972,373	40,221,459	43,981,537	1.12%
Commercial GS-1	10,796,796	10,492,543	9,702,611	10,935,744	-2.05%
Commercial CS-1	18,152,499	17,442,962	15,674,481	16,206,935	3.74%
TSO	52,806,312	50,184,420	51,146,219	53,047,003	-2.74%

§ 165:45-23-7(c)(17): Market Conditions

§ 165:45-23-7(c)(17): The most current information available comparing the base line and milestones to be achieved under market transformation programs with actual conditions in the market.

Program year 2025 marked the third year of Summit Utilities Oklahoma updated DSM Portfolio for PY 2023-2025. As Summit Utilities Oklahoma implements this portfolio, it remains important for the Company to evaluate market conditions to improve program performance.

The RSOL Program is made up of four channels: Natural Gas Equipment, Do-It-Yourself, Home Energy Reports, and High Efficiency Homes Channel. Overall, almost all Channels within the RSOL Program underperformed due to various factors that include inflation driving up the cost of goods, services, and labor as well as higher customer attrition rates in the Home Energy Reports Channel. Unfavorable economic conditions and elevated interest rates continue to plague the residential sector as affordability remains a major factor for customers opting to repair instead of replacing equipment.

The AAEC Program consists of the following channels: LMI Do-It-Yourself, LMI Home Energy Reports, Low-Income Saving Homes, LivingWise, and Affordable Housing Equipment Rebate Pilot Channels. The DSM portfolio provides LMI customers with a comprehensive suite of channels that help conserve energy and save money. The LMI market is the most sensitive to changing economic conditions, so outreach is critical in helping customers find low to no-cost ways to participate and benefit from energy efficiency measures. Summit's outreach efforts have led to consistent LMI customer participation, resulting in energy savings achievement above last year's results. One example of outreach was Summit engagement with Housing Authorities to inform them of the LMI DIY offerings, as well as rebate program offerings for future projects. Another effort that helped improve savings was Summit's request to change the Affordable Housing Equipment Rebate Channel participation criteria to include housing authorities and homeowners. This change resulted in higher savings achieved this program year as compared to last program year.

The Natural Gas Commercial Solutions Program again proved to be a high-performing program delivering 62,799 Mcf in energy savings. The commercial customer segment has been more resilient to the current economic conditions, particularly for low-cost direct install measures that provide a substantial amount of savings. The project pipeline is stable and will continue to be a large savings contributor in the following program years.

§ 165:45-23-7©(18): Summary of Spending by Demand Program

OAC § 165:45-23-7(c)(18): By Demand Program, provide a summary of spending, including the following:

(A) Administrative Costs;
(B) Inducements, including direct payments and other inducements;
(C) Education and marketing costs;
(D) Program Delivery Costs; and
(E) EM&V Costs.

Table 13 provides the actual 2025 program expenditures by Demand Program and cost category.

Table 13: 2025 Program Spending by Category

Program	Admin/Internal Delivery	Rebate & Incentive	Marketing	Delivery	Evaluation	Total Program
Residential Solutions (RSOL) Program	$42,589	$376,321	$36,913	$279,529	$50,067	$785,419
Access to Affordable Energy & Conservation (AAEC) Program	$23,300	$434,559	$1,529	$102,162	$9,452	$571,001
Natural Gas Commercial Solutions (NGCS) Program	$48,463	$509,200	$22,950	$177,705	$64,903	$823,222
Summit Utilities Education Program (SUEP)	$137	$0	$26,409	$1,749	$0	$28,294
Total Program Costs	**$114,488**	**$1,320,080**	**$87,801**	**$561,145**	**$124,421**	**$2,207,936**

§ 165:45-23-7(c)(19): Funds Planned versus Funds Expended

§ 165:45-23-7(c)(19): A statement of any funds that were committed but not spent during the year, by program, with an explanation for non-spending.

Summit Utilities Oklahoma PY 2025 DSM Portfolio expenses were $2,207,936, which is 84% of the approved budget of $2,621,344.

Program	Comment
RSOL	The RSOL funds budgeted for PY 2025 was $1.36 million of which 58% of the budget was spent. Residential customer participation was down compared to years past. This is generally due to the higher equipment and labor costs and customers opting to repair rather than replace equipment.

AAEC	The AAEC funds budgeted for PY 2025 was $571,001 of which 102% of the budget was spent. In the third year of the AAEC Program's existence, the cost to implement the channels was close to what we anticipated. Due to more participation than expected, funds were reallocated to meet the needs of this program. Expense management and leveraging existing marketing and advertising channels helped reduce costs for the AAEC program.
NGCS	The NGCS funds budgeted for PY 2025 was $823,222 of which 127% of the budget was spent. Due to more participation than expected, funds were reallocated to meet the needs of this program. The commercial & industrial custom and direct install channel continues to have a strong pipeline of projects that provide a sizable amount of savings. Additional program funds were spent to keep up with high demand.

Table 14: Budgeted Funding and Actual Expenditures by Program

Program	Program Funds Budgeted	Program Funds Expended	% Budget Spent
Residential Solutions (RSOL) Program	$1,361,705	$785,419.00	**58%**
Access to Affordable Energy & Conservation (AAEC) Program	$557,440	$571,001.00	**102%**
Natural Gas Commercial Solutions (NGCS) Program	$646,679	$823,222.00	**127%**
Summit Utilities Education Program (SUEP)	$55,520	$28,294.00	**51%**
Total Program Costs	**$2,621,344**	**$2,207,936**	**84%**

§ 165:45-23-7I(20): Description of Each Demand Program

§ 165:45-23-7(c)(20): A detailed description of each Demand Program reflecting the scale of the program as part of the Demand Portfolio that includes the following:

(A) Number of customers served by each Demand Program or program category;
(B) Program or program category expenditures;
(C) Verified energy and peak demand savings achieved by the Demand Program or program category, when available; and
(D) A description of proposed changes in the Demand Program plans.

Detailed information related to 2025 expenditures, participation, energy savings, overall program scale, as well as recent or proposed changes are provided below for each program:

Residential Solutions Program

A suite of DSM channels that offer a number of comprehensive measures designed to help residential customers reduce their energy cost and carbon emissions. The RSOL Program consists of the following channels: Natural Gas Equipment, DIY, Home Energy Reports, and High Efficiency Homes Channels. Summit Utilities filed and was approved to implement an updated three-year DSM portfolio for PY 2026 – PY 2028. Program changes include an increase in rebate amounts for prescriptive rebates, as well as the addition of a weatherization program for customers who are experiencing energy burden and who are not served by an investor-owned utility. Changes were also made to the Natural Gas Equipment Channel to split the residential and commercial channel savings between their respective programs. Both savings and budgets were adjusted to reflect anticipated changes in the market within the three-year cycle.

Participation & Energy Savings

Customer Class	Participation	Gross Energy Savings (MCF)	% Portfolio Gross Savings	Net Energy Savings (MCF)	% Portfolio Net Savings
Residential	35,599	23,316	61.1%	22,516	61.9%

Program Expenditures

Customer Class	Implementation	Admin/Internal Delivery	EM&V	Rebate	Marketing	Total Program	% Total Portfolio
Residential	$279,529	$42,589	$50,067	$376,321	$36,913	$785,419	36%

Access to Affordable Energy and Conservation Program

The Summit Utilities Oklahoma's AAEC Program is designed to provide low to moderate income customers and severely energy burdened customers the opportunity to save energy and money by leveraging a number of channels designed to encourage hard-to-reach customers to participate in the Company's conservation programs. Summit Utilities Oklahoma filed and was approved to implement an updated three-year DSM portfolio for PY 2026 – PY 2028. Program changes include an increase in rebate amounts for prescriptive rebates, as well as an adjustment to the income eligibility table for the Affordable Housing Equipment Rebate Channel. Both savings and budgets were adjusted to reflect anticipated changes in the market within the three-year cycle.

Participation & Energy Savings

Customer Class	Participation	Gross Energy Savings (MCF)	% Portfolio Gross Savings	Net Energy Savings (MCF)	% Portfolio Net Savings
Residential	9,728	15,557	68.8%	15,557	69.4%

Program Expenditures

Customer Class	Implementation	Admin/Internal Delivery	EM&V	Rebate	Education/ Advertising	Total Program	% Total Portfolio
Residential	$102,162	$23,300	$9,452	$434,559	$1,529	$571,001	26%

Natural Gas Commercial Solutions Program

The Natural Gas Commercial Solutions Program encourages Commercial and Industrial (C&I") customers to use natural gas efficiently by installing cost-effective energy efficient equipment, adopting energy-efficient designs, and using energy-efficient operations at their facilities. The program provides financial incentives to C&I customers installing or implementing cost-effective energy efficiency measures through the Direct-Install, Custom, or Prescriptive measure components of the program. Summit Utilities Oklahoma filed and was approved to implement an updated three-year DSM portfolio for PY 2026 – PY 2028. Program changes include an increase in rebate amounts for prescriptive rebates, as well as adding the Mission Based Channel which is designed to provide direct install services to buildings owned or leased by nonprofit organizations. Both savings and budgets were adjusted to reflect anticipated changes in the market within the three-year cycle.

Participation & Energy Savings

Customer Class	Participation	Gross Energy Savings (MCF)	% Portfolio Gross Savings	Net Energy Savings (MCF)	% Portfolio Net Savings
GS-1; CS-1; LCS	74	63,310	116.4%	62,799	116.6%

Program Expenditures

Customer Class	Implementation	Admin/Internal Delivery	EM&V	Rebate	Education/ Advertising	Total Program	% Total Portfolio
GS-1; CS-1; LCS	$177,705	$48,463	$64,903	$509,200	$22,950	$823,222	37%

Summit Utilities Education Program (SUEP)

SUEP is an education and awareness program that has no directly attributable energy savings associated with program implementation.
Summit Utilities Oklahoma filed and was approved to implement an updated three-year DSM portfolio for PY 2026 – PY 2028. The budget for this program was adjusted to reflect anticipated changes in the market within the three-year cycle.

Program Expenditures

	Admin	Rebate	Marketing	Delivery	EM&V	Total Program	% Total Portfolio
SUEP	$137	$0	$26,409	$1,749	$39,423	$28,294	1%

§ 165:45-23-7(b)(21): Research and Development Activities

§ 165:45-23-7(c)(21): A list of research and development activities included in the demand portfolio, their status, and a report on the connection between each activity and effective energy efficiency programs.

Summit Utilities Oklahoma did not conduct any research and development activities during PY 2025.

§ 165:45-23-7©(22): Program Implementers

§165:45-23-7(c)(22): Identification of program implementers, including names, job titles, business postal addresses, business electronic mail addresses, and business telephone numbers.

Summit Utilities Oklahoma implements the following programs and channels in-house: SUEP, Natural Gas Equipment, DIY, LMI DIY, High Efficiency Homes, and AHER Channel. The remainder of the programs are vendor implemented.

The contact information is:

Name of Program Implementer: Danielle Beckham

Job Title: Manager of Energy Efficiency

Business Postal Address: 1000 Fianna Way, Fort Smith, AR 72916

Business Email Address: dbeckham@summitutilities.com

Business Telephone Number: 479-285-4205

The HERs and LMI HERs channel is implemented by Oracle Utilities (formerly Opower Inc.) with oversight and management by Summit Utilities Oklahoma. The Summit Utilities Oklahoma contact is as above and the Oracle contact is:

Name of Program Implementer: David Ware/Rachel Kim

Job Title: Assoc. Director, Service Delivery/Service Delivery Manager

Business Postal Address: 2311 Wilson Blvd., 8th Floor, Arlington, VA 22201

Business Email Address:david.a.ware@oracle.com/rachel.k.kim@oracle.com

Business Telephone Number: 757-237-2125/703-945-5621

Summit Utilities Oklahoma manages DIY, but it utilizes the fulfillment services of CLEAResult. The CLEAResult contact is:

Name of Program Implementer: Shelly Baron

Job Title: Program Portfolio Manager

Business Postal Address: 1300 Bond Avenue, Little Rock, AR 72202

Business Email Address: shelly.baron@clearesult.com

Business Telephone Number: 501-221-4063

The Low-Income Saving Homes Program is delivered by our vendor Titan ES, in partnership with Public Service Company of Oklahoma (“PSO”). The Titan ES contact is:

Name of Program Implementer: Scott Carter

Job Title: Program Manager

Business Postal Address: 9700 S. Pole Rd. Oklahoma City, OK 73160

Business Email Address: scarter@titanes.us

Business Telephone Number: 405-632-1700

The LivingWise Channel is implemented by AM Conservation. The AM Conservation contact is:

Name of Program Implementer: Brenee Mitchell

Job Title: Program Manager

Business Postal Address: 1701 Charleston Regional Parkway, Suite A, Charleston, SC 29492

Business Email Address: bmitchell@franklinenergy.com

Business Telephone Number: 843-531-9962

The Natural Gas Commercial Solutions Program is delivered by our vendor, CLEAResult. The CLEAResult contact is:

Name of Program Implementer: Shelly Baron

Job Title: Program Portfolio Manager

Business Postal Address: 1300 Bond Avenue, Little Rock, AR 72202

Business Email Address: shelly.baron@clearesult.com

Business Telephone Number: 501-221-4063

Conclusion

PY 2025 was the third year of the three-year portfolio plan cycle spanning PY 2023 – 2025. The Summit Utilities Oklahoma DSM Portfolio includes three customer categories: residential, low- to moderate-income, and commercial customers.

Economic headwinds in the Summit Utilities Oklahoma service territories continue to intensify our efforts to sustain energy savings for both residential and LMI customer segments as they struggle with affordability. Elevated costs of goods and services, labor, and interest rates negatively impacted program participation. Despite the headwinds, the Company was able to increase energy savings by 7% for SUO customers. SUO is committed to maintaining our relationship with key trade allies to help educate customers on ways to reduce energy consumption and carbon emissions. The Residential Solutions Program ended the program year with 22,516 Mcf in savings, just under PY 2024 final savings results. Home Energy Reports remains the best source of energy savings for the program followed by natural gas equipment. As for the Access to Affordable Energy and Conservation Program, strong program performance elevated the savings total to 15,557 Mcf over the previous PY 2024. The higher savings were attributed to the improved performance of the LMI DIY, Affordable Housing Equipment Rebate, and Low-Income Saving Homes Channel. . Finally, the Commercial Solutions Program led all programs in achieved savings, resulting in 62,799 Mcf savings. These savings were significantly higher than PY 2024 and were driven primarily by a large number of direct install measures resulting in 53,963 Mcf of savings. Despite flat savings growth for the residential and LMI programs, the increased savings for the Commercial Solutions Program was enough to elevate the overall total DSM portfolio savings to 100,872 Mcf, which is higher than in PY 2024. Higher energy savings and expense management led to a higher TRC ratio of 1.96 resulting in a net customer benefit of $2.44 million and a UCT ratio of 1.78 resulting in a customer net benefit of $1.86 million .

Appendix A – EM&V Report

Evaluation of Summit Oklahoma Program Year 2025 Demand Side Management Portfolio

Submitted to:

Summit Oklahoma

April 23, 2026

Prepared by:

QUALUS

Qualus Services, LLC

Prepared by:

John Vazquez
Joe Marquez
David Diebel
Dan Asisa
Will Meyer

Qualus Services
100 Colonial Center Parkway,
Suite 400
Lake Mary, FL 32746
Tel: (916) 363-8383

Acknowledgements:

We would like to thank the staff at Summit Oklahoma for their time and effort in contributing to the EM&V of the 2025 programs. This evaluation was conducted with regular coordination with staff at Summit, who provided quick feedback and turnaround to the requests of the evaluation team as well as open and forthright insights into the operations of their programs.

Further, we would like to acknowledge our gratitude towards Summit customers, implementation contractor staff and trade allies. As with the staff at Summit, their active participation allowed the evaluation team to collect all needed data for this effort.

Qualus Services
100 Colonial Center Parkway,
Suite 400
Lake Mary, FL 32746
Tel: (916) 363-8383

TABLE OF CONTENTS

1. Executive Summary 1-1
2. General Methodology 2-1
3. Residential Solutions Program 3-1
4. Access to Affordable Energy & Conservation Program 4-1
5. Natural Gas Commercial Solutions Program 5-1
6. Appendix A: Site Reports 6-1

LIST OF TABLES

Table 1-1 Gross Impact Summary for the RSOL Program 1-2

Table 1-2 Net Impact Summary for the RSOL Program 1-2

Table 1-3 Gross Impact Summary for the AAEC Program 1-2

Table 1-4 Net Impact Summary for the AAEC Program 1-3

Table 1-5 Gross Impact Summary for the NGCS Program 1-3

Table 1-6 Net Impact Summary for the NGCS Program 1-3

Table 3-1 Heating Load Factors by Weather Zone and Construction Date 3-6

Table 3-2 Verified Gross Therms Savings: Natural Gas Equipment Rebates (Residential) 3-10

Table 3-3 Verified Net Therms Savings: Natural Gas Equipment Rebates (Residential) 3-10

Table 3-4 Do-it-Yourself Participation by Kit Type 3-12

Table 3-5 Faucet Aerator Mixed Water Temperatures by Weather Zone 3-13

Table 3-6 Faucet Aerator Volume of Use 3-13

Table 3-7 Low-Flow Showerhead Mixed Water Temperatures by Weather Zone 3-14

Table 3-8 Low-Flow Showerhead Volume of Use 3-14

Table 3-9 Verified Gross Therms Savings: Do-it-Yourself 3-15

Table 3-10 Verified Net Therms Savings: Do-it-Yourself 3-16

Table 3-11 Applicable Net NEBs: Do-it-Yourself Pathway 3-16

Table 3-12 Home Energy Reports Number of Accounts by Cohort Group 3-17

Table 3-13 Wave-Level HER Treatment Customer Allocations by Pathway (HER and LMI HER) and Pre-Treatment Period Intervals 3-21

Table 3-14 Wave-Level HER Regression Results and Annual Natural Gas Savings 3-22

Table 3-15 HERs Pathway Savings Before and After Double Counting 3-23

Table 3-16 HERs Pathway Savings 3-23

Table 3-17 Verified Gross Therms Savings: High Efficiency Homes 3-24
Table 3-18 Verified Net Therms Savings: High Efficiency Homes 3-25
Table 4-1 LMI Do-it-Yourself Participation by Kit Type 4-2
Table 4-2 Verified Gross Therms Savings: LMI Do-it-Yourself 4-3
Table 4-3 Verified Net Therms Savings: LMI Do-it-Yourself 4-3
Table 4-4 Applicable Net NEBs: LMI Do-it-Yourself Pathway 4-3
Table 4-5 Wave-Level LMI HER Regression Results and Annual Natural Gas Savings 4-4
Table 4-6 LMI HERs Pathway Savings Before and After Double Counting 4-5
Table 4-7 LMI HERs Pathway Savings 4-6
Table 4-8 QA Violation Definitions by Measure 4-8
Table 4-9 LISH Ex Ante Summary 4-9
Table 4-10 Air Infiltration Deemed Savings Multipliers 4-10
Table 4-11 Ceiling Insulation Deemed Multipliers by Weather Zone – R-38 4-11
Table 4-12 Verified Gross Therms Savings: LISH 4-12
Table 4-13 Verified Net Therms Savings: LISH 4-12
Table 4-14 LivingWise Verified Gross Gas Savings 4-15
Table 4-15 LivingWise Verified Net Gas Savings 4-16
Table 4-16 LivingWise Applicable Net NEBs 4-16
Table 4-17 Verified Gross Therms Savings: AHER Pathway 4-17
Table 4-18 Verified Net Therms Savings: AHER Pathway 4-17
Table 5-1 Hot Water Requirements by Building Type 5-5
Table 5-2 Verified Gross Therms Savings: Natural Gas Equipment Rebates (Commercial) 5-5
Table 5-3 Verified Net Therms Savings: Natural Gas Equipment Rebates (Commercial) 5-6
Table 5-4 Verified Gross Therms Savings: Commercial Boilers Pathway 5-7

Table 5-5 Verified Net Therms Savings: Commercial Boilers Pathway 5-7
Table 5-6 Verified Gross Therms Savings: C&I Custom Pathway 5-8
Table 5-7 Verified Net Therms Savings: C&I Custom Pathway 5-8
Table 5-8 Commercial Faucet Aerator Inputs 5-11
Table 5-9 Reduction in Daily Hot Water Usage, ΔV 5-12
Table 5-10 Commercial Low-Flow Showerhead Inputs 5-12
Table 5-11 Commercial Pre-Rinse Spray Valve Inputs 5-14
Table 5-12 DI Weather Stripping Savings Calculation Parameters 5-15
Table 5-13 EFLHH by Weather Zone and Building Type 5-15
Table 5-14 Deemed Annual Therms Savings per Linear Foot 5-15
Table 5-15 Verified Gross Therms Savings: C&I Direct Install Pathway 5-16
Table 5-16 Verified Net Therms Savings: C&I Direct Install Pathway 5-16
Table 5-17 C&I Direct Install Applicable Net NEBs 5-16

LIST OF FIGURES

Figure 1-1 Contribution to Portfolio Net Savings by Program and by Channel 1-4

Figure 1-2 Residential Net Savings by Measure 1-4

Figure 1-3 Non-Residential Net Savings by Measure 1-5

Figure 1-4 Commercial Net Savings by Measure 1-5

Figure 3-1 Channel Summary by Savings Share and Participation 3-3

Figure 3-2 Cumulative Savings and Participants by Month 3-3

Figure 4-1 Channel Summary by Savings Share and Participation 4-7

Figure 4-2 LISH Cumulative Savings and Participants by Month 4-7

Figure 4-3 LivingWise Participation Summary 4-13

Figure 5-1 Commercial Space Heating Summary by Savings Share and Participation 5-3

Figure 5-2 Pathway Summary by Savings Share and Participation 5-10

1. Executive Summary

This report is to provide a summary of the evaluation effort of the 2025 Demand Side Management ("DSM") portfolio by Summit Oklahoma ("Summit"). Qualus (the "Evaluator") conducted this evaluation. This report provides verified gross and net savings estimates for evaluated programs in Program Year 2025 ("PY2025").

1.1 Summary of Summit Demand Side Management Programs

For PY2025, the Summit DSM portfolio contained the following programs and channels (and components for the Natural Gas Commercial Solutions Program):

- Residential Solutions Program ("RSOL")
  - Natural Gas Equipment Rebates Channel
  - Do-it-Yourself Channel ("DIY")
  - Home Energy Reports Channel ("HERs")
  - High Efficiency Homes Channel
- Access to Affordable Energy Conservation Program ("AAEC")
  - LMI Do-it-Yourself Channel ("LMI DIY")
  - LMI Home Energy Reports Channel ("LMI HERs")
  - Low-Income Savings Homes Channel ("LISH")
  - LivingWise Channel
  - Affordable Housing Equipment Rebate ("AHER") Pilot Channel
- Natural Gas Commercial Solutions Program ("NGCS")
  - Natural Gas Equipment Rebates Channel
  - Commercial Food Service Channel
  - Commercial Boilers Channel
  - C&I Custom Channel
  - C&I Direct Install Channel

1.2 Evaluation Objectives

The goals of the PY2025 EM&V effort are as follows:

- For prescriptive measures, verify that savings are being calculated according to appropriate deemed savings protocols.
- For custom measures, this effort comprises the calculation of savings according to accepted protocols (such as IPMVP). This is to ensure that custom measures are cost-effective and provide reliable savings.

1.3 Summary of Findings

The following presents a summary of Summit portfolio gross and net impact evaluation findings.

1.3.1 Impact Findings

Table 1-1, Table 1-3, and Table 1-5 summarize the gross impacts while Table 1-2, Table 1-4, and Table 1-6 summarize the net impacts for the Residential Solution Program, the Access to Affordable Energy Conservation Program, and the Natural Gas Commercial Solution Program, respectively.

Table 1-1 Gross Impact Summary for the RSOL Program

RSOL Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		Gross Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post	
Natural Gas Equipment Rebates	17,576	34,912	427,211	904,583	198.6%
Do-it-Yourself	4,653	4,458	49,695	47,744	95.8%
Home Energy Reports	118,464	173,543	118,464	173,543	146.5%
High Efficiency Homes	5,280	20,243	143,730	551,035	383.4%
Total	**145,973**	**233,156**	**739,100**	**1,676,906**	**159.7%**

Total sums may differ due to rounding.

Table 1-2 Net Impact Summary for the RSOL Program

RSOL Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		NTGR	Net Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post		
Natural Gas Equipment Rebates	17,576	28,716	427,211	749,698	82.3%	163.4%
Do-it-Yourself	4,653	4,293	49,695	45,978	96.3%	92.3%
Home Energy Reports	118,464	173,543	118,464	173,543	100.0%	146.5%
High Efficiency Homes	5,280	18,607	143,730	506,894	91.9%	352.4%
Total	**145,973**	**225,160**	**739,100**	**1,476,113**	**96.6%**	**154.2%**

Total sums may differ due to rounding.

Table 1-3 Gross Impact Summary for the AAEC Program

AAEC Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		Gross Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post	
LMI Do-it-Yourself	5,221	4,527	52,207	45,268	86.7%
LMI Home Energy Reports	63,942	61,417	63,942	61,417	96.1%
Low-Income Savings Homes	62,095	69,446	1,389,227	1,586,597	111.8%
LivingWise	17,205	17,205	156,995	156,995	100.0%
Affordable Housing Equipment Rebates	2,088	2,978	70,343	100,548	142.6%
Total	**150,550**	**155,572**	**1,732,715**	**1,950,825**	**103.3%**

Total sums may differ due to rounding.

Table 1-4 Net Impact Summary for the AAEC Program

AAEC Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		NTGR	Net Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post		
LMI Do-it-Yourself	5,221	4,527	52,207	45,268	100.0%	86.7%
LMI Home Energy Reports	63,942	61,417	63,942	61,417	100.0%	96.1%
Low-Income Savings Homes	62,095	69,446	1,389,227	1,586,597	100.0%	111.8%
LivingWise	17,205	17,205	156,995	156,995	100.0%	100.0%
Affordable Housing Equipment Rebates	2,088	2,978	70,343	100,548	100.0%	142.6%
Total	**150,550**	**155,572**	**1,732,715**	**1,950,825**	**100.0%**	**103.3%**

Total sums may differ due to rounding.

Table 1-5 Gross Impact Summary for the NGCS Program

NGCS Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		Gross Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post	
Natural Gas Equipment Rebates	29,242	31,216	605,663	649,735	106.8%
Commercial Boilers	7,589	6,220	151,786	124,409	82.0%
C&I Custom	56,038	56,038	576,067	576,067	100.0%
C&I Direct Install	539,579	539,626	5,935,373	5,935,881	100.0%
Total	**632,449**	**633,100**	**7,268,888**	**7,286,093**	**100.1%**

Total sums may differ due to rounding.

Table 1-6 Net Impact Summary for the NGCS Program

NGCS Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		NTGR	Net Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post		
Natural Gas Equipment Rebates	29,242	26,110	605,663	540,076	83.6%	89.3%
Commercial Boilers	7,589	6,220	151,786	124,409	100.0%	82.0%
C&I Custom	56,038	56,038	576,067	576,067	100.0%	100.0%
C&I Direct Install	539,579	539,626	5,935,373	5,935,881	100.0%	100.0%
Total	**632,449**	**627,994**	**7,268,888**	**7,176,434**	**99.2%**	**99.3%**

Total Sums may differ due to rounding.

The contribution to portfolio savings by program and by channel is summarized in Figure 1-1. the Evaluator abbreviated channel names and kept the same order outlined in Section 1.1.

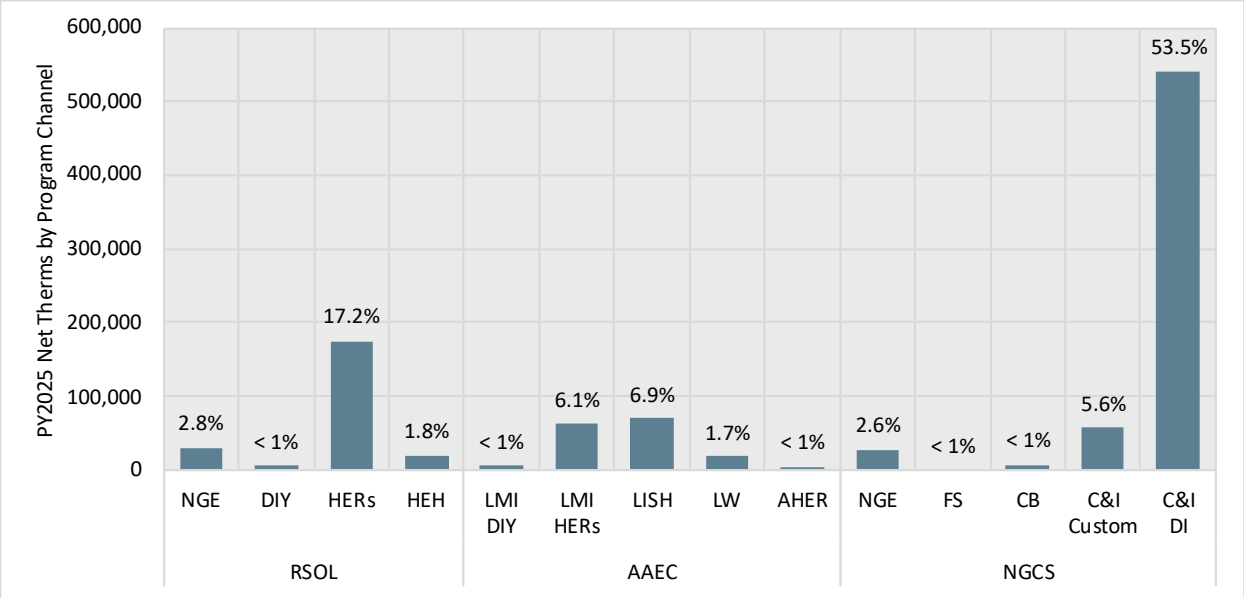


Figure 1-1 Contribution to Portfolio Net Savings by Program and by Channel

The contribution to portfolio savings for RSOL and AAEC measures is summarized in Figure 1-2.

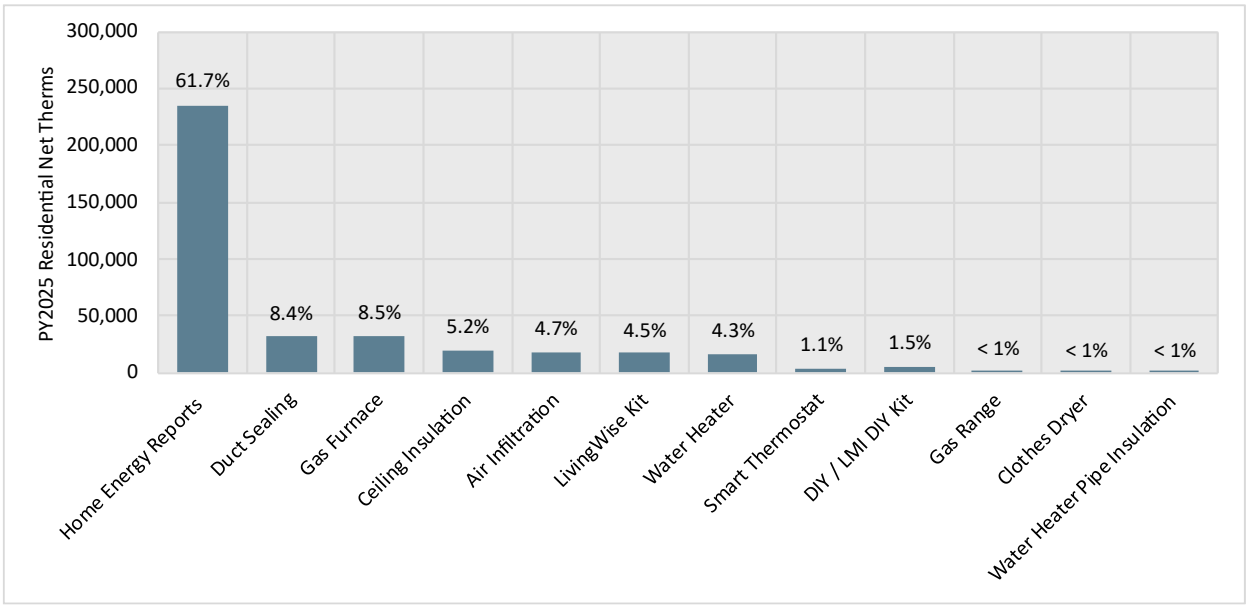


Figure 1-2 Residential Net Savings by Measure

The contribution to portfolio savings for non-residential Natural Gas Equipment measures is summarized in Figure 1-3 below.

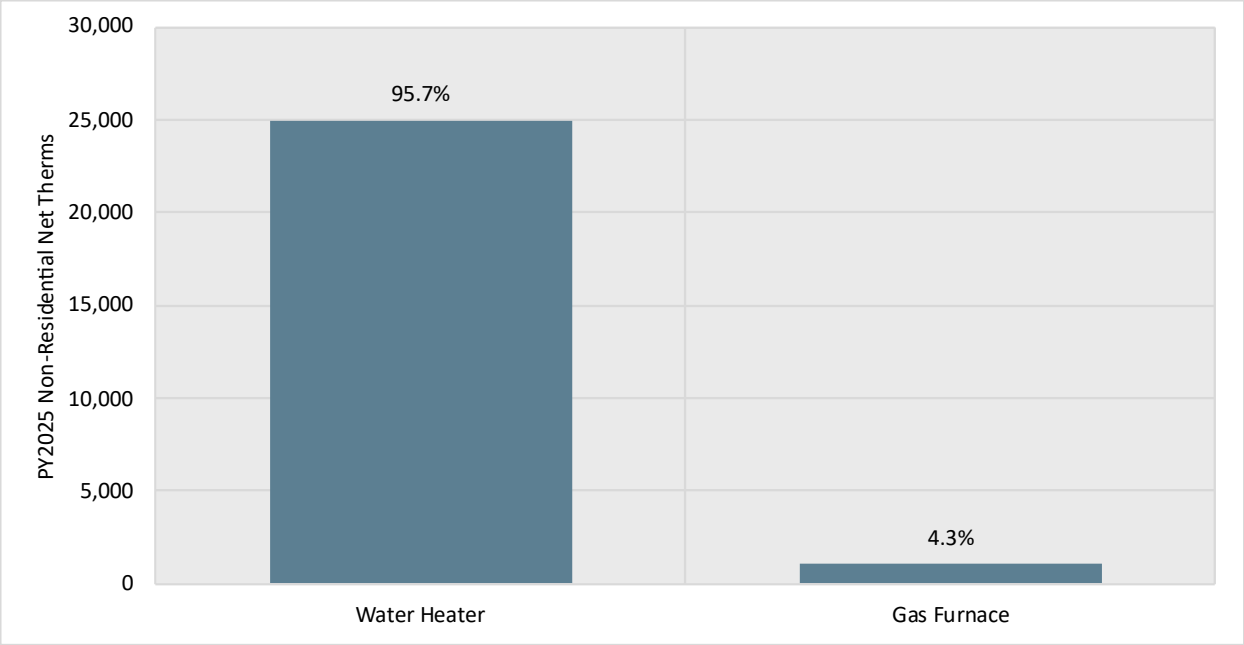


Figure 1-3 Non-Residential Net Savings by Measure

The contribution to portfolio savings for C&I Custom, Direct Install, and Food Services measures is summarized in Figure 1-4.

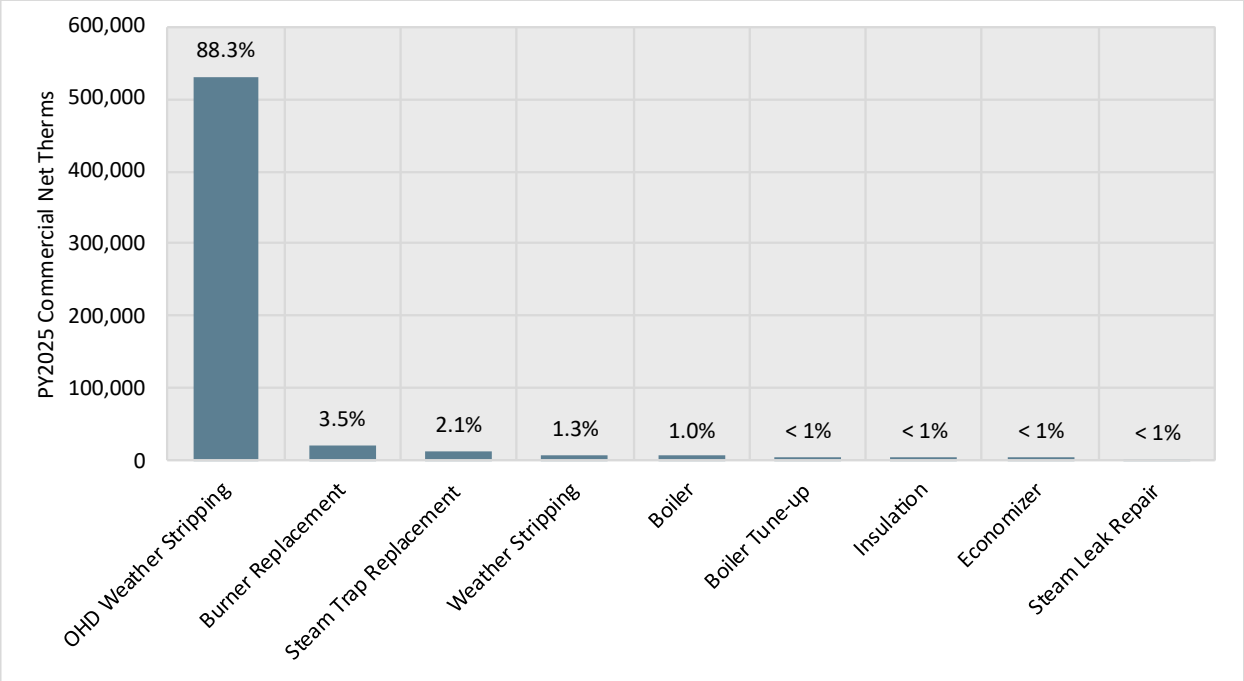


Figure 1-4 Commercial Net Savings by Measure

1.4 Summary of EM&V Effort

The evaluation effort consisted of:

- **Review of deemed savings calculations.** For all programs that apply deemed savings, the Evaluator conducted a detailed review on a census of projects to ensure that savings are up to date with the most recently available deemed savings and applicable code inputs from the Arkansas Technical Reference Manual v10 ("AR TRM 10").
- **Analysis of custom projects.** Custom projects within the C&I Solutions Program accounted for 15.4% of portfolio-level savings. All custom projects received site-level analyses based on International Measurement & Verification Protocols ("IPMVP").[1]
- **Analysis of bill impacts from Home Energy Reports.** The RSOL Home Energy Reports channel accounted for 17.4% of total portfolio savings while the AAEC LMI Home Energy Reports channel accounted for 6.2%. The Evaluator conducted an analysis of impacts on customer bills applying methods vetted through the National Renewable Energy Laboratory Uniform Methods Project Chapter 17: Residential Behavioral Protocol.[2]

1.5 Report Organization

This report is organized with one chapter providing the full impact evaluation summary of a specified program. Then, within a program chapter, subsections provide detailed impact evaluation summaries of a specified channel offered within a given program. The report is as follows:

- Chapter 1 provides high level portfolio findings and general report structure
- Chapter 2 provides general methodology;
- Chapter 3 provides results for the Residential Solutions Program;
    - Section 3.1 provides results for the Natural Gas Equipment Rebates (Residential) channel
    - Section 3.2 provides results for the Do-it-Yourself channel
    - Section 3.3 provides results for the Home Energy Reports channel
    - Section 3.4 provides results for the High Efficiency Homes channel

[1] https://evo-world.org/en/products-services-mainmenu-en/protocols/ipmvp

[2] https://www.energy.gov/sites/prod/files/2015/02/f19/UMPChapter17-residential-behavior.pdf

- Chapter 4 provides results for the Access to Affordable Energy and Conservation Program;
    - Section 4.1 provides results for the LMI Do-it-Yourself channel
    - Section 4.2 provides results for the LMI Home Energy Reports channel
    - Section 4.3 provides results for the Low-Income Savings Homes channel
    - Section 4.4 provides results for the LivingWise School Kits channel
    - Section 4.5 provides results for the Affordable Housing Equipment Rebates Pilot channel
- Chapter 5 provides results for the Natural Gas Commercial Solutions Program
    - Section 5.1 provides results for the Natural Gas Equipment Rebates (Non-Residential) channel
    - Section 5.3 provides results for the Commercial Boilers component
    - Section 5.4 provides results for the C&I Custom component
    - Section 5.5 provides results for the C&I Direct Install component
- Appendix A provides the site-level custom reports for the Natural Gas Commercial Solutions Program.

2. General Methodology

This section details general impact evaluation methodologies by program-type as well as data collection methods applied. This section will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies;
- Free ridership determination; and
- Data Collection Procedures.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluator provides a glossary of terms to follow:

- Ex Ante – Savings estimates provided by program administrators prior to review from a third party-evaluator (from the Latin for "beforehand")
- Ex Post – Savings estimates reported by an evaluator after the energy impact evaluation has been completed (from the Latin for "from something done afterward")
- Deemed savings – An estimate of an energy savings or 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) are applicable to the situation being evaluated. (e.g., assuming 17.36 therms savings for a low-flow showerhead)
- Gross savings – The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated
- Gross realization rate – Ratio of Ex Post savings / Ex Ante savings (e.g., If the Evaluator verifies 15 therms per showerhead, *gross realization rate* = 15/17.36 = 86%)
- 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
- Spillover – Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program that exceed 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)

- Net savings – The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand. (e.g., if Free ridership for low-flow showerheads = 50%, net savings = 15 therms x (100% - 50%) = 7.5 therms)
- Net-to-gross-ratio ("NTGR") = (1 – Free ridership % + Spillover %), also defined as *net savings* / *gross savings*
- Ex Ante net savings = Ex Ante gross savings x Ex Ante free ridership rate
- Ex Post net savings = Ex Post gross savings x Ex Post free ridership rate
- Net realization rate = Ex Post net savings / Ex Ante net savings
- Effective useful life ("EUL") – An estimate of the median number of years that the efficiency measures installed under a program are still in place and operable
- Gross lifetime therms = Ex Post gross savings x EUL

2.2 Overview of Methodology

The proposed methodology for the evaluation of the PY2025 Summit DSM Portfolio is intended to provide:

- Net impact results at the 90% confidence and +/-10% precision level, and
- Program feedback and recommendations when applicable.

In doing so, this evaluation will provide the verified net savings results, provide recommendations for program improvement, and ensure cost-effective use of ratepayer funds. By leveraging experience and lessons learned from prior evaluations, the PY2025 evaluation is streamlined to focus on areas in need of research and improvement.

2.3 Sampling

Sampling is necessary to evaluate savings for the Summit DSM portfolio insomuch as verification of a census of program participants is typically cost-prohibitive. Samples are drawn in order to ensure 90% confidence at the +/- 10% precision level. Programs are evaluated on one of three bases:

- Census of all participants
- Simple random sample
- Stratified random sample

2.4 Census of Participants

A census of participant data was used for programs where such review is feasible. For example, the Home Energy Reports program's savings estimates are based on a regression model that incorporates billing data for a census of program recipients.

2.5 Simple Random Sampling

For programs with relatively homogenous measures (largely in the residential portfolio), the Evaluator conducted a simple random sample of participants. The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of variation ("CV") is defined as:

$$CV(x) = \frac{Standard\ Deviation\ (x)}{Mean(x)}$$

Where x is the average therms savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

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

Where,

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

CV = Coefficient of variation

RP = Required precision, 10% in this evaluation

With 10% required precision ("RP"), this calls for a sample of 68 for programs with a sufficiently large population. However, in some instances, programs did not have sufficient participation to make a sample of this size cost-effective. In instances of low participation, the Evaluator then applied a finite population correction factor, defined as:

$$n = \frac{n_0}{1 + {}^{n_0}/_{N}}$$

Where,

n_0 = Sample required for large population

N = Size of population

n = Corrected sample

For example, if a program were to have 100 participants, the finite population correction would result in a final required sample size of 41. The Evaluator applied finite population correction factors in instances of low participation in determining samples required for surveying or onsite verification.

2.6 Free Ridership

In determining Ex Post net savings for the Summit DSM portfolio, the Evaluator provides estimates of free ridership for individual programs. Free riders are program participants that would have implemented the same energy efficiency measures at nearly the same time absent from the program. As per TRM guidelines, free riders are defined as:

> "…program participants who received an incentive but would have installed the same efficiency measure on their own had the program not been offered. This includes partial free riders, defined as customers who, at some point, would have installed the measure anyway, but the program persuaded them to install it *sooner* or customers who would have installed the measure anyway, but the program persuaded them to install more efficient equipment and/or more equipment. For the purposes of EM&V activities, participants who would have installed the equipment within one year will be considered full free riders; whereas 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)."

Given this definition, participants are defined as free riders through a binary scoring mechanism, in being either 0% or 100% free riders.

2.6.1 Prescriptive Free Ridership

The general methodology for evaluating free ridership among prescriptive program participants involved examination of four factors:

(1) Demonstrated financial ability to purchase high efficiency equipment absent the rebate.

(2) Importance of the rebate in the decision-making process.

(3) Prior planning to purchase high efficiency equipment.

(4) Importance of the contractor in influencing the decision-making process.

In this methodology, Part (1) is essentially a gateway value, in that if a participant does not have the financial ability to purchase energy efficient equipment absent a rebate, the other components of free ridership become moot. As such, if they could not have afforded the high efficiency equipment absent the rebate, free ridership is scored at 0%. If they did have the financial capability, the Evaluator then examined the other three components. The respondent is determined to be a free rider based upon a preponderance of evidence of these three factors; that is, if the respondent's answers indicate free ridership in two or more of these three

components, they are considered free riders. Specific questions and modifications to this general methodology are presented in the appropriate program chapters.

For residential programs, free ridership is calculated as the average score determined for the sample of participants surveyed. This value is then applied to the program-level savings to discount savings attributable to free ridership.

2.6.2 Custom Free Ridership

For custom projects from the Commercial Solutions program, free ridership is assessed on a case-study basis, through which the Evaluator conducts an in-depth interview that includes a battery of questions addressing:

- The timing of learning of the program relative to the timing of the planning of the retrofit,
- The impact the program incentive has on measure payback relative to the stated payback requirements by the respondent,
- Whether the respondent learned of the energy efficiency measure from a program-funded audit, and
- Whether any influence the program had in modifying the project affected savings by greater than 50%.

3. Residential Solutions Program

The Residential Solutions Program is part of a reorganization effort on the Summit portfolio to consolidate non-low-income residential programs. This new program combines the following former programs:

- Natural Gas Equipment Rebates Program (Residential)
- Low-Flow Showerhead and Faucet Aerator Program
- Home Energy Reports Program
- High Efficiency Homes Program

In addition to combining the former programs, the Summit portfolio renamed the consolidated programs and are now categorized as 'channels' under the program umbrella. The following channels are now part of the overall Residential Solutions Program:

- Natural Gas Equipment Channel (Residential)
- Do-it-Yourself Channel
- Home Energy Reports Channel
- High Efficiency Homes Channel

The following subsections outline the results for each of the channels within the RSOL program.

3.1 Natural Gas Equipment Channel (Residential)

The Natural Gas Equipment channel provides incentives to residential customers for high efficiency space and water heating equipment. Eligible measures for this channel include:

- $300 for Gas furnaces with 90 – 94.9% AFUE
- $500 for Gas furnaces with 95% or higher AFUE
- $2,000 for placement of electric heating to gas furnaces with 90 – 94.9% AFUE
- $2,000 for placement electric heating to gas furnaces with 95% or higher AFUE
- $60 for qualified smart thermostats installed with new qualified furnace or installed with existing furnace.
- $500 for tankless water heaters with a UEF of 0.80 or greater (non-condensing units)
- $200 per 100,000 input BTU/h for storage tank water heaters (≥ 75,000 BTU/h) with thermal efficiency ≥ 88% (not to exceed 25% of total equipment cost)
- $900 for replacement of electric water heater with natural gas tankless water heaters with an EF of 0.80 or greater

- Up to $300 for replacement of electric to gas cooking ranges
- Up to $450 for new construction and replacement of electric to gas clothes dryers

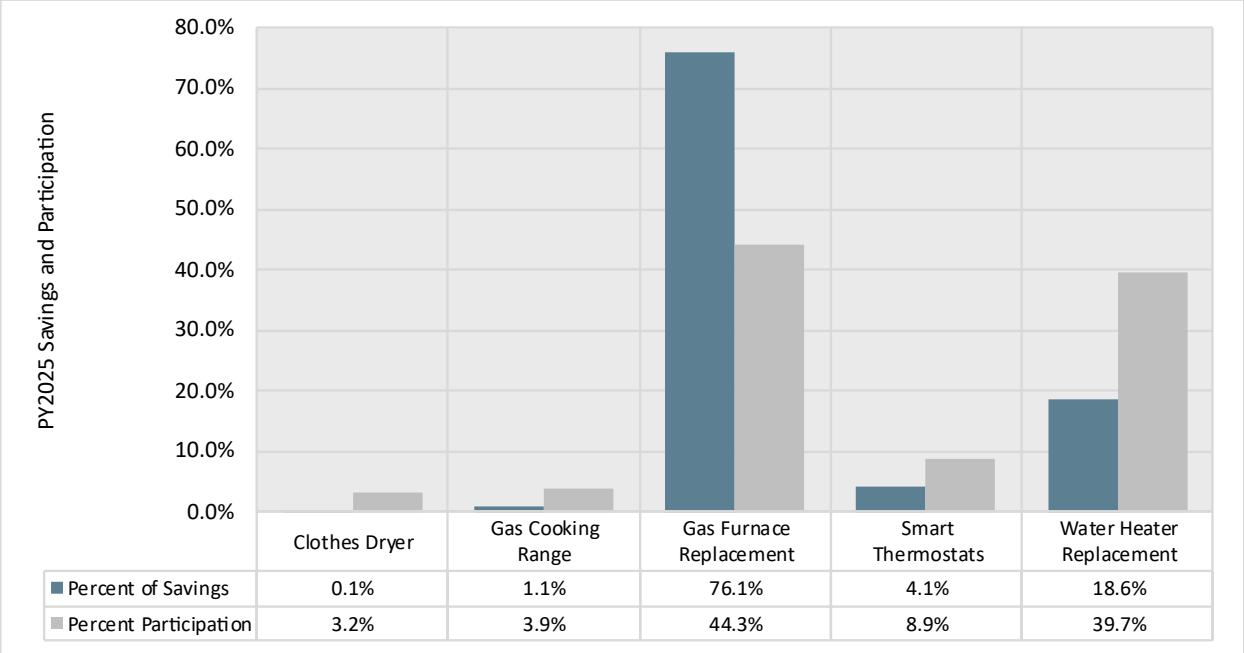
The channel is targeted at the residential market sectors and offers incentives for both retrofit and new construction applications. The marketing efforts for the space and water heating equipment were largely directed at plumbing and HVAC contractors; their involvement is seen as crucial, as they are generally a primary source of information for end-use customers when deciding upon a replacement system.

3.1.1 Participation Summary

In PY2025, the Natural Gas Equipment Channel achieved the following participation by measure rebated:

- Furnaces: 125 total units
- Water heaters: 112 total units
- Smart thermostats: 25 total units
- Clothes dryers: 9 total units
- Gas cooking ranges: 11 total units

In total, the number of distinct residential customers that participated in the channel was 255. This reflects the total number of distinct gas account numbers that received rebates for various equipment. Figure 3-1 below summarizes the overall percentage of savings and percentage of participation by measure offered in the channel.



	Clothes Dryer	Gas Cooking Range	Gas Furnace Replacement	Smart Thermostats	Water Heater Replacement
Percent of Savings	0.1%	1.1%	76.1%	4.1%	18.6%
Percent Participation	3.2%	3.9%	44.3%	8.9%	39.7%

Figure 3-1 Channel Summary by Savings Share and Participation

Figure 3-2 below summarizes the number of distinct premises by month as determined by the date of rebate delivery as well as the cumulative savings from the program.

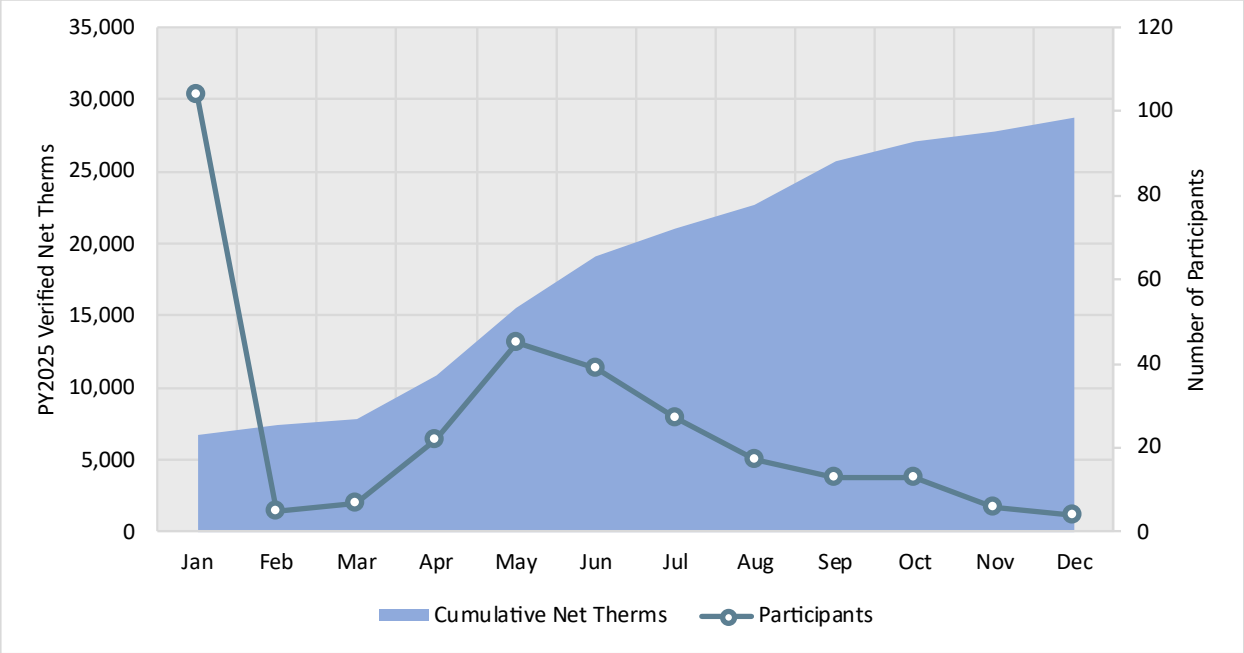


Figure 3-2 Cumulative Savings and Participants by Month

3.1.1.1 Residential Space Heating Participation Summary

In PY2025, the Natural Gas Equipment Channel processed 150 rebates for residential space heating. The rebates included the following:

- 99 single-family furnace replacements;
- 26 multi-family furnace replacements;
- 77 new construction furnace rebates;
    - 1 furnace was installed in a building considered as 'small office', metered as a residential account
- 12 fuel-switch furnaces rebates; and
- 25 smart thermostats.

Of the 125 furnaces that were rebated 123 had AFUE ratings that met or exceeded 95% AFUE, and 2 had AFUE ratings of 92%. The verified furnace AFUE ratings ranged from 92% to 98% AFUE.

3.1.1.2 Residential Water Heating Participation Summary

In PY2025, the Natural Gas Equipment Channel processed 112 rebates for residential water heating. The rebates included the following:

- 60 single-family water heater replacements;
- 51 multi-family water heater replacements; and
- 3 fuel-switch water heater rebates.

All 112 of the water heater replacements that were installed were tankless water heaters. The verified water heater efficiencies ranged from 0.82 to 0.98 UEF.

3.1.1.3 Residential Appliance Participation Summary

In PY2025, the Natural Gas Equipment Channel processed 20 rebates for residential appliances that excluded furnaces, water heaters, and smart thermostats. The rebates included the following:

- 9 high efficiency clothes dryers; and
- 11 high efficiency gas cooking ranges.

3.1.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

3.1.2.1 Space Heating Gas Savings Methodology

Savings for residential furnaces are calculated as follows:

$$therm_{ex\ post\ savings} = therm_{basline\ heating\ system} - therm_{new\ heating\ system}$$

First the energy use of the new heating system was found.

$$therm_{new\ heating\ system} = Heat\ load \times \left(\frac{1}{AFUEnew\ heating\ system}\right)$$

$$Heat\ load = \left(\frac{\frac{therms}{site\ area}}{yr}\right) \times site\ area = \left(\frac{\frac{therms}{site\ area}}{yr}\right) \times \left(\frac{CAP_H}{30}\right) \times 1.05$$

Where:

Site area = square footage of the project site

$CAP_H = \left(\frac{Btu}{hr}\right)$= Verified heating capacity verified by the Evaluator with AHRI number

$AFUE_{new\ heating\ system}$ = Verified by the Evaluator with AHRI number

Source to site ratio, electric to gas = 3.14

Next the energy use of the removed furnace was found.

$$therm_{new\ heating\ system} = Heat\ load \times \left(\frac{1}{AFUE_{old\ heating\ system}}\right)$$

$$Heat\ load = \left(\frac{\frac{therms}{site\ area}}{yr}\right) \times site\ area = \left(\frac{\frac{therms}{site\ area}}{yr}\right) \times \left(\frac{CAP_H}{30}\right) \times 1.05$$

Where:

$\left(\frac{\frac{therms}{site\ area}}{yr}\right)$= heating load based on weather zone and construction date, see Table 3-1

$CAP_H = \left(\frac{Btu}{hr}\right)$ = rated heating capacity = new furnace heating capacity, see above

$AFUE_{base}$ = 80%

Source to site ratio, electric to gas = 1.05

Table 3-1 Heating Load Factors by Weather Zone and Construction Date

Construction Date	Heating Load (therms / sq ft / year)			
	Zone 9	Zone 8	Zone 7	Zone 6
Pre-1970 – 1979	0.404	0.360	0.336	0.296
1980 – 1989	0.303	0.270	0.252	0.222
1990 – 1999	0.202	0.180	0.168	0.148
2000 – Present (New Construction)	0.152	0.135	0.126	0.111

3.1.1.1.1 Impact of Early Replacement

The method for calculating the impact of early replacement for residential furnaces applies a degradation factor to the performance of a 78% AFUE unit. This is calculated as:

$$AFUE_{base_{early}} = (Base\ AFUE) \times (1 - M)^{age}$$

Where:

$Base\ AFUE$ = efficiency of the existing equipment when new, 78% AFUE
M = maintenance factor, 0.01
age = the age of the existing equipment, in years

Based on the degradation equation and the average age of replaced functional systems of 16 years this leads to an early retirement AFUE of:

$$AFUE_{base_{early}} = 0.78 \times (1 - 0.01)^{16} = 0.66$$

The Evaluator applied this baseline to residential retrofits as well as to master-metered multifamily units.

3.1.1.1.2 Net-to-Gross Ratios

The following net-to-gross ("NTG") ratios were applied to the space heating rebates:

- 84.95% - Residential retrofit;
- 84.95% - Residential retrofit - multifamily;
- 84.95% - Residential fuel-switch retrofit;
- 48.70% - Residential new construction (owner);
- 92.30% - Residential new construction (builder);
- 88.90% - Residential smart thermostat installation;

3.1.2.2 Smart Thermostats Gas Savings Methodology

Energy savings values for smart thermostats are calculated as follows:

$$therms_{ex\ post\ savings} = gas\ heating_{default} \times home\ square\ footage$$

Where:

$gas\ heating_{default}$ = 0.033 therms per square feet

$home\ square\ footage$ = verified home square footage, or default square footage of 1,484 SF

The following NTG ratio was applied to the smart thermostat rebates: 88.90%

3.1.2.3 Water Heating Gas Savings Methodology

Energy savings values for storage tank water heaters were developed using installed *energy factor* ratings as determined by the Gas Appliance Manufacturers Association Directory of Certified Water Heating Products. Tank sizing must follow AHRI standards.

$$therm_{ex\ post\ savings} = therm_{basline\ water\ heater} - therm_{new\ water\ heater}$$

First the energy use of the new water heater was found.

$therm_{new\ water\ heater} =$

$$\rho \times Cp \times V \times \left(T_{SetPoint} - T_{Supply}\right) \times \frac{1}{EF_{Post}} \times \left(\frac{1}{100{,}000}\right) \times 1.05$$

Where:

ρ = Water density = 8.33 lb./gal

Cp = Specific heat of water = 1 BTU/lb.·°F

V = Calculated estimated annual hot water use (gal) based on tank size and weather zone

$T_{SetPoint}$ = Water heater set point (124°F for residential)

T_{Supply} = Calculated average supply water temperature by weather zone

EF_{Post} = Verified *energy factor* of new water heater

BTU to therms conversion factor = 100,000 $\frac{\text{BTU}}{\text{therm}}$

Source to site ratio, gas to gas = 1.05

Energy use of the baseline water heater is calculated with the equation below.

$therm_{baseline\ water\ heater} =$

$$\rho \times Cp \times V \times (TSetPoint - TSupply) \times \frac{1}{EFpre\ electric} \times \left(\frac{1}{100{,}000}\right) \times 3.14$$

Where:

ρ = Water density = 8.33 lb./gal

C_p = Specific heat of water = 1 BTU/lb.·°F

V = Calculated estimated annual hot water use (gal) based on tank size and weather zone

$T_{SetPoint}$ = Water heater set point (120°F for residential)

T_{Supply} = Calculated average supply water temperature based on weather zone

EF_{post} = Verified energy factor of baseline water heater

Volume of water heater = verified water heater's volume, for tankless water heaters the assumed baseline volume is 50 gal

Source to site ratio, gas to gas = 1.05

Source to site ratio, electricity to gas = 3.14

The Evaluator used results from the PY2022 survey to develop the NTG for water heaters.

- Residential retrofit: 71.4%
- Residential fuel switch: 71.4%
- Multifamily: 71.4%

3.1.2.4 Cooking Range Gas Savings Methodology

The energy savings of a gas range are found by subtracting the energy use of the new range from the energy use from the old range.

$$therm_{ex\ post\ savings} = therm_{basline\ range} - therm_{new\ range}$$

First the energy use of the baseline range was found.

$$therm_{baseline\ electric\ range} = 716\left(\frac{kWh}{yr}\right) \times 3{,}413\left(\frac{Btu}{kWh}\right) \times \left(\frac{1}{100{,}000\frac{Btu}{therm}}\right) \times 3.14$$

$$therm_{baseline\ gas\ range} = 3{,}986{,}950\ \text{BTU} \times \left(\frac{1}{100{,}000\frac{BTU}{therm}}\right) \times 1.05$$

Next the energy use of the newly installed range was found. It is assumed that the installed range uses the same amount of energy as the baseline gas range.

$$\text{therm}_{\text{ex post gas range}} = \text{therm}_{\text{baseline gas range}}$$

Where:

Annual kWh usage of electric range = 716 kWh/yr.

Annual BTU usage of gas range = 3,986,950 BTU

kWh to BTU conversion factor = 3413 $\frac{\text{BTU}}{\text{kWh}}$

BTU to therms conversion factor = 100,000 $\frac{\text{BTU}}{\text{therms}}$

Site-to-source ratio, electricity to gas = 3.14

Site-to-source ratio, gas to gas = 1.05

Due to low participation in the program, the Evaluators used the NTG value of 55.70% that was developed for the PY2024 Oklahoma Natural Gas evaluation.

3.1.2.5 Clothes Dryer Gas Savings Methodology

The energy savings of a gas clothes dryer is found by subtraction the energy use of the new dryer from the energy use from the old dryer.

$$therm_{ex\ post\ savings} = therm_{basline\ dryer} - therm_{new\ dryer}$$

First the energy use of the baseline dryer was found.

$$therm_{baseline\ electric\ range} = 942\ \left(\frac{kWh}{yr}\right) \times 3{,}413\ \left(\frac{Btu}{kWh}\right) \times \left(\frac{1}{100{,}000\frac{Btu}{therm}}\right) \times 3.14$$

$$therm_{baseline\ gas\ range} = 3{,}216{,}455\ \text{BTU} \times \left(\frac{1}{100{,}000\frac{Btu}{therm}}\right) \times 1.05$$

Next the energy use of the newly installed dryer was found. It is assumed that the installed dryer uses the same amount of energy as the baseline gas dryer.

$$therm_{ex\ post\ gas\ range} = therm_{baseline\ gas\ range}$$

Where:

Annual kWh usage of electric dryer = 942 kWh/yr.

Annual BTU usage of gas dryer = 3,216,455 BTU

kWh to BTU conversion factor = 3413 $\frac{BTU}{kWh}$

BTU to therms conversion factor = 100,000 *BTU/therm*

Site-to-source ratio, electricity to gas = 3.14

Site-to-source ratio, gas to gas = 1.05

Due to the low participation in the program, the Evaluators used the NTG value of 69.40% that was developed for the PY2024 Oklahoma Natural Gas evaluation.

3.1.2.6 Channel Verified Savings

The Natural Gas Equipment Rebates Channel gross and net savings are presented in Table 3-2 and Table 3-3, respectively.

Table 3-2 Verified Gross Therms Savings: Natural Gas Equipment Rebates (Residential)

Natural Gas Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Gas Clothes Dryers	35	40	112.5%	14	544
Gas Cooking Ranges	209	383	183.4%	15	5,750
Gas Furnaces	10,849	26,553	244.7%	28.3	752,517
Smart Thermostats	1,441	1,441	100.0%	11	15,856
Water Heaters	5,041	6,495	128.9%	20	129,906
Total	**17,576**	**34,912**	**198.6%**	**26**	**904,583**

Table 3-3 Verified Net Therms Savings: Natural Gas Equipment Rebates (Residential)

Natural Gas Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Gas Clothes Dryers	35	27	78.1%	69.4%	385
Gas Cooking Ranges	209	213	102.1%	55.7%	3,201
Gas Furnaces	10,849	22,556	207.7%	85.0%	639,263
Smart Thermostats	1,441	1,281	88.9%	88.9%	14,096
Water Heaters	5,041	4,638	92.0%	71.4%	92,753
Total	**17,576**	**28,716**	**163.4%**	**81.3%**	**749,698**

The net savings are shown in aggregate and the measure-level NTG value may differ from the retrofit-level NTG value.

3.2 Do-it-Yourself Channel

The Do-it-Yourself Channel, formerly known as the Low Flow Showerhead & Faucet Aerator Program, provides no-cost mailer kits to Summit residential customers. These kits may contain:

- Up to three 1.5 gallons per minute ("GPM") low flow showerheads, available in chrome and ivory finish;

- Up to three faucet aerators, with options including 1.5 GPM kitchen aerators (with a shutoff valve) and 1.0 GPM bathroom aerators (without a shutoff valve); and
- Optional smart thermostats to be installed by the customers themselves.

These kit items (measures) are then self-installed. The channel has been markedly popular among Summit customers.

3.2.1 Participation Summary

In PY2025, Summit distributed 157 kits to 125 distinct residential households. The following list provides a summary of the types of kits that were offered within the channel:

- Bathroom Water & Energy Savings Bundle #1
  - (1) 1.0 GPM bathroom aerator
  - (1) 1.5 GPM kitchen aerator
  - (1) 1.50 GPM low-flow showerhead
- Bathroom Water & Energy Savings Bundle #2
  - (2) 1.0 GPM bathroom aerators
  - (1) 1.5 GPM kitchen aerator
  - (2) 1.50 GPM low-flow showerheads
- Bathroom Water & Energy Savings Bundle #3
  - (2) 1.0 GPM bathroom aerators
  - (1) 1.5 GPM kitchen aerator
  - (3) 1.50 GPM low-flow showerheads
- Showerhead kit (quantity, color, and type options)
- Aerator kit (quantity and GPM options)
- Smart thermostat (quantity and thermostat brand options)

Table 3-4 below summarizes the PY2025 participation by kit / item type. The table excludes the 29 total Temperature Gaige Cards that some of the participants received.

Table 3-4 Do-it-Yourself Participation by Kit Type

Do-it-Yourself Kit	Number of Kits / Items	Number of Distinct Households	Percent of Savings
Bathroom Water & Energy Savings Bundle #1	6	6	1.9%
Bathroom Water & Energy Savings Bundle #2	14	14	8.5%
Bathroom Water & Energy Savings Bundle #3	9	9	7.7%
Faucet Aerator	24	10	0.8%
Low-Flow Showerhead	41	26	10.1%
Smart Thermostat	63	56	71.0%
Total	**157**	**125**	**100.0%**

3.2.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

3.2.2.1 Faucet Aerator Gas Savings Methodology

Natural gas savings for faucet aerators are based on the methodology described in AR TRM 10 Section 2.3.4. Gas savings are calculated as follows:

$$Energy\ Savings\ = \frac{\rho \times C_P \times V \times \left(T_{Mixed} - T_{Supply}\right) \times \left(\frac{1}{RE}\right)}{Conversion\ Factor}$$

Where,

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb·°F

V = gallons of hot water saved per year per faucet

T_{Mixed} = Mixed water temperature by weather zone, see Table 3-5

T_{Supply} = Average supply water temperature by weather zone, see Table 3-5

RE = Recovery efficiency of water heater, excluding standby losses (0.98 electric / 0.79 Gas)

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therms for gas water heating.

Table 3-5 Faucet Aerator Mixed Water Temperatures by Weather Zone

Oklahoma Weather Zone	Average Water Main Temperature (°F)	Average Mixed Water Temperature (°F)	Water Temperature Difference (Δ°F)
9	65.6	104.7	39.1
8	66.1	104.8	38.7
7	67.8	105.4	37.6
6	70.1	106.2	36.1

Table 3-6 below summarizes calculation inputs that were utilized to determine gas savings.

Table 3-6 Faucet Aerator Volume of Use

Parameter	Value
Faucet use gallons/person/day (baseline)	9.7
Faucet use gallons/person/day (1.5 GPM)	8.2
Faucet use gallons/person/day (1.0 GPM)	7.2
Occupants per home	2.53
Faucets per home	3.86
Gal./yr./faucet (Baseline)	2,321
Gal./yr./faucet (1.5 GPM)	1,962
Gal./yr./faucet (1.0 GPM)	1,722
DHW gallons saved/yr./faucet for 1.5 GPM (V)	359
DHW gallons saved/yr./faucet for 1.0 GPM (V)	599

3.2.2.2 Low-Flow Showerhead Gas Savings Methodology

Natural gas savings for low-flow showerheads are based on the methodology described in AR TRM 10 Section 2.3.5. Gas savings are calculated as follows:

$$Energy\ Savings = \frac{\rho \times C_P \times V \times \left(T_{Mixed} - T_{Supply}\right) \times \left(\frac{1}{RE}\right)}{Conversion\ Factor}$$

Where,

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb·°F

V = gallons of hot water saved per year per faucet

T_{Mixed} = Mixed water temperature by weather zone, see Table 3-7

T_{Supply} = Average supply water temperature by weather zone, see Table 3-7

RE = Recovery efficiency of water heater, excluding standby losses (0.98 electric / 0.79 Gas)

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therms for gas water heating

Table 3-7 Low-Flow Showerhead Mixed Water Temperatures by Weather Zone

Oklahoma Weather Zone	Average Water Main Temperature (°F)	Average Mixed Water Temperature (°F)	Water Temperature Difference (Δ°F)
9	65.6	106.5	40.9
8	66.1	106.7	40.6
7	67.8	107.2	39.4
6	70.1	107.9	37.8

Table 3-8 below summarizes calculation inputs that were utilized to determine gas savings.

Table 3-8 Low-Flow Showerhead Volume of Use

Parameter	Value
Average Shower Duration (minutes)	8.3
Gallons/shower @ 2.5 GPM (baseline	20.7
Gallons/shower @ 2.0 GPM	16.5
Gallons/shower @ 1.5 GPM	12.4
Showers/person/day (baseline)	0.69
Showers/person/day(post)	0.72
Occupants per home	2.53
Showers/home/day (baseline)	1.62
Showers/home/day(post)	1.93
Showerheads per home	1.62
Showers per showerhead per day (baseline)	1.16
Showers per showerhead per day (post)	1.19
Gal./yr./showerhead @ 2.5 GPM (baseline)	8,142
Gal./yr./showerhead @ 1.5 GPM	5,089
1.5 GPM showerhead DHW gallons saved/yr. (V)	3,053

3.2.2.3 Smart Thermostat Gas Savings Methodology

Natural gas savings for low-flow showerheads are based on the methodology described in AR TRM 10 Section 2.1.12. Gas savings are calculated as follows:

$$therms_{ex\ post\ savings} = gas\ heating_{default} \times home\ square\ footage$$

Where:

$gas\ heating_{default}$ = 0.033 therms per square feet

$home\ square\ footage$ = verified home square footage, or default square footage of 1,484 SF

3.2.2.4 In-Service Rates

The Evaluators applied the in-service rates ("ISR") developed by Summit Utilities. The following ISRs were applied to the PY2025 evaluation:

- Showerhead: 85.5%
- Kitchen aerator 80.0%
- Bathroom aerator: 85.5%
- Self-install smart thermostat: 100.0%

3.2.2.5 Net-to-Gross

The Evaluators applied a net-to-gross rate that was developed by Summit Utilities. A NTG rate of 96.3% was applied to the PY2025 evaluation.

3.2.2.6 Channel Verified Savings

Table 3-9 summarizes the total gross gas savings and Table 3-10 summarizes the total net gas savings of the Do-it-Yourself Channel.

Table 3-9 Verified Gross Therms Savings: Do-it-Yourself

Do-it-Yourself Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Bathroom Water & Energy Savings Bundle #1	97	84	87.1%	10	841
Bathroom Water & Energy Savings Bundle #2	432	379	87.6%	10	3,785
Bathroom Water & Energy Savings Bundle #3	388	342	88.2%	10	3,419
Bathroom Aerators (1.0 GPM)	27	23	85.5%	10	227
Kitchen Aerators (1.5 GPM)	19	15	80.0%	10	149
Low-Flow Showerheads (1.50 GPM)	525	449	85.5%	10	4,486
Smart Thermostats	3,167	3,167	100.0%	11	34,837
Total	**4,653**	**4,458**	**95.8%**	**11**	**47,744**

Table 3-10 Verified Net Therms Savings: Do-it-Yourself

Do-it-Yourself Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Bathroom Water & Energy Savings Bundle #1	97	81	83.9%	96.3%	810
Bathroom Water & Energy Savings Bundle #2	432	365	84.4%	96.3%	3,645
Bathroom Water & Energy Savings Bundle #3	388	329	85.0%	96.3%	3,292
Bathroom Aerators (1.0 GPM)	27	22	82.3%	96.3%	218
Kitchen Aerators (1.5 GPM)	19	14	77.0%	96.3%	144
Low-Flow Showerheads (1.50 GPM)	525	432	82.3%	96.3%	4,320
Smart Thermostats	3,167	3,050	96.3%	96.3%	33,548
Total	**4,653**	**4,293**	**92.3%**	**96.3%**	**45,978**

Table 3-11 summarizes the non-energy benefits ("NEBs") that were applicable to the Do-it-Yourself Channel in PY2025.

Table 3-11 Applicable Net NEBs: Do-it-Yourself Channel

Do-it-Yourself Kit Measure	Water Savings (gal)	Energy Savings (kWh)	Demand Reductions (kW)	Propane Savings (gal)
Bathroom Aerators (1.0 GPM)	32,266	329	0.00	0
Kitchen Aerators (1.5 GPM)	12,063	103	0.00	0
Low-Flow Showerheads (1.50 GPM)	266,252	2,064	0.00	0
Smart Thermostats	0	36,876	N/A	0
Total	**310,580**	**2,496**	**0.00**	**0**

3.3 Home Energy Reports Channel

The HERs Channel is an educational offering run by Oracle, a third-party implementer for Summit. The educational offering provides educational materials to a sample of Summit's residential customers, in which their usage is compared against similar households. The channel is designed to encourage behavioral change and program participation on the part of the recipients of the Home Energy Report.

3.3.1 Participation Summary

The HERs Channel was launched in October 2011 and has been implemented on a rolling, cohort-based basis. Customers are assigned to treatment and comparison groups, with treated customers receiving periodic reports that present household energy consumption alongside benchmarks derived from similar homes.

Unlike traditional information-only marketing efforts, the HERs channel delivers individualized usage comparisons designed to increase customer awareness of relative consumption levels. Over time, participation within each cohort declines due to normal customer attrition, primarily driven by account closures and customer moves. Participation counts used in the impact evaluation reflect the number of customer accounts active at the beginning of treatment and those remaining active at the close of the reporting period.

Table 3-12 summarizes cohort participation for the HERs Channel, including treatment start dates, treatment group sizes at program launch, treatment group sizes at the close of PY2025, and associated attrition metrics.

Table 3-12 Home Energy Reports Number of Accounts by Cohort Group

Wave	Treatment Start Date	Treatment Group Size at Start of Treatment	Treatment Group Size at Close of PY2025	Attrition %	Average Annual Attrition %
Wave 1	10/1/2011	30,127	11,136	63.04%	4.42%
Wave 2	9/1/2014	13,419	4,941	63.18%	5.57%
Wave 3	12/31/2016	10,890	4,292	60.59%	6.73%
Wave 4	9/1/2019	11,371	5,304	53.36%	8.42%
Wave 5	1/1/2022	7,690	4,145	46.10%	11.52%
Wave 6	1/1/2023	11,930	7,186	39.77%	13.24%
Wave 7	10/31/2024	7,472	7,138	4.47%	3.82%
Wave 8	10/1/2025	4,102	4,102	0.00%	n/a

3.3.2 Impact Evaluation

The following sections outline the methodology used to estimate natural gas savings for the Home Energy Reports Channel and the Low-to-Moderate Income Home Energy Reports Channel. While these channels are components of different programs – the HERs Channel within the Residential Solutions Program and the LMI HERs Channel within the Access to Affordable Energy and Conservation Program – a single impact evaluation is performed jointly across both channels using the methods described below. Evaluated savings are reported for the HERs Channel in Section 3.3 and for the LMI HERs Channel in Section 4.2.

3.3.2.1 Data Preparation

Source data for the impact evaluation were obtained from the HERs implementation contractor and constructed at the billing-read × account level. Raw billing reads were processed to derive month-aligned natural gas usage through calendarization of irregular billing periods, producing a consistent account × month panel with associated exposure (days-in-month). Customer

identifiers were harmonized and deduplicated to ensure a single observation per account-month, and accounts were linked to program wave attributes, geographic identifiers, and corresponding weather stations. Monthly heating and cooling degree days were calculated from hourly temperature data and merged to the usage panel. The final analytical dataset includes monthly usage, weather variables, treatment and comparison indicators, and exposure measures used as inputs to the impact regression models described below.

3.3.2.2 Gas Savings Calculation Methodology

This evaluation estimates natural gas savings using a post-only ANCOVA-style panel regression, referred to as a post-program regression (PPR). The approach compares usage for treated customers against a contemporaneous comparison group during the post-program period, while controlling for account-level pre-program usage characteristics and common month-specific shocks. Estimation employs account-clustered standard errors and probability weights proportional to the number of days in each billing read.

The analysis dataset is structured at the billing-read × account level. For each program wave, baseline (pre-program) and post-program periods are defined based on that wave's report delivery schedule. Billing records falling within the baseline window are used to construct pre-period usage measures and are excluded from the outcome regression. The regression model is estimated using post-program observations only.

For each wave, a post-program regression is estimated with average daily natural gas usage (therms per day) as the dependent variable. The model includes the following covariates:

- An indicator for treatment status (treated versus comparison accounts).
- Month–year fixed effects to control for common shocks, seasonality, and other time-varying factors affecting all customers.
- Interactions between month–year fixed effects and three pre-program average daily usage measures (overall, summer, and winter) to flexibly control for heterogeneous usage profiles over time.

Estimation is performed separately by wave, and savings are aggregated across months within each wave.

Observations are probability-weighted by the number of days in the billing read so that longer billing periods contribute proportionately to estimation. Standard errors are clustered at the account level to address within-customer serial correlation. The estimated treatment coefficient represents the change in average daily therm consumption attributable to receipt of Home Energy Reports during the post-program period, conditional on pre-program usage characteristics and month-specific effects.

The post-program regression is specified as follows:

$$Usage_{it} = \alpha_0 + \beta * treatment_i$$
$$+\alpha_1 * PreUsage_i$$
$$+\alpha_2 * PreUsageSummer_i$$
$$+\alpha_3 * PreUsageWinter_i$$
$$+\gamma * mm_t$$
$$+\delta_1 * mm_t * PreUsage_i$$
$$+\delta_2 * mm_t * PreUsageSummer_i$$
$$+\delta_3 * mm_t * PreUsageWinter_i$$
$$+\varepsilon_{it}$$

This specification corresponds to a post-only ANCOVA-style regression in which pre-program usage measures are interacted with month–year indicators to allow their relationship with post-program consumption to vary flexibly over time

Where:

- *i* denotes the *i*th customer account
- *t* denotes the month-year of the post-treatment period
- $Usage_{it}$ is the average daily natural gas usage (therms per day) for account *i* in month *t*
- $Treatment_i$ is an indicator equal to 1 for treated accounts and 0 for contemporaneous comparison accounts
- mm_t is a vector of post-program month–year dummy variables
- $PreUsage_i$ is average daily usage of customer *i* in the pre-program period
- $PreUsageSummer_i$ is average daily usage of customer *i* during summer months (June-September) in the pre-program period
- $PreUsageWinter_i$ is average daily usage during winter months (December–March) in the pre-program period

And parameter definitions are:

- α_0 is an intercept term
- $\alpha_1, \alpha_2, \alpha_3$ are effects of control variables $PreUsage_i$, $PreUsageSummer_i$, and $PreUsageWinter_i$ on $Usage_{it}$ in the reference month

- $\delta_1, \delta_2, \delta_3$ are the effect of the control variables *PreUsage*$_i$, *PreUsageSummer*$_i$, and *PreUsageWinter*$_i$ in each month-year (mm_t) of the post period
- ε_{it} is an error term

In this specification, savings are calculated by:

- Savings = ∑ (Treatment Coeff * Number of recipients in month *t* * Number of days in month *t*)

Where:

- Treatment Coeff = Coefficient for treatment parameter (daily use is the dependent variable, a negative value for treatment reflects the difference in therms/day used by the recipient group after report delivery)
- Number of recipients in month *t* = Number of treated accounts active and contributing billing data in month *t*, after accounting for attrition
- Number of days in month *t* = For month *t,* number of billing-read days associated with treated accounts in month

As a result of this approach, customer attrition does not require a separate adjustment or assumption. Attrition is reflected directly through observed billing data, as treated accounts contribute savings only for months and billing-read days in which they remain active. Declines in participation due to account closure, program exit, or natural cohort aging are therefore inherently incorporated into the evaluated savings at both the wave and program levels

The HERs channel is evaluated using a randomized control trial design, comparing recipients to non-recipients. As a result, the estimated savings represent net savings, and no additional adjustment for free ridership is required. A net-to-gross ratio of 100 percent is applied.

3.3.2.3 HERs Model Output Results by Wave

Table 3-13 summarizes the pre-treatment period used for each HERs cohort, based on approximately one year of billing data prior to the program start date. For each wave, the same pre-treatment interval is applied to both treated and comparison accounts, ensuring a consistent basis for measuring pre-program usage.

The table also presents the allocation of treated customers between the HERs Channel and the LMI HERs Channel within each cohort. While a single impact evaluation is performed jointly across both channels, total evaluated program savings are subsequently apportioned between the HER and LMI HER channels based on treated-customer allocation factors. These allocation factors are derived using ZIP-level low-to-moderate income shares constructed from American Community Survey (“ACS”) microdata and LIHEAP income thresholds. ZIP-level LMI shares are

mapped from Public Use Microdata Areas ("PUMAs") to ZIP Code Tabulation Areas ("ZCTAs") using geographic correspondence files and are then applied to treated-customer counts by wave and ZIP.

Savings allocation to the LMI HERs Channel using this approach is described in Section 4.2.

Table 3-13 Wave-Level HERs Treatment Customer Allocations by Channel (HERs and LMI HERs) and Pre-Treatment Period Intervals

HERs Cohort Group	Treatment Group Size at Close of PY2025	HERs Channel Share of Treatment Group	LMI HERs Channel Share of Treatment Group	Treatment Group Size at Close of PY2025 (HERs Channel)	Treatment Group Size at Close of PY2025 (LMI HERs Channel)	Pre-Treatment Period Start Year/ Month	Pre-Treatment Period End Year/ Month
Wave 1	11,136	74%	26%	8,193	2,943	2010-10	2011-09
Wave 2	4,941	73%	27%	3,625	1,316	2013-09	2014-08
Wave 3	4,292	74%	26%	3,180	1,112	2016-01	2017-01
Wave 4	5,304	75%	25%	3,964	1,340	2018-09	2019-09
Wave 5	4,145	75%	25%	3,108	1,037	2021-02	2022-01
Wave 6	7,186	75%	25%	5,409	1,777	2022-01	2022-12
Wave 7	7,138	75%	25%	5,355	1,783	2023-01	2023-12
Wave 8	4,102	14%	86%	588	3,514	2024-10	2025-09
Total	**48,244**	**69%**	**31%**	**33,422**	**14,822**	-	-

For each Home Energy Reports cohort, annual natural gas savings are calculated by applying the estimated daily treatment effect from the post-program regression to observed treated-customer participation and billing exposure over the reporting period. Specifically, for each wave and month, savings are calculated by scaling the estimated treatment coefficient (therms per day) by the number of treated accounts active in that month and the associated number of billing-read days. Monthly savings are then aggregated across months to produce annual wave-level savings.

This approach ensures that savings reflect only observed billing data for actively treated accounts. Customers who close accounts during the reporting period contribute savings only for the portion of the year in which they remain active, and no savings are attributed to periods following account closure. As a result, customer attrition is inherently and fully reflected in the evaluated savings without the need for a separate attrition adjustment.

Table 3-14 summarizes regression results and evaluated savings by wave, including model fit statistics, estimated annual savings per recipient, confidence intervals, and total annual savings for the HER Channel. Negative savings estimates for individual waves reflect instances in which

treated customers exhibited higher average post-program usage than comparison customers during the reporting period.

Table 3-14 Wave-Level HERs Regression Results and Annual Natural Gas Savings

Wave	Regression Model R^2	Annual Savings per Recipient	Annual Savings (Lower 95% CI)	Annual Savings (Upper 95% CI)	Annual Pre-Period Usage per Recipient	Percent Therm Savings	Annual HERs Pathway Savings Therm
1	0.81	11.03	6.45	15.62	625.74	1.76%	90,398
2	0.80	10.80	6.24	15.37	516.71	2.09%	39,165
3	0.80	5.30	1.02	9.58	466.16	1.14%	16,847
4	0.80	6.18	2.04	10.31	444.94	1.39%	24,482
5	0.82	(1.23)	(6.98)	4.52	547.69	-0.22%	(3,822)
6	0.82	1.88	(1.73)	5.50	326.98	0.58%	10,179
7	0.81	(0.87)	(6.37)	4.63	473.74	-0.18%	(4,677)
8	0.82	(0.09)	(2.64)	2.46	101.81	-0.09%	(51)
All	**n/a**	**4.84**	**3.13**	**6.55**	**462.26**	**1.05%**	**172,521**

When aggregating across all waves, the Evaluator estimated an overall 95% confidence interval of approximately ±35.0% of HERs Channel savings. Across all waves, evaluated HERs Channel savings accounted for 1.05% of annual natural gas consumption for participating accounts.

3.3.2.4 Double Counting Analysis

Protocol J of the Arkansas Technical Reference Manual defines double-counted savings for behavior-based programs as the incremental difference in per-participant savings from other non-behavioral efficiency programs between treatment and control groups. Because behavior-based programs may influence participation in other efficiency programs (e.g., rebates or direct install programs), Protocol J requires evaluators to assess whether incremental savings attributed to those other programs should be adjusted to avoid double counting.

Consistent with Protocol J, double-counted savings are quantified by comparing average per-participant savings from other efficiency programs for treated and control group customers, rather than by summing total other-program savings across groups.

For PY2025, treated customers did not exhibit higher average other-program savings than control group customers, resulting in a small negative double-counting adjustment.

Table 3-15 presents HERs Channel savings before and after the Protocol J double-counting adjustment, which is small in magnitude for PY2025 (-0.59 percent).

Table 3-15 HERs Channel Savings Before and After Double Counting

Program Year	Ex Post Therms Before Double Counting	Percent Difference	Ex Post Therms After Double Counting
2025	172,521	-0.59%	173,542

3.3.2.5 Verified Channel Savings

The Home Energy Reports Channel achieved 173,543 therms of evaluated natural gas savings in PY2025, compared to 118,464 therms assumed ex ante, resulting in a realization rate of 146.5 percent, as shown in Table 3-16.

In aggregate, the combined HERs and LMI HERs channels achieved a realization rate of approximately 129 percent in PY2025. Variation in realization rates across the HERs and LMI HERs segments reflects differences between ex ante assumed savings shares and ex post savings shares allocated to each segment based on treated-customer allocation factors.

Table 3-16 HERs Channel Savings

Program Year	Ex Ante Therms	Ex Post Therms	Realization Rate
2025	118,464	173,543	146.5%

3.4 High Efficiency Homes Channel

The High Efficiency Homes Channel provides incentives to new construction home builders for installing energy efficient space heating and water heating equipment. The High Efficiency Homes Channel offers a rebate of $1,000 to builders that construct new homes that feature natural gas appliances that include:

- A Forced-air furnace with 95% AFUE or greater;
- A natural gas water heater; and
- At least one other natural gas appliance.

The High Efficiency Homes Channel is designed to encourage new home builders to choose energy efficient natural gas space heating and water heating equipment. The channel is marketed to consumers, builders, and developers through local publication, bill inserts, various media avenues, and direct contact.

3.4.1 Participation Summary

In PY2025, the High Efficiency Homes Channel participation consisted of 71 total furnaces – all furnaces were rates at 95% AFUE or greater. There were no rebates for furnaces with ratings within the 90 – 94.9% AFUE range.

Additionally, there were 71 water heaters that were rebated through the channel. Thirty-four of the 71 water heaters were gas storage water heaters that had rated UEF values ranging from 0.62 to 0.64. Thirty-seven of the 71 water heaters were gas tankless water heaters with UEF ratings ranging from 0.93 to 0.96.

There were no smart thermostats, or natural gas burner tips that were rebated through the channel.

3.4.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

3.4.2.1 Gas Savings Methodology

The gas savings calculations for residential furnaces are described in Section 3.1.2.1.

The gas savings calculations for residential smart thermostats are described in Section 3.1.2.2.

The gas savings calculations for residential water heaters are described in Section 3.1.2.3.

The Evaluators applied a net-to-gross (NTG) ratio of 91.9% to High Efficiency Homes Channel savings.

3.4.2.2 Verified Channel Savings

The High Efficiency Homes Channel gross and net savings are presented in Table 3-17 and Table 3-18, respectively.

Table 3-17 Verified Gross Therms Savings: High Efficiency Homes

High Efficiency Homes Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Gas Furnaces	1,926	7,384	383.4%	36.0	265,821
Water Heaters	3,354	12,859	383.4%	22.2	285,215
Total	**5,280**	**20,243**	**383.4%**	**27.2**	**551,035**

Table 3-18 Verified Net Therms Savings: High Efficiency Homes

High Efficiency Homes Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Gas Furnaces	1,926	6,185	353.9%	92.3%	245,352
Water Heaters	3,354	11,792	351.6%	91.7%	261,542
Total	**5,280**	**18,607**	**352.4%**	**91.9%**	**506,894**

4. Access to Affordable Energy & Conservation Program

The Access to Affordable Energy and Conservation Program is part of a reorganization effort on the Summit portfolio to consolidate low-to-moderate-income residential programs. This new program consolidated the following former program:

- Low-Income Savings Homes Program

In addition, the Summit portfolio introduced additional 'channels' under the program umbrella. The following channels are now part of the overall Access to Affordable Energy and Conservation Program:

- LMI Do-it-Yourself Channel
- LMI Home Energy Reports Channel
- Low-Income Saving Homes Channel
- LivingWise Channel
- Affordable Housing Equipment Rebates Pilot Channel

The following subsections outline the results for each of the channels within the AAEC program.

4.1 LMI Do-it-Yourself Channel

The LMI Do-it-Yourself Channel, like the Do-it-Yourself Channel as described in Section 3.2, provides no-cost mailer kits to Summit residential customers. These kits contain:

- One 1.5 gallons per minute ("GPM") low flow showerhead, two faucet aerators, including one 1.5 GPM kitchen aerator and one 1.0 GPM bathroom aerator and Teflon tape; and
- One plug-in CO alarm, weatherization tape and temperature gauge card.

These kit items (measures) are then self-installed.

PY2025 marks the third year that the channel is offered through the new AAEC Program.

4.1.1 Participation Summary

In PY2025, Summit distributed 6 kits to 6 distinct residential households, 275 kits to Ada Housing Authority, and 42 kits to Maud Housing Authority.

The following list provides a summary of the kit that is offered within the channel:

- Summit OK Simple Savings & Safety Pack
    - (1) 1.0 GPM bathroom aerator

- (1) 1.5 GPM kitchen aerator
- (1) 1.50 GPM low-flow showerhead
- (1) Plug-in CO alarm
- (1) 5/16"x17' weatherization tape

Table 4-1 below summarizes the PY2025 participation by kit / item type.

Table 4-1 LMI Do-it-Yourself Participation by Kit Type

LMI Do-it-Yourself Kit	Number of Kits / Items	Number of Distinct Households	Percent of Savings
Summit OK Savings & Safety Kit	6	6	1.9%
Ada Housing Authority	275	n/a	85.1%
Maud Housing Authority	42	n/a	13.0
Total	**6**	**6**	**100.0%**

There was a notable increase in participation in the third year since channel launch; the channel achieved 4,527 therm savings in PY2025 compared to 233 therms in PY2024.

4.1.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

4.1.2.1 Gas Savings Methodology

The gas savings calculations for residential faucet aerators are described in Section 3.2.2.1.

The gas savings calculations for residential low-flow showerheads are described in Section 3.2.2.2.

The gas savings calculations for residential smart thermostats are described in Section 3.2.2.3.

4.1.2.2 In-Service Rates

The Evaluator applied in-service rates developed by Summit Utilities. The following ISRs were applied to the PY2025 evaluation:

- Showerhead: 85.5%
- Kitchen aerator 80.0%
- Bathroom aerator: 85.5%

4.1.2.3 Net-to-Gross

The Evaluators applied a NTG ratio of 100.0%. The ratio is typical for LMI type of program offerings. A NTG ratio of 100.0% was applied to the PY2025 evaluation.

4.1.2.4 Channel Verified Savings

Table 4-2 summarizes the total gross gas savings and Table 4-3 summarizes the total net gross gas savings for the LMI Do-it-Yourself Channel.

Table 4-2 Verified Gross Therms Savings: LMI Do-it-Yourself

LMI Do-it-Yourself Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Summit OK Savings & Safety Kit	5,221	4,527	86.7%	10	45,268
Total	**5,221**	**4,527**	**86.7%**	**10**	**45,268**

Table 4-3 Verified Net Therms Savings: LMI Do-it-Yourself

LMI Do-it-Yourself Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Summit OK Savings & Safety Kit	5,221	4,527	86.7%	100.0%	45,268
Total	**5,221**	**4,527**	**86.7%**	**100.0%**	**45,268**

Table 4-4 summarizes the non-energy benefits (NEBs) that were applicable to the LMI Do-it-Yourself Channel in PY2025.

Table 4-4 Applicable Net NEBs: LMI Do-it-Yourself

LMI Do-it-Yourself Kit Measure	Water Savings (gal)	Energy Savings (kWh)	Demand Reductions (kW)	Propane Savings (gal)
Bathroom Aerators (1.0 GPM)	165,423	2,035	0.21	0
Kitchen Aerators (1.5 GPM)	92,766	1,141	0.12	0
Low-Flow Showerheads (1.50 GPM)	843,132	10,868	1.13	0
Total	**1,101,320**	**14,044**	**1.43**	**0**

4.2 LMI Home Energy Reports Channel

The LMI HERs Channel is an educational offering implemented by Oracle on behalf of Summit. The LMI HERs Channel represents the portion of Home Energy Reports recipients who meet applicable low-to-moderate income (LMI) criteria. As with the HERs Channel described in Section 3.3, customers receive personalized energy reports comparing their natural gas usage to that of similar households, with the objective of encouraging energy-saving behavioral changes.

4.2.1 Participation Summary

The LMI Home Energy Reports Channel began in October 2023. The LMI HERs Channel does not operate with separate waves, cohorts, or independently assigned treatment and control groups. Instead, it is defined as the LMI subset of the broader Home Energy Reports treatment population evaluated jointly under the randomized control trial design described in Section 3.3.

Participation in the LMI HERs Channel is determined by applying LMI identification criteria to treated customers within each Home Energy Reports cohort. LMI participation shares are derived using ZIPlevel low-to-moderate income indicators and applied consistently across waves, as summarized in Table 3-13.

4.2.2 Impact Evaluation

A single impact evaluation is conducted jointly for all Home Energy Reports recipients using the data preparation procedures, post-program regression methodology, and wave-level model outputs described in Section 3.3.2. Total evaluated savings are subsequently apportioned between the HERs and LMI HERs channels based on treated-customer allocation factors derived from ZIP-level LMI shares. As a result, no separate data preparation, regression estimation, or wave-level modeling is performed specifically for the LMI HERs Channel. Savings attributable to the LMI HERs Channel reflects its allocated share of total evaluated program savings.

Table 4-5 summarizes regression results and evaluated savings by wave, including model fit statistics, estimated annual savings per recipient, confidence intervals, and total annual savings for the LMI HERs Channel. Negative savings estimates for individual waves reflect instances in which treated customers exhibited higher average post-program usage than comparison customers during the reporting period.

Table 4-5 Wave-Level LMI HERs Regression Results and Annual Natural Gas Savings

Wave	Regression Model R^2	Annual Savings per Recipient	Annual Savings (Lower 95% CI)	Annual Savings (Upper 95% CI)	Annual Pre-Period Usage per Recipient	Percent Therm Savings	Annual LMI HERs Channel Savings Therm
1	0.81	11.03	6.45	15.62	625.74	1.76%	32,470
2	0.80	10.80	6.24	15.37	516.71	2.09%	14,212
3	0.80	5.30	1.02	9.58	466.16	1.14%	5,894
4	0.80	6.18	2.04	10.31	444.94	1.39%	8,272
5	0.82	(1.23)	(6.98)	4.52	547.69	-0.22%	(1,275)
6	0.82	1.88	(1.73)	5.50	326.98	0.58%	3,344
7	0.81	(0.87)	(6.37)	4.63	473.74	-0.18%	(1,558)
8	0.82	(0.09)	(2.64)	2.46	101.81	-0.09%	(304)

Wave	Regression Model R^2	Annual Savings per Recipient	Annual Savings (Lower 95% CI)	Annual Savings (Upper 95% CI)	Annual Pre-Period Usage per Recipient	Percent Therm Savings	Annual LMI HERs Channel Savings Therm
All	**n/a**	**4.84**	**3.13**	**6.55**	**462.26**	**1.05%**	**61,055**

When aggregating across all waves, the Evaluator estimated an overall 95% confidence interval of approximately ±35.0% of LMI HERs Channel savings. Across all waves, evaluated LMI HERs Channel savings accounted for 1.05% of annual natural gas consumption for participating accounts.

4.2.2.1 Double Counting Analysis

Protocol J of the Arkansas Technical Reference Manual defines double-counted savings for behavior-based programs as the incremental difference in per-participant savings from other non-behavioral efficiency programs between treatment and control groups. Because behavior-based programs may influence participation in other efficiency programs (e.g., rebates or direct install programs), Protocol J requires evaluators to assess whether incremental savings attributed to those other programs should be adjusted to avoid double counting.

Consistent with Protocol J, double-counted savings are quantified by comparing average per-participant savings from other efficiency programs for treated and control group customers, rather than by summing total other-program savings across groups.

For PY2025, treated customers did not exhibit higher average other-program savings than control group customers, resulting in a small negative double-counting adjustment.

Table 4-6 presents LMI HERs Channel savings before and after the Protocol J double-counting adjustment, which is small in magnitude for PY2025 (-0.59 percent).

Table 4-6 LMI HERs Channel Savings Before and After Double Counting

Program Year	Ex Post Therms Before Double Counting	Percent Difference	Ex Post Therms After Double Counting
2025	61,055	-0.59%	61,417

4.2.2.2 Verified Channel Savings

The LMI Home Energy Reports Channel achieved 61,417 annual therm savings in PY2025, shown in Table 4-7.

In aggregate, the combined HERs and LMI HERs program achieved a realization rate of approximately 129 percent in PY2025. Variation in realization rates across the HERs and LMI HERs segments reflects differences between ex ante assumed savings shares and ex post savings shares allocated to each segment based on treated-customer allocation factors

Table 4-7 LMI HERs Channel Savings

Program Year	Ex Ante Therms	Ex Post Therms	Realization Rate
2025	63,942	61,417	96.1%

4.3 Low-Income Saving Homes Channel

The Low-Income Saving Homes Channel provides weatherization services to hard-to-reach customers. The channel is administered in partnership with Public Service Company of Oklahoma ("PSO").

Direct install measures include:

- Faucet aerators,
- Low-flow showerheads,
- Water heater pipe insulation, and
- Water heater jackets.

Weatherization measures include:

- Air infiltration,
- Duct sealing, and
- Ceiling insulation.

The channel is implemented by Titan ES in partnership with PSO.

The LISH Channel is intended to be primarily a vendor-driven channel, with the marketing targeted at contractors in the Summit Energy service territory.

4.3.1 Participation Summary

In PY2025, the LISH Channel had 217 distinct participants by address, and a total of 526 energy efficiency improvements were installed overall.

Figure 4-1 summarizes the share of program savings contributed by each measure. Most of the program savings were generated by duct sealing, ceiling insulation, and air infiltration.

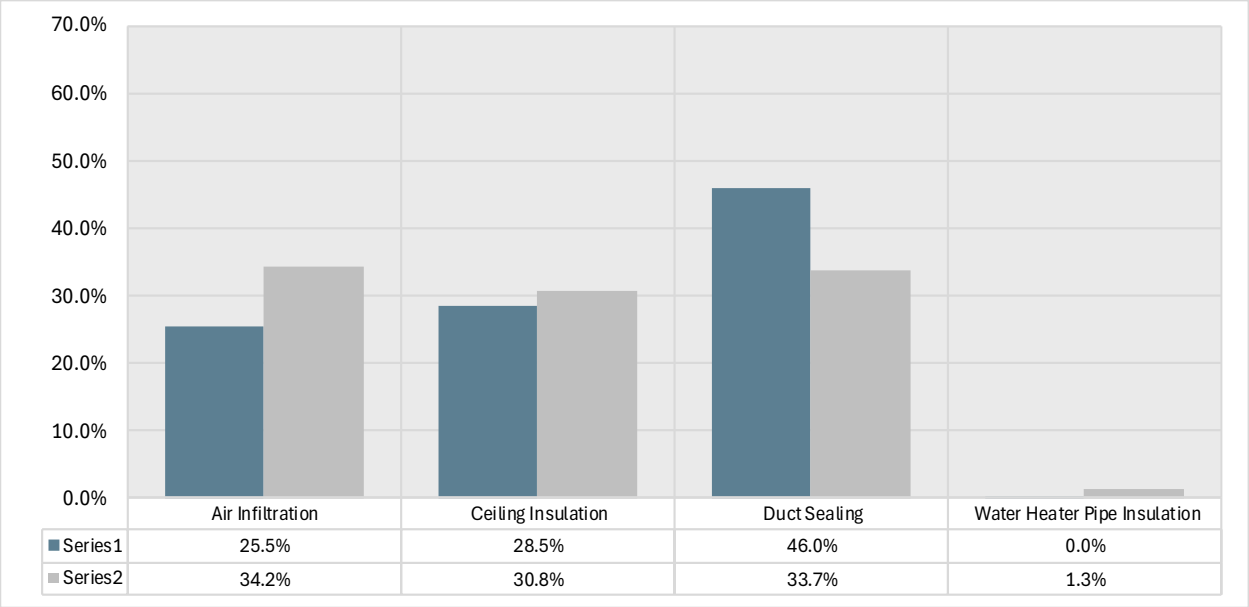


Figure 4-1 Channel Summary by Savings Share and Participation

In addition, incentives were provided for 250 Health & Safety assessment measures at 197 homes. These types of Health & Safety measures included carbon monoxide detectors and vent pipe installations to improve home air flow quality.

4.3.1.1 Participation Timing

Figure 4-2 summarizes the premises by month as determined by the date of rebate delivery as well as the cumulative savings from the program.

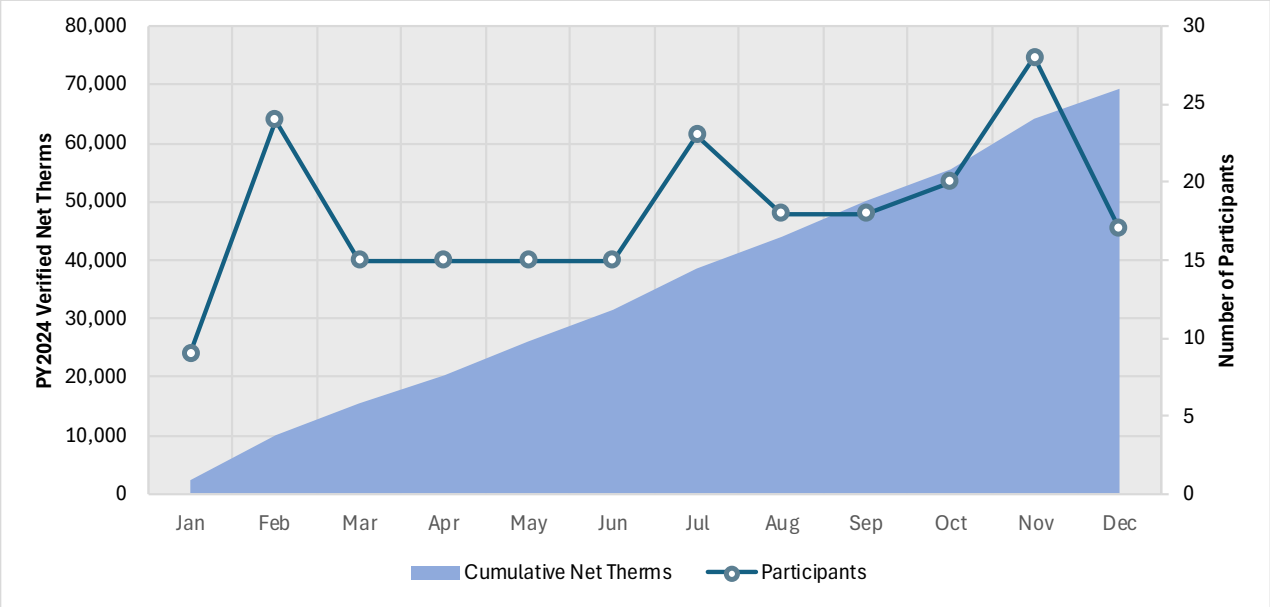


Figure 4-2 LISH Cumulative Savings and Participants by Month

4.3.1.2 Quality Assurance

Staff at Titan ES conduct post inspections of a minimum of 10% of the projects completed by each trade ally. Post inspections are conducted by a quality assurance specialist. The post-inspection procedure includes designations of major violations and minor violations for each measure.

- Major violations require immediate resolution which may include charging the contractor back for the coupon amount.
- Minor violations may be resolved without coupon chargeback.

The definition of major and minor violations by measure are summarized in Table 4-8.

Table 4-8 QA Violation Definitions by Measure

Measure	*Definitions*
Direct install	Major violation examples: ■ Verified devices installed do not match claimed devices installed. ■ Device installed on an appliance of non-eligible fuel type ■ Installation of direct install equipment results in damage or inoperability of existing equipment Minor violation examples: ■ None
Insulation	Major violation examples: ■ Stated existing R-value: error > 1 step difference in R-value range chart on the coupon. ■ Stated finished R-value: error of > 10% in R-value ■ Stated square footage: error of >10% in square feet Minor violation examples: ■ Improper installation of new insulation (such as varying depths) ■ Bag count card not properly displayed ■ Depth markers not properly displayed
Duct sealing / Air infiltration	Major violation examples: ■ Starting vs. finished air leakage rate: verification reveals discrepancy > 20% ■ Minimum Ventilation Requirement (MVR): failure to identify correct MVR or take proper action in the event of the MVR not being met ■ Duct sealing or air sealing materials: use of improper materials ■ Combustion Safety Test (CST): not performing the CST or failing to take proper action on the results. Minor violation examples: ■ None

4.3.2 Impact Evaluation

The evaluation effort of the LISH Channel included a desk review of residential calculations. The Evaluator utilized AR TRM 10 values in assessing savings from measures included in the channel.

4.3.2.1 Tracking Data Review

The impact evaluation began with a review of the channel tracking data. The tracking data was provided in a 'wide' format, where each row in the data represented a distinct premise that received weatherization measures, and each of the measures and associated information were stored in columns. Every premise in the channel had a unique rebate identifier by row, and thus one premise would have multiple columns to reflect the different measures completed. Table 4-9 summarizes ex ante therms savings by measure, provided by the implementation team, for the LISH Channel.

Table 4-9 LISH Ex Ante Summary

Measure	Ex Ante Therm
Air Infiltration	18,252
Ceiling Insulation	14,746
Duct Sealing	29,083
Faucet Aerators	0
Low-Flow Showerheads	0
Water Heater Jacket	0
Water Heater Pipe Insulation	0
Total	**62,081**

The tracking data provided measured values for duct pressurization testing and blower door tests, allowing for the recreation of ex ante calculations based on leakage reduction. Further, the tracking data was found to include detailed parameters for all measures, such as baseline R-value for ceiling insulation.

4.3.2.2 Air Infiltration Gas Savings Methodology

Savings for residential air infiltration projects are calculated as follows:

$$kWh_{savings} = CFM_{50} \times ESF$$

$$kW_{reductions} = CFM_{50} \times DSF$$

$$therms_{savings} = CFM_{50} \times GSF$$

Where:

CFM_{50} = air infiltration reduction in Cubic Feet per Minute at 50 pascals, as measured by the difference between pre- and post-installation blower door air leakage tests

ESF = corresponding energy savings factor based on home heating type and weather zone

DSF = corresponding demand reductions factor based on home heating type and weather zone

GSF = corresponding gas savings factor based on home heating type and weather zone

Table 4-10 Air Infiltration Deemed Savings Multipliers

Weather Zone	Heating Type	kWh Savings per CFM_{50} (ESF)	kW Reductions per CFM_{50} (DSF)	Therm Savings per CFM_{50} (GSF)
9	Gas Heat w/ Electric AC	0.16600	0.000098	0.09500
	Gas Heat Only (no AC)	0.07300	-	0.09900
	Electric Resistance w/ AC	2.34400	0.000098	-
	Heat Pump	1.09900	0.000098	-
8	Gas Heat w/ Electric AC	0.18800	0.00014	0.08250
	Gas Heat Only (no AC)	0.06200	-	0.08630
	Electric Resistance w/ AC	2.07900	0.00014	-
	Heat Pump	0.94200	0.00014	-
7	Gas Heat w/ Electric AC	0.19000	0.00016	0.07070
	Gas Heat Only (no AC)	0.05300	-	0.07470
	Electric Resistance w/ AC	1.81200	0.00016	-
	Heat Pump	0.81800	0.00016	-
6	Gas Heat w/ Electric AC	0.25500	0.00017	0.06040
	Gas Heat Only (no AC)	0.04600	-	0.06390
	Electric Resistance w/ AC	1.64100	0.00017	-
	Heat Pump	0.75600	0.00017	-

4.3.2.3 Ceiling Insulation Gas Savings Methodology

Savings for residential ceiling insulation projects are calculated by multiplying the total square footage of installed insulation by AR TRM 10 deemed multipliers. The deemed multipliers based on weather zone and home heating type are found in Table 4-11 below.

Table 4-11 Ceiling Insulation Deemed Multipliers by Weather Zone – R-38

Weather Zone	Insulation R-Value Range	Gas Heat w/ Electric AC	Electric Resistance w/ AC	Heat Pump	kW Reduction Multiplier	Gas Therms
9	R-0 to R-1	1.71600	9.36600	5.07100	0.00140	0.34200
	R-1 to R-5	0.96900	5.21200	2.76400	0.00080	0.18900
	R-5 to R-8	0.58600	3.13600	1.65300	0.00050	0.11400
	R-8 to R-15	0.36400	1.92600	1.01300	0.00032	0.07000
	R-15 to R-22	0.17200	0.93100	0.48600	0.00014	0.03400
8	R-0 to R-1	1.86420	8.73400	4.57200	0.00107	0.30600
	R-1 to R-5	1.04970	4.84600	2.49500	0.00061	0.16870
	R-5 to R-8	0.63300	2.90900	1.49500	0.00038	0.10110
	R-8 to R-15	0.39090	1.78400	0.91700	0.00025	0.06180
	R-15 to R-22	0.18470	0.85800	0.43900	0.00011	0.02990
7	R-0 to R-1	1.88200	7.93600	4.06700	0.00201	0.27000
	R-1 to R-5	1.05050	4.40100	2.25200	0.00118	0.14950
	R-5 to R-8	0.63150	2.64300	1.35500	0.00073	0.08980
	R-8 to R-15	0.39010	1.62400	0.83400	0.00047	0.05510
	R-15 to R-22	0.18540	0.78100	0.40000	0.00022	0.02660
6	R-0 to R-1	2.12300	7.48200	3.87300	0.00203	0.23780
	R-1 to R-5	1.19670	4.20000	2.18000	0.00118	0.13310
	R-5 to R-8	0.72420	2.54500	1.32400	0.00073	0.08060
	R-8 to R-15	0.44970	1.57400	0.82000	0.00047	0.04970
	R-15 to R-22	0.21160	0.75300	0.39100	0.00021	0.02400

4.3.2.4 Duct Sealing Gas Savings Methodology

Savings for residential duct sealing projects are calculated as follows:

$$Therms_{savings} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{1{,}000 \times AFUE}$$

Where:

DL_{pre} = pre-improvement duct leakage at 25 Pa

ESF = corresponding energy savings factor based on home heating type and weather zone

DSF = corresponding demand reductions factor based on home heating type and weather zone

GSF = corresponding gas savings factor based on home heating type and weather zone

4.3.2.5 Net Savings Estimates

The net-to-gross rate for the LISH Channel is 100% due to the channel's emphasis on targeting hard-to-reach lower-income customers. This aligns with AR TRM's protocol for low-to-moderate income program participants.

4.3.2.6 Verified Channel Savings

Table 4-12 presents the gross savings results while Table 4-13 presents the net savings results of the evaluation of the PY2025 Low-Income Saving Homes Channel. Total gross savings summarizes the savings calculations performed by AR TRM 10 protocols for the measures offered within the channel.

Table 4-12 Verified Gross Therms Savings: LISH

Measure	Ex Ante Therms	Ex Post Therms	Gross Realization	EUL	Lifetime Therms
Air Infiltration	18,252	17,728	97.1%	20	354,552
Ceiling Insulation	14,746	19,781	134.1%	30	593,415
Duct Sealing	29,083	31,924	109.8%	20	638,480
Faucet Aerators	0	0	N/A	N/A	0
Low-Flow Showerheads	0	0	N/A	N/A	0
Water Heater Jacket	0	0	N/A	N/A	0
Water Heater Pipe Insulation	14	14	N/A	11	150
Total	**62,095**	**69,446**	**111.8%**	**22.8**	**1,586,597**

Table 4-13 Verified Net Therms Savings: LISH

Free-Ridership Rate		Net Annual Savings		Net Realization Rate	EUL	Net Lifetime Therms Savings
Ex Ante	*Ex Post*	Ex Ante	Ex Post			
0.00%	**0.00%**	**62,095**	**69,446**	**111.8%**	**22.8**	**1,586,597**

4.4 LivingWise Channel

Introduced in PY2023, the LivingWise Channel is an outreach channel targeted at elementary school and/or middle 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 that they took home to have their guardians help them install.

The school kits contain the following measures:

- (2) Bathroom faucet aerators – 1.0 GPM,
- (1) Kitchen faucet aerator – 1.5 GPM,
- (2) Low-flow showerheads – 1.5 GPM,
- (1) Shower timer
- (1) Filtertone Alarm
- (1) Digital thermometer

4.4.1 Participation Summary

In PY2025, the LivingWise Channel distributed a total of 747 kits to participating students. Figure 4-3 summarizes the share of channel savings contributed by each therms-saving measure. The filter tone alarm and the digital thermometer measures were omitted from the following figure since they did not produce savings.

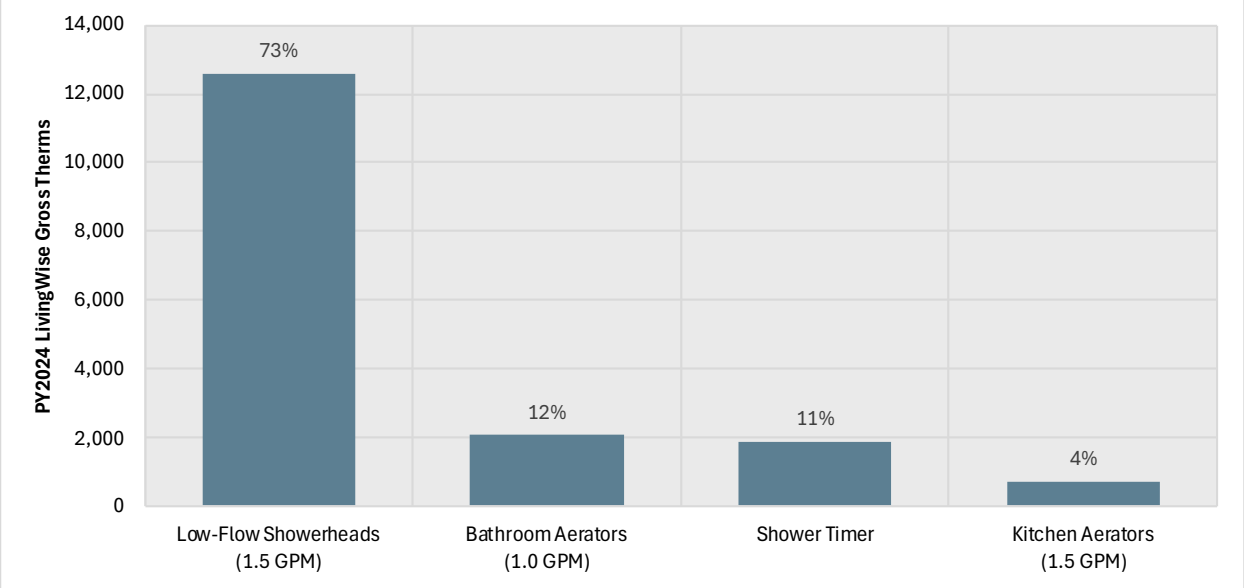


Figure 4-3 LivingWise Participation Summary

To be consistent with the rest of the report, the Evaluators opted to assume that ex ante savings are equal with ex post savings.

4.4.2 Impact Evaluation

The evaluation effort of the LivingWise Channel included a desk review of residential calculations. The Evaluator utilized AR TRM 10 values in assessing savings from measures included in the channel.

4.4.2.1 Faucet Aerators Gas Savings Methodology

The gas savings calculations for residential faucet aerators are described in Section 3.2.2.1.

4.4.2.2 Low-Flow Showerhead Gas Savings Methodology

The gas savings calculations for residential faucet aerators are described in Section 3.2.2.2.

4.4.2.3 Shower Timer Gas Savings Methodology

Shower timers are not found in AR TRM 10; therefore, the Evaluators cited another source for the savings. Natural gas savings for shower timers are based on the methodology described in the Illinois TRM 11.0[3] Section 5.4.9, with some of the inputs adjusted for Oklahoma.

The estimated useful life (EUL) for this measure is estimated at 2 years.

Gas savings are calculated as follows:

$$Therms_{savings} = \%Fossil \times GPM \times (L_{base} - L_{timer}) \times Household \times Days \times SPCD \times Usage \times EPG_{gas}$$

Where:

$\%Fossil$ = percentage of DHW savings assumed to be fossil fuel = 84%

GPM = flow rate of showerhead as used

L_{base} = number of minutes in shower without a shower timer = 8.30 min

L_{timer} = number of minutes in shower after shower timer = 6.29 min

$Household$ = number in household using timer = 2.53

$Days$ = days in a given year = 365.25

$SPCD$ = showers per capita per day = 0.6

$Usage$ = how often each participant is using shower timer = 0.34

[3] The Illinois TRM was retrieved from the Illinois state site located here:

https://icc.illinois.gov/programs/illinois-statewide-technical-reference-manual-for-energy-efficiency

EPG_{gas} = energy per gallon of hot water supplied by gas =

$$EPG_{gas} = \left(8.33 \times 1.0 \times \left(Temp_{mixed} - Temp_{supply}\right)\right) \Big/ \left(RE_{gas} \times 100{,}000\right)$$

Where the additional inputs are the same as described in Section 3.2.2.2

4.4.2.4 In-Service Rates

The Evaluator applied in-service rates developed by Summit Utilities. The following ISRs were applied to the PY2025 evaluation:

- Bathroom faucet aerator: 57.6%
- Kitchen faucet aerator: 66.2%
- Low-flow showerhead: 65.8%
- Shower timer: 65.8%

4.4.2.5 Net-to-Gross

The Evaluator applied a net-to-gross rate of 100.0%.

4.4.2.6 Channel Verified Savings

Table 4-14 summarizes the total gross gas savings and Table 4-15 summarizes the total net gas savings.

Table 4-14 LivingWise Verified Gross Gas Savings

LivingWise School Kit Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Bathroom Aerators (1.0 GPM)	2,059	2,059	100.0%	10	20,586
Kitchen Aerators (1.5 GPM)	709	709	100.0%	10	7,090
Low-Flow Showerheads (1.5 GPM)	12,556	12,556	100.0%	10	125,556
Digital Thermometer	0	0	100.0%	1	0
Filtertone Alarm	0	0	100.0%	1	0
Shower Timer	1,882	1,882	100.0%	2	3,763
Total	**17,205**	**17,205**	**100.0%**	**11**	**156,995**

Table 4-15 LivingWise Verified Net Gas Savings

LivingWise School Kit Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Bathroom Aerators (1.0 GPM)	2,059	2,059	100.0%	100.0%	20,586
Kitchen Aerators (1.5 GPM)	709	709	100.0%	100.0%	7,090
Low-Flow Showerheads (1.5 GPM)	12,556	12,556	100.0%	100.0%	125,556
Digital Thermometer	0	0	100.0%	100.0%	0
Filtertone Alarm	0	0	100.0%	100.0%	0
Shower Timer	1,882	1,882	100.0%	100.0%	3,763
Total	**17,205**	**17,205**	**100.0%**	**100.0%**	**156,995**

Additionally, Table 4-16 below summarizes the non-energy benefits that were applicable to the LivingWise Channel in PY2025.

Table 4-16 LivingWise Applicable Net NEBs

LivingWise Kit Measure	Water Savings (gal)	Energy Savings (kWh)	Demand Reductions (kW)	Propane Savings (gal)
Bathroom Aerators (1.0 GPM)	515,466	34,046	3.54	0
Kitchen Aerators (1.5 GPM)	177,531	11,726	1.22	0
Low-Flow Showerheads (1.5 GPM)	3,001,258	207,648	21.60	0
Digital Thermometer	0	0	0.00	0
Filtertone Alarm	0	0	0.00	0
Shower Timer	0	0	0.00	0
Total	**3,694,254**	**0**	**0.00**	**0**

4.5 Affordable Housing Equipment Rebates Pilot Channel

Introduced in PY2023, the Affordable Housing Equipment Rebates Pilot Channel provides incentives to landlords and property managers who provide low-income housing who replace inefficient furnaces and/or water heaters. Eligible measures for this program include:

- $370 for Forced-air furnace with 90% - 94% AFUE or greater
- $610 for Forced-air furnace with 95% AFUE or greater
- $610 for tankless water heaters with UEF of 0.80 or greater (condensing units)

The AHER Channel was designed to assist to landlords and property managers who provide low-income housing to choose energy efficient natural gas water heating and space heating equipment. The program is marketed to landlords and property managers through local publication, bill inserts, various media avenues, and direct contact.

4.5.1 Participation Summary

In PY2025, the AHER Channel participation consisted of twenty-six total furnaces and two water heaters. All furnaces were rated at 95% AFUE or greater. The water heaters that were rebated were rated at 0.82 UEF and 0.93 UEF.

There were no rebates for furnaces with ratings within the 90 – 94.9% AFUE range.

4.5.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

4.5.2.1 Gas Savings Methodology

The gas savings calculations for residential furnaces are described in Section 3.1.2.1.

The gas savings calculations for residential smart thermostats are described in Section 3.1.2.2.

The gas savings calculations for residential water heaters are described in Section 3.1.2.3.

The Evaluators applied a net-to-gross ratio of 100.0% to Affordable Housing Equipment Rebates Pilot Channel savings as there were few participants and the channel aligns with typical LMI program offerings.

4.5.2.2 Verified Channel Savings

The Affordable Housing Equipment Rebates Pilot Channel gross and net savings are presented in Table 4-17 and Table 4-18, respectively.

Table 4-17 Verified Gross Therms Savings: AHER Channel

Affordable Housing Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Gas Furnaces	2,013	2,886	143.4%	34.2	98,707
Water Heaters	75	92	122.1%	20	1,841
Total	**2,088**	**2,978**	**142.6%**	**33.8**	**100,548**

Table 4-18 Verified Net Therms Savings: AHER Channel

Affordable Housing Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Gas Furnaces	2,013	2,886	143.4%	100.0%	98,707
Water Heaters	75	92	122.1%	100.0%	1,841
Total	**2,088**	**2,978**	**142.6%**	**100.0%**	**100,548**

5. Natural Gas Commercial Solutions Program

The Natural Gas Commercial Solutions Program is part of a reorganization effort on the Summit portfolio to consolidate commercial programs. This new program combines the following former programs and program components:

- Natural Gas Equipment Rebates Program (Commercial)
- Commercial Solutions Program
    - C&I Direct Install
    - C&I Custom
- Commercial Boiler Program
- Commercial Food Service Program

The Natural Gas Commercial Solutions Program does not further break down into official channels (like the Residential Solutions Program); however, the Evaluators opted to report the measure-level findings within their respective program components:

- Natural Gas Equipment Rebates Channel (Commercial)
- Commercial Food Service
- Commercial Boilers
- C&I Custom Projects
- C&I Direct Install Projects

The following subsections outline the results for each of the channels within the NGCS Program.

5.1 Natural Gas Equipment Rebates Channel (Commercial)

The Natural Gas Equipment Rebates channel provides incentives to commercial customers for high efficiency space and water heating equipment. Eligible measures for this channel include:

- $300 for Gas furnaces with 90 – 94.9% AFUE
- $500 for Gas furnaces with 95% or higher AFUE
- $2,000 for replacement of electric heating to gas furnaces with 90 – 94.9% AFUE
- $2,000 for replacement electric heating to gas furnaces with 95% or higher FUE
- $500 for tankless water heaters with an EF of 0.80 or greater (non-condensing units)

- $200 per 100,000 input BTU/h for storage tank water heaters (≥ 75,000 BTU/h) with thermal efficiency ≥ 88% (not to exceed 25% of total equipment cost)
- $900 for replacement of electric water heater with natural gas tankless water heaters with an EF of 0.80 or greater
- $60 for ENERGY STAR qualified smart thermostats

The channel is targeted at the commercial market sectors and offers incentives for both retrofit and new construction applications. The marketing efforts for the space and water heating equipment were largely directed at plumbing and HVAC contractors; their involvement is seen as crucial, as they are generally a primary source of information for end-use customers when deciding upon a replacement system.

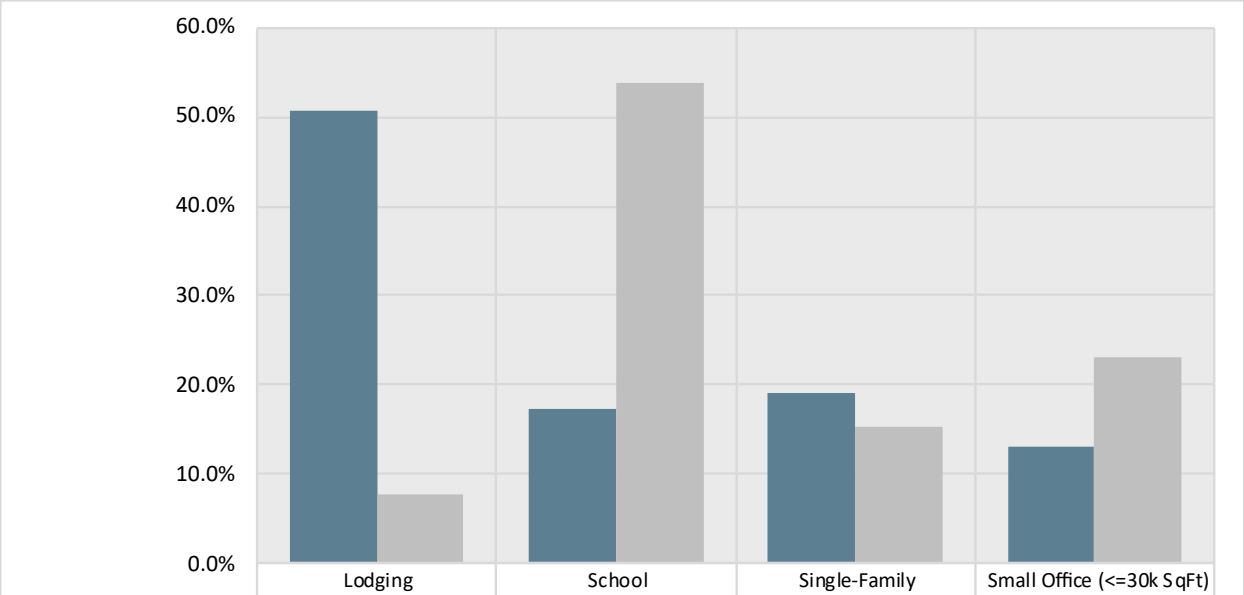
5.1.1 Participation Summary

In PY2025, the commercial component of the Natural Gas Equipment Rebates Channel achieved the following participation by measure offered:

- Furnaces: 13 total units
- Water heaters: 14 total units

5.1.1.1 Commercial Space Heating Participation Summary

In PY2025, the Natural Gas Equipment Rebates Channel processed 13 rebates for commercial space heating. All 13 furnaces were verified to have ratings that met or exceeded 95% AFUE. Figure 5-1 below summarizes the participation and share of channel savings by building type.



	Lodging	School	Single-Family	Small Office (<=30k SqFt)
Percent of Savings	50.6%	17.3%	19.0%	13.1%
Percent Participation	7.7%	53.8%	15.4%	23.1%

Figure 5-1 Commercial Space Heating Summary by Savings Share and Participation

In PY2025, the bulk of the commercial gas furnace savings were driven by lodging, single family premises, schools, and small offices.

5.1.1.2 Commercial Water Heating Participant Summary

In PY2025, the Natural Gas Equipment Rebates Channel processed fourteen (14) rebates for commercial water heating. All fourteen (14) of the water heaters were tankless water heaters.

5.1.1.3 Commercial Smart Thermostat Participation Summary

In PY2025, the Natural Gas Equipment Rebates Channel did not process any smart thermostat projects.

5.1.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10, with Oklahoma weather-adjusted inputs and total channel savings.

5.1.2.1 Space Heating Gas Savings Methodology

Savings for commercial furnaces are calculated as follows:

$$Therms_{savings} = Capacity \times EFLH_H \times \left(\frac{1}{\eta_{pre}} - \frac{1}{\eta_{post}}\right) \times \left(\frac{1}{100{,}000}\right) \times Source$$

Where:

$Capacity$ = Rated equipment output heating capacity, Btu/h

$EFLH_H$ = Equivalent full-load hours for heating from Table 5-13

η_{pre} = Efficiency of the existing furnace

η_{post} = Efficiency of the energy efficient furnace

$100{,}000$ = conversion factor to convert BTU to therms

$Source$ = Source to site ratio, gas to gas = 1.05, electric to gas = 3.14

5.1.2.2 Water Heating Gas Savings Methodology

Energy savings values for storage tank water heaters were developed using installed *energy factor* ratings as determined by the Gas Appliance Manufacturers Association Directory of Certified Water Heating Products. Tank sizing must follow AHRI standards.

Savings for commercial water heaters are calculated as follows

$$Therms_{savings} = \rho \times Cp \times GPD \times \left(T_{SetPoint} - T_{Supply}\right) \times \left(\frac{1}{EF_{base}} - \frac{1}{EF_{post}}\right) \times Days \times \left(\frac{1}{100{,}000}\right) \times Source$$

Where:

ρ = Water density = 8.33 lb./gal

Cp = Specific heat of water = 1 BTU/lb.·°F

GPD = Average daily hot water use (gallons per day), see Table 5-1

$T_{SetPoint}$ = Water heater set point (120°F for commercial)

T_{Supply} = Calculated average supply water temperature by weather zone

EF_{base} = Calculated energy factor of existing WH, based on tank size and draw pattern

EF_{Post} = Verified energy factor of new water heater

$Days$ = Days of operation per year; appropriate values by building type, see Table 5-1

$100{,}000$ = BTU to therms conversion factor = 100,000 $\frac{\text{BTU}}{\text{therm}}$

$Source$ = Source to site ratio, gas to gas = 1.05, electric to gas = 3.14

Table 5-1 Hot Water Requirements by Building Type

Building Type	Daily Demand (Gallons/Unit/Day)	Unit	Units / 1,000 ft²	Applicable Days/Year	Gallons/ 1,000 ft²/day
Small Office	1	person	2.3	250	2.3
Large Office	1	person	2.3	250	2.3
Fast Food Restaurant	0.7	meal/day	784.6	365	549.2
Sit-Down Restaurant	2.4	meal/day	340	365	816.0
Retail	2	employee	1	365	2.0
Grocery	2	employee	1.1	365	2.2
Warehouse	2	employee	0.5	250	1.0
Elementary School	0.6	person	9.5	200	5.7
Jr. High/ High School	1.8	person	9.5	200	17.1
Health	90	patient	3.8	365	342.0
Motel	20	unit (room)	5	365	100.0
Hotel	14	unit (room)	2.2	365	30.8
Other	1	employee	0.7	250	0.7

5.1.2.3 Net-to-Gross

The Evaluators applied a net-to-gross rate that was developed by Summit Utilities and applied to the PY2025 evaluation.

A net-to-gross ratio of 70.3% was applied to the space heating rebates and a net-to-gross ratio of 84.4% was applied to the water heating rebates.:

5.1.2.4 Verified Channel Savings

The Natural Gas Equipment Rebates Channel gross and net savings are presented in Table 5-2 and Table 5-3, respectively.

Table 5-2 Verified Gross Therms Savings: Natural Gas Equipment Rebates (Commercial)

Natural Gas Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Water Heaters	27,941	29,628	106.0%	20	592,566
Gas Furnaces	1,301	1,588	122.0%	36	57,169
Smart Thermostats	0	0	N/A	N/A	0
Total	**29,242**	**31,216**	**106.8%**	**20.8**	**649,735**

Table 5-3 Verified Net Therms Savings: Natural Gas Equipment Rebates (Commercial)

Natural Gas Equipment Rebates Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Water Heaters	27,941	24,993	89.5%	84.4%	499,869
Gas Furnaces	1,301	1,117	85.9.0%	70.3%	40,207
Smart Thermostats	0	0	N/A	N/A	0
Total	**29,242**	**26,110**	**89.3%**	**83.6%**	**540,076**

5.2 Commercial Boilers

The Commercial Boilers component is a prescriptive program designed to incent high-efficiency hot water boilers installed for commercial comfort heating applications

It is implemented by CLEAResult Consulting on behalf of Summit. CLEAResult handles program administration, marketing and outreach, and technical review of prescriptive boiler projects.

5.2.1 Participation Summary

In PY2025, the Commercial Boilers component processed two (2) boilers in one distinct facility. All 2 boilers were verified through the AHRI database and were verified to have efficiencies greater than 95% Et.

5.2.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10.0, with Oklahoma weather-adjusted inputs and total channel savings.

5.2.2.1 Commercial Boiler Gas Savings Methodology

Savings for commercial boilers are calculated as follows:

$$Therms_{savings} = Capacity \times EFLH_H \times \left(\frac{1}{\eta_{pre}} - \frac{1}{\eta_{post}}\right) \times \left(\frac{1}{100{,}000}\right) \times Source$$

Where:

$Capacity$ = Rated equipment output heating capacity, Btu/h

$EFLH_H$ = Equivalent full-load hours for heating from Table 5-13

η_{pre} = Efficiency of the existing boiler

η_{post} = Efficiency of the energy efficient boiler

$100{,}000$ = conversion factor to convert BTU to therms

$Source$ = Source to site ratio, gas to gas = 1.05, electric to gas = 3.14

5.2.2.2 Net-to-Gross

The Evaluators did not develop a net-to-gross ratio for this channel as there was limited program participation in PY2025. A NTG value of 100% was applied.

5.2.2.3 Verified Commercial Boiler Savings

The Commercial Boilers gross and net savings are summarized in Table 5-4 and Table 5-5, respectively.

Table 5-4 Verified Gross Therms Savings: Commercial Boilers

Commercial Boilers Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Boiler	7,589	6,220	82.0%	20	124,409
Total	**7,589**	**6,220**	**82.0%**	**20**	**124,409**

Table 5-5 Verified Net Therms Savings: Commercial Boilers

Commercial Boilers Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Boiler	7,589	6,220	82.0%	100.0%	124,409
Total	**7,589**	**6,220**	**82.0%**	**100.0%**	**124,409**

Discrepancies in ex-post savings are due to a difference in baseline Et assumptions based on boiler use application and replacement scenario. The Evaluator assumed 'Replace-on-Burnout' as the replacement scenario and 'hot water' as the use application for the boiler. The Evaluator verified make / model efficiencies through the AHRI database.

5.3 C&I Custom Projects

The C&I Custom Projects are directed at developing and incentivizing custom energy efficiency measures for which deemed values are not applicable or feasible. It is implemented by CLEAResult Consulting on behalf of Summit. CLEAResult handles program administration, marketing and outreach, direct installation of water conservation and air infiltration measures, and technical review of custom efficiency projects. Program participants are provided.

5.3.1 Participation Summary

In PY2025, the C&I Custom Projects achieved the following participation by measure offered:

- Boiler Replacement: 1

- Boiler Tune-ups: 1
- Economizer: 1
- Pipe/Valve Insulation: 1
- Smart Thermostats: 1
- Steam Leak Repairs: 3
- Steam Trap Repairs: 3

5.3.2 Impact Evaluation

The Evaluators conducted project-specific M&V on a census of the C&I Custom Projects completed.. Each project included an M&V plan and project-specific report. The reports are provided in Appendix A.

5.3.2.1 Verified Custom Project Savings

The C&I Custom Projects total gross and net savings are summarized in Table 5-6 and Table 5-7, respectively.

Table 5-6 Verified Gross Therms Savings: C&I Custom Projects

C&I Custom Project Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Boiler Replacement	20,934	20,934	100.0%	20	251,208
Boiler Tune-up	5,593	5,593	100.0%	2	11,186
Economizer	4,586	4,586	100.0%	15	68,790
Insulation	5,355	5,355	100.0%	20	107,100
Steam Leaks	2,151	2,151	100.0%	10	21,510
Steam Traps	12,556	12,556	100.0%	5	62,780
Smart Thermostat	4,863	4,863	100.0%	10	53,493
Total	**56,038**	**56,038**	**100.0%**	**13**	**576,067**

Table 5-7 Verified Net Therms Savings: C&I Custom Projects

C&I Custom Project Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Boiler Replacement	20,934	20,934	100.0%	100.0%	251,208
Boiler Tune-up	5,593	5,593	100.0%	100.0%	11,186
Economizer	4,586	4,586	100.0%	100.0%	68,790
Insulation	5,355	5,355	100.0%	100.0%	107,100
Steam Leaks	2,151	2,151	100.0%	100.0%	21,510
Steam Traps	12,556	12,556	100.0%	100.0%	62,780

C&I Custom Project Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Smart Thermostat	4,863	4,863	100.0%	100.0%	53,493
Total	**56,038**	**56,038**	**100.0%**	**100.0%**	**576,067**

5.4 C&I Direct Install

The C&I Direct Install component is directed at developing and incentivizing custom energy efficiency projects for which deemed values are not applicable or feasible. It is implemented by CLEAResult Consulting on behalf of Summit. CLEAResult handles program administration, marketing and outreach, direct installation of water conservation and air infiltration measures, and technical review of custom efficiency projects. Program participants are provided.

Historically, the type of measures that have been offered in the C&I Direct Install component are:

- Faucet aerators
- Low-flow showerheads
- Pre-rinse spray valves
- Overhead door weather stripping
- Weather stripping / door sweeps

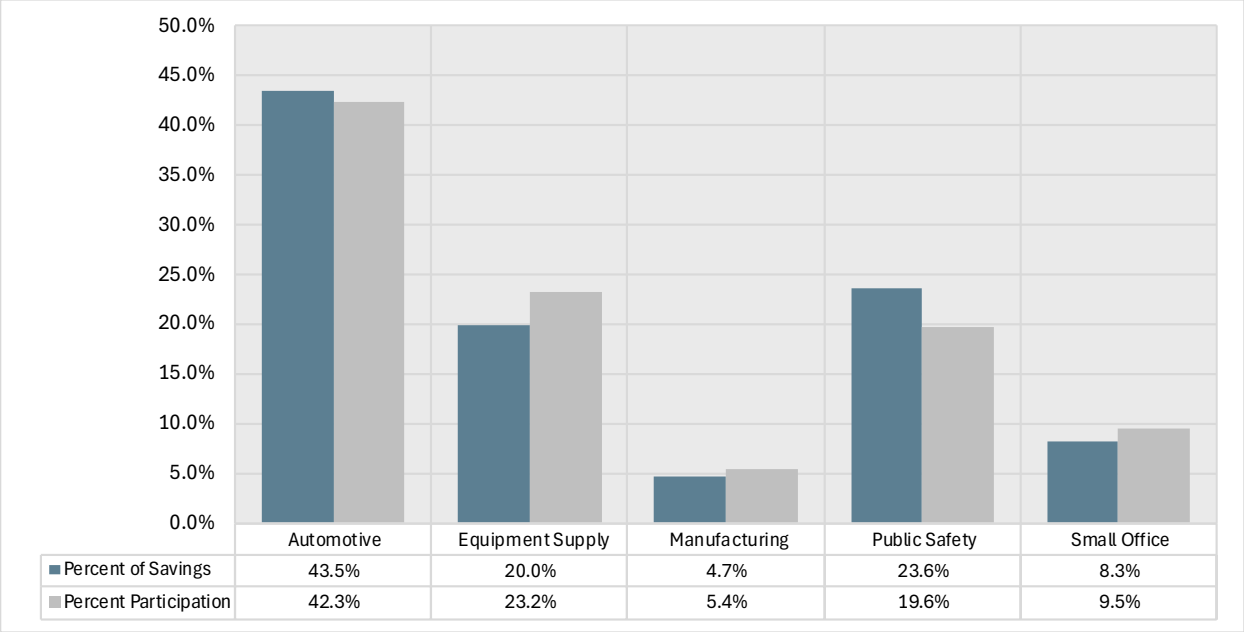
5.4.1 Participation Summary

In PY2025, the C&I Direct Install component achieved the following participation by measure offered:

- 30 distinct participants that installed overhead door weather stripping
- 8 distinct participants that installed weather stripping

There were no participants that installed faucet aerators, low-flow showerheads, or pre-rinse spray valves.

Overall, 30 distinct commercial customers participated in the C&I Direct Install. In PY2025, the provided tracking data did not include building type. The Evaluator reviewed addresses and assigned building types. ‘Automotive’ facilities accounted for the majority (43.5%) of the channel savings, followed by ‘Equipment Supply’ and ‘Manufacturing’, accounting for 20.0% and 4.7% of channel savings, respectively. Figure 5-2 summarizes the participation by facility type, quantified in percent of participation as well as percent of total savings by facility type.



	Automotive	Equipment Supply	Manufacturing	Public Safety	Small Office
Percent of Savings	43.5%	20.0%	4.7%	23.6%	8.3%
Percent Participation	42.3%	23.2%	5.4%	19.6%	9.5%

Figure 5-2 Pathway Summary by Savings Share and Participation

5.4.2 Impact Evaluation

The following sections outline the natural gas savings calculation methodologies from AR TRM 10.0, with Oklahoma weather-adjusted inputs and total channel savings.

5.4.2.1 Commercial Faucet Aerator Gas Savings Methodology

Natural gas savings for faucet aerators are based on the methodology described in AR TRM 10.0 Section 3.3.2. Gas savings are calculated as follows:

$$Therms_{savings} = \frac{\rho \times C_P \times U \times (F_B - F_P) \times \left(T_{Mixed} - T_{Supply}\right) \times \left(\frac{1}{E_t}\right) \times Days}{Conversion\ Factor}$$

Where,

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb.·°F

F_B = average baseline flow rate

F_P = average post-retrofit flow rate

U = baseline water usage duration, based on building type

T_{Mixed} = Mixed water temperature = 105.0 °F

T_{Supply} = Average supply water temperature by weather zone

E_t = Thermal efficiency of water heater, excluding standby losses (0.98 electric / 0.79 Gas).

$Days$ = Annual building type operating days for the applications

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therms for gas water heating.

Table 5-8 Commercial Faucet Aerator Inputs

Parameter	Description	Value
F_B	Average baseline flow rate (GPM)	2.2
F_P	Average post-retrofit flow rate (GPM)	≤ 1.5
$Days$	Annual building type operating days for the applications: 1. Prison 2. Hospital, Nursing Home 3. Dormitory 4. Multifamily 5. Lodging 6. Commercial 7. School	 365 365 274 365 365 250 200
U	Baseline water usage duration, following applications: 1. Prison 2. Hospital, Nursing Home 3. Dormitory 4. Multifamily 5. Lodging 6. Commercial 7. School	 30 min/day/unit 3.0 min/day/unit 30 min/day/unit 3.0 min/day/unit 3.0 min/day/unit 30 min/day/unit 30 min/day/unit
T_{Supply}	Average supply (cold) water temperature (°F) 1. Zone 9 2. Zone 8 3. Zone 7 4. Zone 6	 65.6 66.1 67.8 70.1

5.4.2.2 Commercial Low-Flow Showerhead Gas Savings Methodology

Natural gas savings for low-flow showerheads are based on the methodology described in AR TRM 10.0 Section 3.3.5. Gas savings are calculated as follows:

$$Therms_{savings} = \frac{\rho \times C_P \times \Delta V \times (T_{HW} - T_{Supply}) \times \left(\frac{1}{E_t}\right) \times Days}{Conversion\ Factor}$$

Where:

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb.·°F

ΔV = gallons saved per day, based on building type, see Table 5-9

$\Delta V = U \times N \times (Q_B - Q_P) \times F_{HW}$

Where:

U = Typical shower duration of 7.8 (minutes/shower)

N = Number of showers per day (per showerhead) by building type

Q_B = Baseline showerhead flow rate, 2.5 GPM

Q_P = Flow rate of installed showerhead (in GPM)

F_{HW} = hot water fraction (share of water flowing through SH from WH, %)

T_{HW} = Mixed water temperature = 120.0 °F

T_{Supply} = Average supply water temperature by weather zone

E_t = Thermal efficiency of water heater, excluding standby losses (0.98 electric / 0.79 Gas).

$Days$ = Annual building type operating days for the applications

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therms for gas water heating.

Table 5-9 Reduction in Daily Hot Water Usage, ΔV

GPM	Weather Zone	Building Type				
		Hospital / Nursing Home	Hospitality	Commercial	Fitness Center	Schools
2.00	9	2.51	3.53	2.74	56.3	3.73
	8	2.51	3.52	2.73	56.15	3.72
	7	2.47	3.48	2.70	55.45	3.67
	6	2.43	3.41	2.64	54.36	3.60
1.75	9	3.77	5.29	4.11	84.45	5.59
	8	3.76	5.28	4.1	84.22	5.58
	7	3.71	5.21	4.05	83.17	5.51
	6	3.64	5.11	3.97	81.54	5.4
1.50	9	5.03	7.06	5.48	112.61	7.45
	8	5.01	7.04	5.46	112.29	7.43
	7	4.95	6.95	5.39	110.89	7.34
	6	4.85	6.82	5.29	108.72	7.2

Table 5-10 Commercial Low-Flow Showerhead Inputs

Parameter	Description	Value
U	Baseline shower duration (min/shower)	7.8
Q_B	Average baseline flow rate of showerhead	2.5
Q_P	Average post-retrofit flow rate (GPM)	≤ 2.0

Parameter	Description	Value
N	Number of showers per day per showerhead, by building: 1. Hospital, Nursing Home 2. Lodging 3. Commercial 4. Fitness Center 5. School	 0.89 1.25 0.97 19.94 1.32
$Days$	Baseline water usage duration, following applications: 1. Hospital, Nursing Home 2. Lodging 3. Commercial 4. Fitness Center 5. School	 365 365 250 365 200
T_{Supply}	Average supply (cold) water temperature (°F) 1. Zone 9 2. Zone 8 3. Zone 7 4. Zone 6	 65.6 66.1 67.8 70.1
F_{HW}	Share of water flowing through SH coming from WH (%) 1. Zone 9 2. Zone 8 3. Zone 7 4. Zone 6	 72.4 72.2 71.3 69.9

5.4.2.3 Commercial Pre-Rinse Spray Valve Gas Savings Methodology

Natural gas savings for pre-rinse spray valves are based on the methodology described in AR TRM 10.0 Section 3.7.12. Gas savings are calculated as follows:

$$Therms_{savings} = \frac{\rho \times C_P \times U \times (F_B - F_P) \times (T_H - T_{Supply}) \times \left(\frac{1}{E_t}\right) \times Days}{Conversion\ Factor}$$

Where:

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb.·°F

U = Baseline water usage duration, see Table 5-11

F_B = average baseline flow rate

F_P = average post-retrofit flow rate

T_H = Mixed water temperature = 120.0 °F

T_{Supply} = Average supply water temperature by weather zone

E_t = Thermal efficiency of water heater, excluding standby losses (0.98 electric / 0.79 Gas).

$Days$ = Annual building type operating days for the applications

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therms

Table 5-11 Commercial Pre-Rinse Spray Valve Inputs

Parameter	Description	Value
F_B	Average baseline flow rate of PRSV	2.25
F_P	Average post-retrofit flow rate (GPM)	1.28
U	Number of showers per day per showerhead, by building: 1. Fast Food Restaurant 2. Casual Dining Restaurant 3. Industrial 4. Dormitory 5. K-12 School	 45 min/day/unit 105 min/day/unit 210 min/day/unit 210 min/day/unit 105 min/day/unit
$Days$	Baseline water usage duration, following applications: 1. Fast Food Restaurant 2. Casual Dining Restaurant 3. Industrial 4. Dormitory 5. K-12 School	 365 365 365 274 200
T_{Supply}	Average supply (cold) water temperature (°F) 5. Zone 9 6. Zone 8 7. Zone 7 8. Zone 6	 65.6 66.1 67.8 70.1

5.4.2.4 Commercial Weather Stripping Gas Savings Methodology

Natural gas savings for weather stripping are based on the methodology described in AR TRM 10.0 Section 3.2.10. Gas savings for weatherstripping projects are based on:

- Air infiltration
- Cooling and heating Equivalent Full-Load Hours ("EFLH"),
- Change in temperature between interior and exterior spaces.

Gas savings for weatherstripping projects are calculated as follows:

$$Annual\ therms = \frac{\left(CFM_{pre,day} * Hours_{day} + CFM_{pre,night} * Hours_{night}\right)\left(CFM_{reduction} * 1.08 * \Delta T * \frac{1.0kW}{ton}\right)}{80\%\ AFUE * \frac{100{,}000Btu}{therm}}$$

Calculation inputs are presented in Table 5-12 below, while Table 5-13 shows EFLH heating values by weather zone and by building type.

Table 5-12 DI Weather Stripping Savings Calculation Parameters

Parameter	Description	Value
CFM_{pre}	Calculated pre-retrofit air infiltration rate (ft^3/min)	
$CFM_{reduction}$	Average infiltration reduction	79%
ΔT	Change in temperature across gap barrier	
$Hours_{day}$	12-hour cycles per day, per month	4,380 hours
$Hours_{night}$	12-hour cycles per day, per month	4,380 hours
$EFLH_H$	Average heating equivalent full-load hours	See table below

Table 5-13 $EFLH_H$ by Weather Zone and Building Type

Building Type	Zone 6	Zone 7	Zone 8	Zone 9
Assembly	575	798	855	824
College/University	630	874	936	902
Fast Food Restaurant	288	440	474	455
Full Menu Restaurant	181	328	370	336
Grocery Store	688	935	995	965
Health Clinic	646	885	922	895
Lodging	389	587	635	605
Large Office (>30k Sq. Ft.)	811	1,014	1,054	1,036
Small Office (≤30k Sq. Ft.)	353	538	568	538
Religious Worship	537	745	798	769
Retail	780	1,041	1,131	1,099
School	774	1,026	1,089	1,064

These calculations and inputs translate into therm savings on a per-linear-foot basis. Deemed savings by weather zone are presented in Table 5-14 below.

Table 5-14 Deemed Annual Therms Savings per Linear Foot

Weather Zone	Gap Width (inches)			
	1/8	1/4	1/2	3/4
Zone 9	5.34	10.80	21.43	32.16
Zone 8	4.64	9.38	18.62	27.96
Zone 7	3.91	7.92	15.71	23.58
Zone 6	2.89	5.86	11.62	17.44

5.4.2.5 Net-to-Gross

The Evaluator applied the Oklahoma Natural Gas NTG of 100.0% for Direct Install projects.

5.4.2.6 Verified Direct Install Savings

The C&I Direct Install total gross and net savings are summarized in Table 5-15 and Table 5-16, respectively.

Table 5-15 Verified Gross Therms Savings: C&I Direct Install

C&I Direct Install Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Gross Realization Rate	EUL	Lifetime Therm Savings
Faucet Aerators	0	0	N/A	N/A	0
Low-Flow Showerheads	0	0	N/A	N/A	0
Pre-Rinse Spray Valves	0	0	N/A	N/A	0
Overhead Door Weather Stripping	531,503	531,548	100.0%	11	5,847,029
Weather Stripping	8,076	8,077	100.0%	11	88,852
Total	**539,579**	**539,626**	**100.0%**	**11**	**5,935,881**

Table 5-16 Verified Net Therms Savings: C&I Direct Install

C&I Direct Install Measure	Ex Ante Therms Savings	Ex Post Therms Savings	Net Realization Rate	NTG	Lifetime Therm Savings
Faucet Aerators	0	0	N/A	N/A	0
Low-Flow Showerheads	0	0	N/A	N/A	0
Pre-Rinse Spray Valves	0	0	N/A	N/A	0
Overhead Door Weather Stripping	531,503	531,548	100.0%	100.0%	5,847,029
Weather Stripping	8,076	8,077	100.0%	100.0%	88,852
Total	**539,579**	**539,626**	**100.0%**	**100.0%**	**5,935,881**

Table 5-17 summarizes the non-energy benefits that were applicable to the C&I Direct Install in PY2025.

Table 5-17 C&I Direct Install Applicable Net NEBs

C&I Direct Install Measure	Water Savings (gal)	Energy Savings (kWh)	Demand Reductions (kW)	Propane Savings (gal)
Faucet Aerators	0	0	0	0
Low-Flow Showerheads	0	0	0	0
Pre-Rinse Spray Valves	0	0	0	0
Overhead Door Weather Stripping	0	347,970	241.29	0
Weather Stripping	0	4,863	3.37	0
Total	**0**	**352,833**	**244.66**	**0**

6. Appendix A: Site Reports

This appendix contains the individual site reports for the Commercial Solutions Program.

Program	C&I Solutions
Project ID	EA-0005111369
Facility SIC Code	3582 - Commercial Laundry, Drycleaning, and Pressing Machines
Measures	Steam Trap Replacement
Annual Consumption	23,984 therms

Project Background

The participant is a commercial laundry service establishment that received incentives from Summit Utilities Oklahoma for implementing the following:

- ECM #1: Steam Trap Replacement
- ECM #2: Repair Steam Leaks

The site uses steam throughout the facility primarily for three process needs: space heating, domestic water heating, and other process heating loads such as sterilization. Savings will come from repairing the failed steam traps throughout the site's steam system.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Feedwater temperature is 140°C
- Annual operating hours for the on-site steam system are 2,170 hours
- Combustion efficiency is 85%

Steam Trap Repairs

The following table shows relevant failed steam traps parameters required for annual energy savings.

Table 1. Steam Trap Parameters

Steam Trap #	Orifice Size (in.)	Inlet Pressure (psig)	Outlet Pressure (psig)	Service (Drip/Process)	Feedwater Temperature (°F)	Boiler Efficiency	Operating Hours
1	1/8	100	0.01	Process	140	85%	2,170
2	1/8	100	0.01	Process	140	85%	2,170
3	1/8	100	0.01	Process	140	85%	2,170
4	1/8	100	0.01	Process	140	85%	2,170
5	1/8	100	0.01	Process	140	85%	2,170
6	1/8	100	0.01	Process	140	85%	2,170
7	1/8	100	0.01	Process	140	85%	2,170

Calculations for the annual therms savings use the following equation:

Equation 1. Stream Trap Replacement Annual Energy Savings

$$Annual\ \ therms\ Savings = \frac{Steam\ Trap\ Discharge\ Rate \times OpHrs \times h_{fg}}{EC_{Base} \times Therm\ Conversion\ Factor}$$

Where:

Steam Trap Discharge Rate = steam loss from the system (lb/hr)

OpHrs = annual hours system is pressurized (hrs/yr) = 2,170 annual hours

H_{fg} = latent heat of evaporation (BTU/lb)

EC_{Base} = combustion efficiency of boiler (%), 85%

Therm Conversion Factor = 100,000 (BTU/therm)

Steam Leak Repair

The following table shows relevant steam leak repair parameters required for annual energy savings.

Table 2. Steam Leak Parameters

Steam Leak #	Description	Quantity of Leaks	Plume Length (ft)	Steam Pressure (psig)	Leak Rate (lbs/hr)	Boiler Efficiency
1	HX on Water Tank	1	1.08	90	10.41	85%

An alternative method was used to calculate the steam loss before steam leak repairs. The more traditional method equates the orifice diameter flow rate, using the orifice diameter of the leak

and the system's absolute pressure. Due to the difficulty in determining the exact diameter of an orifice leak, an alternate method was used.
Calculations follow the methods established by G.G. Rajan for a steam leak rate as a function of the length of an active steam plume.

Equation 2. Equating Steam Plume Length to Flow Rate

$$Leak\ Rate\ \left(\frac{lb}{hr}\right) = 5.661\ x\ \exp\left[0.562\ x\ Plume\ Length\ (ft)\right]$$

Equation 3. Calculation for Heat Loss

$$Heat\ Loss\ \left(\frac{Btu}{hr}\right) = Leak\ Rate\ \left(\frac{lb}{hr}\right) x\ \left[Steam\ Enthalpy\ \left(\frac{Btu}{lb}\right) - MW\ Enthalpy\ \left(\frac{Btu}{lb}\right)\right]$$

Where:

Leak Rate = calculated value using Equation 2.

Steam Enthalpy = saturated steam region based on system steam pressure

MV Enthalpy = steam look up table based on makeup water temperature, derived from average temperature of water main in each zone (35.98 BTU/lb)

Measure Life

Table 3. Estimated Useful Life for Respective Measures

Measure	***EUL***
Steam Trap Repairs	5 years
Repair Steam Leaks	10 years

Calculated Savings:

Steam Trap Repairs

Table 4. Steam Trap Repairs Savings

Steam Trap #	***Discharge Rate (lbs/hr)***	***Percent Failed***	***Steam Enthalpy (BTU/lb)***	***Feedwater Enthalpy (BTU/lb)***	***Latent Heat of Evaporation, H_{fg} (BTU/lb)***	***Therms Savings***
1	30	100%	1190.6	107.99	1082.61	892

Steam Trap #	*Discharge Rate (lbs/hr)*	*Percent Failed*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Latent Heat of Evaporation, H_{fg} (BTU/lb)*	*Therms Savings*
2	30	100%	1190.6	107.99	1082.61	892
3	30	100%	1190.6	107.99	1082.61	892
4	30	100%	1190.6	107.99	1082.61	892
5	30	100%	1190.6	107.99	1082.61	892
6	30	100%	1190.6	107.99	1082.61	892
7	30	100%	1190.6	107.99	1082.61	892
Total:						**4,974**

Repair Steam Leaks

Table 5. Steam Leak Repairs Savings

Steam Leak #	*Description*	*Quantity of Leaks*	*Plume Length (ft)*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Therms Savings*
1	HX on Water Tank	1	1.08	1,189.1	35.98	306
					Total	306

Overall, project savings are as follows:

Table 6. Overall Project Savings

Measure	*Expected Annual therms Savings*	*Realized Annual therms Savings*	*Realization Rate*	*Lifetime therms Savings*
Steam Trap Repair	4,975	4,975	100%	24,875
Repair Steam Leaks	306	306	100%	3,064
TOTAL	**5,281**	**5,281**	**100%**	**27.938**

Measure Cost, Incentive, & Payback

The Evaluators reviewed the invoices associated with this project and verified a cost of $4,938. Measure payback is summarized in the table below.

Table 7. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
5,281	$0.941	$4,971	$4,938	$4,229	$3,697	0.2	1.0

Program	C&I Solutions
Project ID	EA-0005111209
Facility SIC Code	3582 - Commercial Laundry, Drycleaning, and Pressing Machines
Measures	Steam Trap Replacement and Steam Leak Repair
Annual Consumption	86,164 therms

Project Background

The participant is a commercial laundry service establishment that received incentives from Summit Utilities Oklahoma for implementing the following:

- ECM #1: Steam Trap Replacement
- ECM #2: Repair Steam Leaks

The site uses steam throughout the facility primarily for three process needs: space heating, domestic water heating, and other process heating loads such as sterilization. Savings will come from repairing the failed steam traps throughout the site's steam system.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Feedwater temperature is 180°C
- Annual operating hours for the on-site steam system are 2,240 hours
- Combustion efficiency is 85%

Steam Trap Repairs

The following table shows relevant failed steam traps parameters required for annual energy savings.

Table 1. Steam Trap Parameters

Steam Trap #	Orifice Size (in.)	Inlet Pressure (psig)	Outlet Pressure (psig)	Service (Drip/Process)	Feedwater Temperature (°F)	Boiler Efficiency	Operating Hours
1	1/8	90	0.01	Process	180	85%	2,240
2	1/8	90	0.01	Process	180	85%	2,240
3	1/8	90	0.01	Process	180	85%	2,240
4	1/8	90	0.01	Process	180	85%	2,240

Calculations for the annual therms savings use the following equation:

Equation 1. Stream Trap Replacement Annual Energy Savings

$$Annual\ \ therms\ Savings = \frac{Steam\ Trap\ Discharge\ Rate \times OpHrs \times h_{fg}}{EC_{Base} \times Therm\ Conversion\ Factor}$$

Where:

Steam Trap Discharge Rate = steam loss from the system (lb/hr)

OpHrs = annual hours system is pressurized (hrs/yr) = 2,240 annual hours

H_{fg} = latent heat of evaporation (BTU/lb)

EC_{Base} = combustion efficiency of boiler (%), 85%

Therm Conversion Factor = 100,000 (BTU/therm)

Steam Leak Repair

The following table shows relevant steam leak repair parameters required for annual energy savings.

Table 2. Steam Leak Parameters

Steam Leak #	Description	Quantity of Leaks	Plume Length (ft)	Steam Pressure (psig)	Leak Rate (lbs/hr)	Boiler Efficiency
1	American HY-PRO Sheet Press	1	1	90	9.93	85%
2	American HY-PRO Sheet Press	1	2.5	90	23.07	85%
3	American HY-PRO Sheet Press	1	2	90	17.42	85%

An alternative method was used to calculate the steam loss before steam leak repairs. The more traditional method equates the orifice diameter flow rate, using the orifice diameter of the leak and the system's absolute pressure. Due to the difficulty in determining the exact diameter of an orifice leak, an alternate method was used.

Calculations follow the methods established by G.G. Rajan for a steam leak rate as a function of the length of an active steam plume.

Equation 2. Equating Steam Plume Length to Flow Rate

$$Leak\ Rate\ \left(\frac{lb}{hr}\right) = 5.661\ x\ \exp\left[0.562\ x\ Plume\ Length\ (ft)\right]$$

Equation 3. Calculation for Heat Loss

$$Heat\ Loss\ \left(\frac{Btu}{hr}\right) = Leak\ Rate\ \left(\frac{lb}{hr}\right) x\ \left[Steam\ Enthalpy\ \left(\frac{Btu}{lb}\right) - MW\ Enthalpy\ \left(\frac{Btu}{lb}\right)\right]$$

Where:

Leak Rate = calculated value using Equation 2.

Steam Enthalpy = saturated steam region based on system steam pressure

MV Enthalpy = steam look up table based on makeup water temperature, derived from average temperature of water main in each zone (35.98 BTU/lb)

Measure Life

Table 3. Estimated Useful Life for Respective Measures

Measure	***EUL***
Steam Trap Repairs	5 years
Repair Steam Leaks	10 years

Calculated Savings:

Steam Trap Repairs

Table 4. Steam Trap Repairs Savings

Steam Trap #	*Discharge Rate (lbs/hr)*	*Percent Failed*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Latent Heat of Evaporation, H_{fg} (BTU/lb)*	*Therms Savings*
1	28	100%	1189.1	148.04	1041.06	768
2	28	100%	1189.1	148.04	1041.06	768
3	28	100%	1189.1	148.04	1041.06	768
4	28	100%	1189.1	148.04	1041.06	768
Total:						**3,073**

Repair Steam Leaks

Table 5. Steam Leak Repairs Savings

Steam Leak #	*Description*	*Quantity of Leaks*	*Plume Length (ft)*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Therms Savings*
1	American HY-PRO Sheet Press	1	1	1,189.1	35.98	302
2	American HY-PRO Sheet Press	1	2.5	1,189.1	35.98	302
3	American HY-PRO Sheet Press	1	2	1,189.1	35.98	302
Total						**1,532**

Overall, project savings are as follows:

Table 6. Overall Project Savings

Measure	*Expected Annual therms Savings*	*Realized Annual therms Savings*	*Realization Rate*	*Lifetime therms Savings*
Steam Trap Repair	3,073	3,073	100%	15,364
Repair Steam Leaks	1,532	1,532	100%	15,322
TOTAL	**4,605**	**4,605**	**100%**	**30,686**

Measure Cost, Incentive, & Payback

The Evaluators reviewed the invoices associated with this project and verified a cost of $4,375. Measure payback is summarized in the table below.

Table 7. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
4,605	$0.941	$4,334	$4,375	$4,375	$3,224	0.3	1.0

Program	C&I Solutions
Project ID	EA-0003724366
Facility SIC Code	622110 - General Medical and Surgical Hospitals
Measures	Boiler Replacement and Insulation
Annual Consumption	280,530 therms

Project Background

The participant is a manufacturing facility that received incentives from Summit Oklahoma for implementing the following:

- ECM #1: Boiler Retrofit
- ECM #2: Steam System Insulation

The site uses steam throughout the facility primarily for three process needs: space heating, domestic water heating, and other process heating loads such as sterilization. Savings will come from repairing the failed steam traps throughout the site's steam system.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Annual operating hours for the on-site steam system are 2,6400 hours
- Combustion efficiency is 85% (for both pre-retrofit and post-retrofit condition)
- Makeup city water was based on AR TRM 9.2 Table 148 – Average Water Main Temperature

Boiler Retrofit

For all three steam boilers, the following equation was used.

Equation 1. Boiler Tune Up Annual Energy Savings

$$Therm\ Savings\ = Capacity * EFLH_H * \left(\frac{1}{E_{C_{Eff}}} - \frac{1}{E_{C_{Base}}}\right) * \frac{1}{100{,}000}$$

Where:

Capacity = Boiler capacity, equal to 10,206,000 Btu/hr

$EFLH_H$ = Equivalent Full Load Hours, heating

$E_{C\text{-}Eff}$ = Boiler combustion efficiency, measured after tune-ups

$E_{C\text{-}Base}$ = Boiler combustion efficiency, measured before tune-ups

100,000 Btu/CCF = Conversion factor (BTU/yr to CCF/yr)

The sum of each was totaled to determine the annual therm savings associated with this ECM.

Steam System Thermal Insulation

Through this method, energy savings are calculated using key data and through the North American Insulation Manufacturers Association's 3E Plus software:

(http://www.pipeinsulation.org/).

Measurement and verification activities are based on the following assumptions:

- Insulation thickness: 1.5 in
- Insulation material type: 850°F MF Pipe and Tank, Type IIIB, C1391-11" & 850°F MF Pipe, Type I, C547-12"
- Jacket: All service Jacket
- Process and ambient air temperature varied based on the measure. See table below.

The 3E Plus software was used to calculate heat loss (btu/hr/ft) for bare piping (pre-retrofit) and piping with 1.5-in insulation (post-retrofit). The software required these inputs: process temperature, ambient temperature, pipe size, base metal, insulation, and jacket material. Annual therms savings were calculated using the following equation:

Equation 3. Pipe Insulation Installation Annual Energy Savings

$$Annual\ Therms\ Savings = \frac{Heat\ Loss\ \left(\frac{Btu}{hr}\right)\ x\ Annual\ Operating\ Hours\ \left(\frac{hrs}{yr}\right)}{Boiler\ Efficiency\ x\ 100{,}000\ \left(\frac{BTU}{CCF}\right)}$$

Where:

Annual Operating Hours = number of hours facility operates annually

Boiler Efficiency

100,000 Btu/CCF = conversion factor (BTU/yr to CCF/yr)

Table 1. Pipe/Valve Insulation Parameters

Entry #	*Description*	*Object To Insulate*	*Pipe Length*	*Pipe Diameter*	*Valve or Fitting Total Length*	*Valve Fitting Size*	*Tank Surface Area*
1	Condensate pipe	Pipe	40	1			
2	Condensate pipe 90's	Valve or Fitting			2.3	13.7	
3	Steam pipe	Pipe	15	6			
4	Steam pipe elbow	Valve or Fitting			3.7	3.7	
5	Steam flanges	Valve or Fitting			4.1	12.4	

Measure Life

Table 2. Estimated Useful Life for Respective Measures

Measure	*EUL*
Boiler Retrofit	20 years
Steam System Thermal Insulation	15 years

Calculated Savings:

Boiler Tune Ups

$$Therm\ Savings\ = Capacity * EFLH_H * \left(\frac{1}{E_{C_{Eff}}} - \frac{1}{E_{C_{Base}}}\right) * \frac{1}{100{,}000}$$

$$Therm\ Savings\ = 10{,}206{,}000\ \left(\frac{Btu}{hr}\right) *\ 2{,}749\ hrs * \left(\frac{1}{0.80} - \frac{1}{0.85}\right) * \frac{1}{100{,}000}$$

$$Therm\ Savings\ = 20{,}934\ therms$$

Steam System Thermal Insulation

Table 3. Pipe Insulation Annual Energy Savings

Entry #	*Description*	*Object to Insulate*	*Temperature (°F)*	*Pre Heat Loss*	*Post Heat Loss*	*Therms Savings*
1	Condensate pipe	Pipe	195	142	19	505
2	Condensate pipe 90's	Valve or Fitting	195	142	19	173

Entry #	Description	Object to Insulate	Temperature (°F)	Pre Heat Loss	Post Heat Loss	Therms Savings
3	Steam pipe	Pipe	440	2175	182	3,080
4	Steam pipe elbow	Valve or Fitting	440	2175	182	764
5	Steam flanges	Valve or Fitting	440	722	70	833
Total						**5,355**

Overall, project savings are as follows:

Table 4. Overall Project Savings

Measure	Expected Annual therms Savings	Realized Annual therms Savings	Realization Rate	Lifetime therms Savings
Boiler Retrofit	20,934	20,934	100%	418,686
Steam System Insulation	5,355	5,355	100%	113,501
TOTAL	**26,289**	**26,289**	**100%**	**532,187**

Measure Cost, Incentive, & Payback

The Evaluators reviewed the invoices associated with this project and verified a cost of $5,589. Measure payback is summarized in the table below.

Table 5. Cost, Incentive, and Payback

Annual Therms Savings	Cost per Therm	Annual Energy Cost Savings	Incremental Cost	Base Incentive	Adjusted Incentive	Payback w/Incentive	Payback w/o Incentive
26,271	$0.571	$15,009	$5,589	$0	$24,975	0.0	0.0

Program	C&I Solutions
Project ID	EA-0001147376
Facility SIC Code	622110 - General Medical and Surgical Hospitals
Measures	Boiler Tune Ups
Annual Consumption	374,010 therms

Project Background

The participant is a hospital that received incentives from Summit Utilities for implementing the following:

- ECM #1: Hot Water Boiler tune ups

The site uses steam throughout the facility primarily for three process needs: space heating, domestic water heating, and other process heating loads such as sterilization. Savings will come from repairing the failed steam traps throughout the site's steam system.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Annual operating hours for the on-site steam system are 2,730 hours
- Combustion efficiency is 88% for the boiler.

Boiler Tune Ups

The following equation was used for the 2 boilers

Equation 1. Boiler Tune Up Annual Energy Savings

$$Annual\ Therm\ Savings = Quantity\ x\ Capacity\left(\frac{\text{BTU}}{\text{hr}}\right)\ xEFLHc\ x\ \%\ Savings\ x\frac{1}{EC_{base}}\ x100{,}000\ \left(\frac{BTU}{CCF}\right)$$

Where:

Capacity = 30 MMBTU/hr for the hot water boiler

EFLHc = 2,730 hrs from utility interval data

% Savings = 2%, from AR TRM 9.1

ECbase = 88%, from AR TRM 9.1

100,000 Btu/CCF = conversion factor (BTU/yr to CCF/yr)

Measure Life

Table 1. Estimated Useful Life for Respective Measures

Measure	*EUL*
Boiler Tune Ups	2 years

Calculated Savings:

Boiler Tune Ups

The following equation was used.

Equation 3. Hot Water Boiler Tune- Up Annual Energy Savings

$$Annual\ Savings = 3\ x\ 3{,}000{,}000\left(\frac{\text{BTU}}{\text{hr}}\right)\ x\ 2{,}730\frac{Hours}{Yr}\ x\ 2\%\ \ x\ \frac{1}{88\%}\ x\ 100{,}000\ \left(\frac{BTU}{CCF}\right)$$

$$Annual\ Savings = 5{,}597\ therms$$

Measure Cost, Incentive, & Payback

Overall, project savings are as follows:

Table 2. Overall Project Savings

Measure	*Expected Annual therms Savings*	*Realized Annual therms Savings*	*Realization Rate*	*Lifetime therms Savings*
Boiler Tune Up	5,593	5,593	100%	11,194
TOTAL	**5,593**	**5,593**	**100%**	**11,194**

The Evaluators reviewed the invoices associated with this project and verified a cost of $15,206. Measure payback is summarized in the table below.

Table 3. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
5,597	$1.576	$8,770	$15,206	$5,313	$4,562	1.2	1.7

Program	C&I Solutions
Project ID	EA-0006502357
Facility SIC Code	3582 - Commercial Laundry, Drycleaning, and Pressing Machines
Measures	Steam Trap Replacement and Steam Leak Repair
Annual Consumption	86,164 therms

Project Background

The participant is a commercial laundry service establishment that received incentives from Summit Utilities Oklahoma for implementing the following:

- ECM #1: Steam Trap Replacement
- ECM #2: Repair Steam Leaks

The site uses steam throughout the facility primarily for three process needs: space heating, domestic water heating, and other process heating loads such as sterilization. Savings will come from repairing the failed steam traps throughout the site's steam system.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Feedwater temperature is 180°C
- Annual operating hours for the on-site steam system are 1,750 hours
- Combustion efficiency is 85%

Steam Trap Repairs

The following table shows relevant failed steam traps parameters required for annual energy savings.

Table 1. Steam Trap Parameters

Steam Trap #	Orifice Size (in.)	Inlet Pressure (psig)	Outlet Pressure (psig)	Service (Drip/Process)	Feedwater Temperature (°F)	Boiler Efficiency	Operating Hours
1	1/8	100	0.01	Process	180	85%	1,750
2	1/8	100	0.01	Process	180	85%	1,750
3	1/8	100	0.01	Process	180	85%	1,750
4	1/8	100	0.01	Process	180	85%	1,750
5	1/8	100	0.01	Process	180	85%	1,750
6	1/8	100	0.01	Process	180	85%	1,750
7	1/8	100	0.01	Process	180	85%	1,750

Calculations for the annual therms savings use the following equation:

Equation 1. Stream Trap Replacement Annual Energy Savings

$$Annual\ \ therms\ Savings = \frac{Steam\ Trap\ Discharge\ Rate \times OpHrs \times h_{fg}}{EC_{Base} \times Therm\ Conversion\ Factor}$$

Where:

Steam Trap Discharge Rate = steam loss from the system (lb/hr)

OpHrs = annual hours system is pressurized (hrs/yr) = 1,750 annual hours

H_{fg} = latent heat of evaporation (BTU/lb)

EC_{Base} = combustion efficiency of boiler (%), 85%

Therm Conversion Factor = 100,000 (BTU/therm)

Steam Leak Repair

The following table shows relevant steam leak repair parameters required for annual energy savings.

Table 2. Steam Leak Parameters

Steam Leak #	Description	Quantity of Leaks	Plume Length (ft)	Steam Pressure (psig)	Leak Rate (lbs/hr)	Boiler Efficiency
1	Steam Line to Uni Press	1	1.5	100	13.2	85%

An alternative method was used to calculate the steam loss before steam leak repairs. The more traditional method equates the orifice diameter flow rate, using the orifice diameter of the leak and the system's absolute pressure. Due to the difficulty in determining the exact diameter of an orifice leak, an alternate method was used.

Calculations follow the methods established by G.G. Rajan for a steam leak rate as a function of the length of an active steam plume.

Equation 2. Equating Steam Plume Length to Flow Rate

$$Leak\ Rate\ \left(\frac{lb}{hr}\right) = 5.661\ x\ \exp\left[0.562\ x\ Plume\ Length\ (ft)\right]$$

Equation 3. Calculation for Heat Loss

$$Heat\ Loss\ \left(\frac{Btu}{hr}\right) = Leak\ Rate\ \left(\frac{lb}{hr}\right) x\ \left[Steam\ Enthalpy\ \left(\frac{Btu}{lb}\right) - MW\ Enthalpy\ \left(\frac{Btu}{lb}\right)\right]$$

Where:

Leak Rate = calculated value using Equation 2.

Steam Enthalpy = saturated steam region based on system steam pressure

MV Enthalpy = steam look up table based on makeup water temperature, derived from average temperature of water main in each zone (35.98 BTU/lb)

Measure Life

Table 3. Estimated Useful Life for Respective Measures

Measure	***EUL***
Steam Trap Repairs	5 years
Repair Steam Leaks	10 years

Calculated Savings:

Steam Trap Repairs

Table 4. Steam Trap Repairs Savings

Steam Trap #	*Discharge Rate (lbs/hr)*	*Percent Failed*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Latent Heat of Evaporation, H_{fg} (BTU/lb)*	*Therms Savings*
1	30	100%	1190.6	148.04	1045.56	644
2	30	100%	1190.6	148.04	1045.56	644
3	30	100%	1190.6	148.04	1045.56	644
4	30	100%	1190.6	148.04	1045.56	644
5	30	100%	1190.6	148.04	1045.56	644
6	30	100%	1190.6	148.04	1045.56	644
7	30	100%	1190.6	148.04	1045.56	644
Total:						**4,508**

Table 5. Steam Leak Repairs Savings

Repair Steam Leaks

Steam Leak #	*Description*	*Quantity of Leaks*	*Plume Length (ft)*	*Steam Enthalpy (BTU/lb)*	*Feedwater Enthalpy (BTU/lb)*	*Therms Savings*
1	American HY-PRO Sheet Press	1	1.5	1190.6	35.98	313
Total						**313**

Overall, project savings are as follows:

Table 6. Overall Project Savings

Measure	*Expected Annual therms Savings*	*Realized Annual therms Savings*	*Realization Rate*	*Lifetime therms Savings*
Steam Trap Repair	4,508	4,508	100%	22,538
Repair Steam Leaks	313	313	100%	3,127
TOTAL	**4,821**	**4,821**	**100%**	**25,664**

Measure Cost, Incentive, & Payback

The Evaluators reviewed the invoices associated with this project and verified a cost of $4,282. Measure payback is summarized in the table below.

Table 7. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
4,821	$0.941	$6,218	$4,282	$4,282	$3,375	0.2	0.7

Program	C&I Solutions
Project ID	EA-0002368997
Facility SIC Code	3596 - Scales and Balances, except Laboratory
Measures	Building Retro Commissioning
Annual Consumption	9,287 therms

Project Background

The participant is a religious services facility that received incentives from Summit Oklahoma for implementing the following energy conservation measure (ECM):

- Smart Thermostat

This included the installation of smart thermostats and associated and occupied/unoccupied temperatures settings.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2022 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement using a bin analysis and associated engineering equations.

Measurement and verification activities are based on the following assumptions:

- Baseline temperature heating setpoints are 72°F
- Post installation occupied heating setpoints are all 70°F, unoccupied are 50°F
- Typical full loads are 80% of all heating capacity
- Combustion efficiency is 80 (for both pre-retrofit and post-retrofit condition)

Building Retro Commissioning

The retro commissioning consisted of the installation of smart thermostats, and putting in occupied and unoccupied setback temperatures. To calculate savings, a bin analysis was sent based on typical meteorological year 3 (TMY3) data based on a general building schedule. Some changes were made by Qualus to the methodology upon initial submission to bring calculations more in line with standard methods. A new methodology will be utilized in the next program year for similar measures.

Measure Life

Table 1. Estimated Useful Life for Respective Measures

Measure	*EUL*
Smart Thermostat	5 years

Calculated Savings:

Overall, project savings are as follows:

Table 2. Overall Project Savings

Measure	*Expected Annual therms Savings*	*Realized Annual therms Savings*	*Realization Rate*	*Lifetime therms Savings*	*Annual Water Gallons Savings*	*Lifetime Water Gallons Savings*
Smart Thermostat	4,751	4,863	102%	24,315	N/A	N/A
TOTAL	**4,751**	**4,863**	**102%**	**24,315**	**N/A**	**N/A**

Measure Cost, Incentive, & Payback

Implementers did not provide cost invoices. Measure payback is summarized in the table below, using provided information.

Table 3. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
4,863	$1.15	$5,593	-	-	$4,620	-	-

Program	C&I Solutions
Project ID	EA-0003202691
Facility SIC Code	2048 - Prepared Feed and Feed Ingredients for Animals and Fowls, except Dogs and Cats
Measures	Economizer
Annual Consumption	79,034 therms

Project Background

The participant is a hospital that received incentives from Summit Utilities Oklahoma for implementing the following:

- ECM #1: Economizer

The M&V effort for this project follows the guidelines of the 2021 International Performance Measurement and Verification Protocol Option A - Retrofit Isolation: Key Parameter Measurement.

Measurement and verification activities are based on the following assumptions:

- Baseline thermal efficiency is 79.5%
- Post case thermal efficiency is 83.6%
- The new boiler capacity is 6.3 MMBTU/h
- Effective full load heating hours are based on a custom case

Economizer

The following table shows relevant boiler economizer parameters required for annual energy savings.

Calculations for the annual therms savings use the following equations:

Equation 1. Boiler Capacity Calculations

$$Capacity\ \left(\frac{BTU}{hr}\right) = Input\ capacity\ \left(\frac{BTU}{hr}\right) x\ \ n_{post}$$

Equation 2. Annual Energy Savings

$$Therm_{savings}(\frac{CCF}{yr}) = Capacity\ \left(\frac{BTU}{hr}\right)\ x\ EFLH_H\ \left(\frac{Hr}{yr}\right) x\ \left(\frac{1}{n_{pre}} - \frac{1}{n_{post}}\right)\ x \frac{1}{100000}$$

Where:

$Capacity = Rated\ equipment\ output\ heating\ capacity, BTU/hr = 6{,}313{,}000\ BTU/hr$

$EFLH_H = Annual\ Full\ Load\ Heating\ Hours = \frac{CCF}{Output\ Capacity}$

$n_{pre} = Pre\ Efficiency\ \% = 79.5\%$

$n_{post} = Post\ Efficiency\ \% = 83.6\%$

$100{,}000 = Conversion\ from\ BTU\ to\ Therm$

Measure Life

Table 1. Estimated Useful Life for Respective Measures

Measure	*EUL*
Economizer	15 years

Calculated Savings:

Economizer:

$$Annual\ Savings = 4{,}586\ therms$$

Overall, project savings are as follows:

Table 2. Overall Project Savings

Measure	***Expected Annual therms Savings***	***Realized Annual therms Savings***	***Realization Rate***	***Lifetime therms Savings***	***Annual Water Gallons Savings***	***Lifetime Water Gallons Savings***
Economizer	4,586	4,586	100%	68,790	N/A	N/A
TOTAL	**4,586**	**4,586**	**100%**	**68,790**	**N/A**	**N/A**

Measure Cost, Incentive, & Payback

The Evaluators reviewed the invoices associated with this project and verified the cost of $59,303. Measure payback is summarized in the table below.

Table 3. Cost, Incentive, and Payback

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback w/Incentive*	*Payback w/o Incentive*
4,586	$0.620	$2,843	$59,303	$4,357	$3,210	19.7	20.9

Appendix B – Marketing Samples

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Celebrate Energy Efficiency Day with Smart Savings

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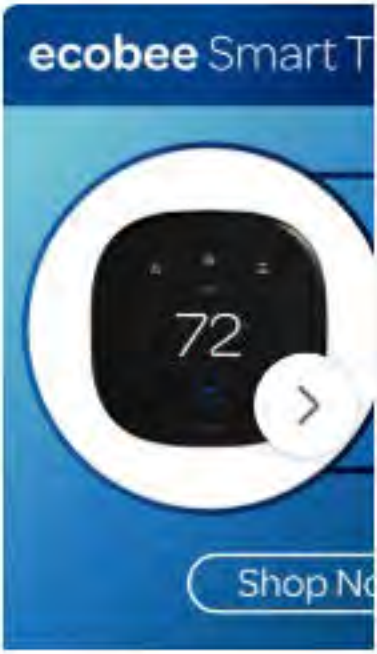

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