Public Utility Commission of Texas

Volume 2. ERCOT Utility-Specific Energy Efficiency Report Program Year 2023

TETRA TECH

TEXAS ENERGY ENGINEERING SERVICES, INC. (www.tecsi.com)

November 2024

720 Brazos Street, Suite 210, Austin, TX 78701

tetratech.com

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

GLOSSARY: ACRONYMS/ABBREVIATIONS/DEFINITIONS

Acronym	Description
AC	Air conditioner
AEP Texas	American Electric Power Texas
AHRI	Air Conditioning, Heating, and Refrigeration Institute
CF	Coincidence factor
C&I	Commercial and industrial
CMTP	Commercial market transformation program
CNP	CenterPoint Energy Houston Electric, LLC
CSOP	Commercial standard offer program
DHP	Ductless heat pump
DLC	DesignLights Consortium
DI	Direct install
ECM	Energy conservation measure
EECRF	Energy Efficiency Cost Recovery Factor
EEIP	Energy Efficiency Implementation Project
EEPR	Energy Efficiency Plan and Report
EESP	Energy efficiency service provider
EISA	Energy Independence and Security Act of 2007
EM&V	Evaluation, measurement, and verification
Entergy	Entergy Texas, Inc.
EPE	El Paso Electric Company
ER	Early replacement
ERCOT	Electric Reliability Council of Texas
ERS	Emergency Response Service
ESCO	Energy service company
ESIID	Electric service identifier ID
ESNH	ENERGY STAR® New Homes
EUL	Estimated useful life
EUMMOT	Electric Utility Marketing Managers of Texas
GSHP	Ground-source heat pump
HCIF	Heating/cooling interactive factor
HOU	Hours of use

Acronym	Description
HPwES	Home Performance with ENERGY STAR®
HTR	Hard-to-reach
HVAC	Heating, ventilation, and air conditioning
IECC	International Energy Conservation Code
IPMVP	International Performance Measurement and Verification Protocol
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light emitting diode
LI	Low-income
LI/HTR	Low-income/hard-to-reach
LM	Load management
mcf	1,000 cubic feet
MF	Multifamily
MTP	Market transformation program
M&V	Measurement and verification
NTG	Net-to-gross
Oncor	Oncor Electric Delivery Company LLC
PUCT	Public Utility Commission of Texas
PV	Photovoltaics
PY	Program year
QA/QC	Quality assurance/quality control
QPL	Qualified Products List
RCx	Retro-commissioning
RFP	Request for proposal
RMTP	Residential market transformation program
ROB	Replace-on-burnout
RSOP	Residential standard offer program
SIR	Savings-to-investment ratio
SOP	Standard offer program
SRA	Self-report approach
SWEPCO	Southwestern Electric Power Company
TMY	Typical meteorological year
TEESI	Texas Energy Engineering Services, Inc.
TNMP	Texas-New Mexico Power Company

Acronym	Description
TRM	Technical reference manual
WACC	Weighted average cost of capital
Xcel Energy SPS	Xcel Energy Southwest Public Service, Inc.

1.0 INTRODUCTION

This document presents the third-party evaluation, measurement, and verification (EM&V) for the ERCOT utilities – specifically, the impact evaluation results for energy efficiency portfolios implemented in program year (PY) 2023 (PY2023). Each section begins with a past five-year trend analysis for the utility energy efficiency portfolio in order to provide additional context for PY2023 results. Volume 2 is a companion document to Volume 1 of the Investor-Owned Utilities (IOUs) PY2023 Energy Efficiency Portfolio Report, and Volume 3 presents similar data for the outside-of-ERCOT utilities.

PY2023 marks the twelfth year of Tetra Tech serving as the Public Utility Commission of Texas' (PUCT) EM&V contractor. The PY2023 scope included targeted impact evaluations of projects where savings have the highest uncertainties identified by prior EM&V results or changes in programs or technologies. The targeted impact evaluation focused on certain commercial and residential programs, including different end-use measures (e.g., HVAC, lighting, refrigeration), while a combination of interval meter data analysis and tracking system reviews provided a due diligence of claimed savings on the portfolio of each utility.

The tracking system reviews also provided an independent assessment of claimed savings, and verified the accuracy of the program data. Types of program documentation reviewed were tracking data, interval meter data, project files, energy savings calculations (including a review of input assumptions and algorithms to verify claimed program savings), and utilities' existing measurement and verification (M&V) information.

The EM&V plans[1] for PY2023 were based on the EM&V prioritization. Programs across all utilities with similar program design, delivery, or target markets were identified by the EM&V team, reviewed by type, and prioritized (*high*, *medium,* or *low*) based on the following considerations:

- magnitude of savings—the percentage of contribution to the portfolio of programs' impacts,
- level of relative uncertainty in estimated savings,
- level and value of existing quality assurance/quality control (QA/QC), and verification data from on-site inspections completed by utilities or by their contractors,
- stage of the program or programmatic component (e.g., pilot, early implementation, mature),
- importance to future portfolio performance,
- priorities for PUCT and utilities, prior EM&V results, and upcoming changes in the markets in which the programs operate.

Sections 2.0 through 5.0 detail the EM&V results for each utility's portfolio.

Appendix A describes the PY2023 EM&V methodology. Appendix B contains the visual representation of the EM&V database import, review, and validation process. Appendix C contains the cost-effectiveness calculations methodology used for the program administrator cost test (PACT).[2] Appendix D contains the quality assurance plan for the reported evaluated savings.

[1] See separate Report Appendix: Public Utility Commission of Texas EM&V Plans for Texas Utilities' Energy Efficiency and Load Management Portfolios—Program Year 2023, June 2023.
[2] Also known as the utility cost test.

2.0 AMERICAN ELECTRIC POWER TEXAS IMPACT EVALUATION RESULTS

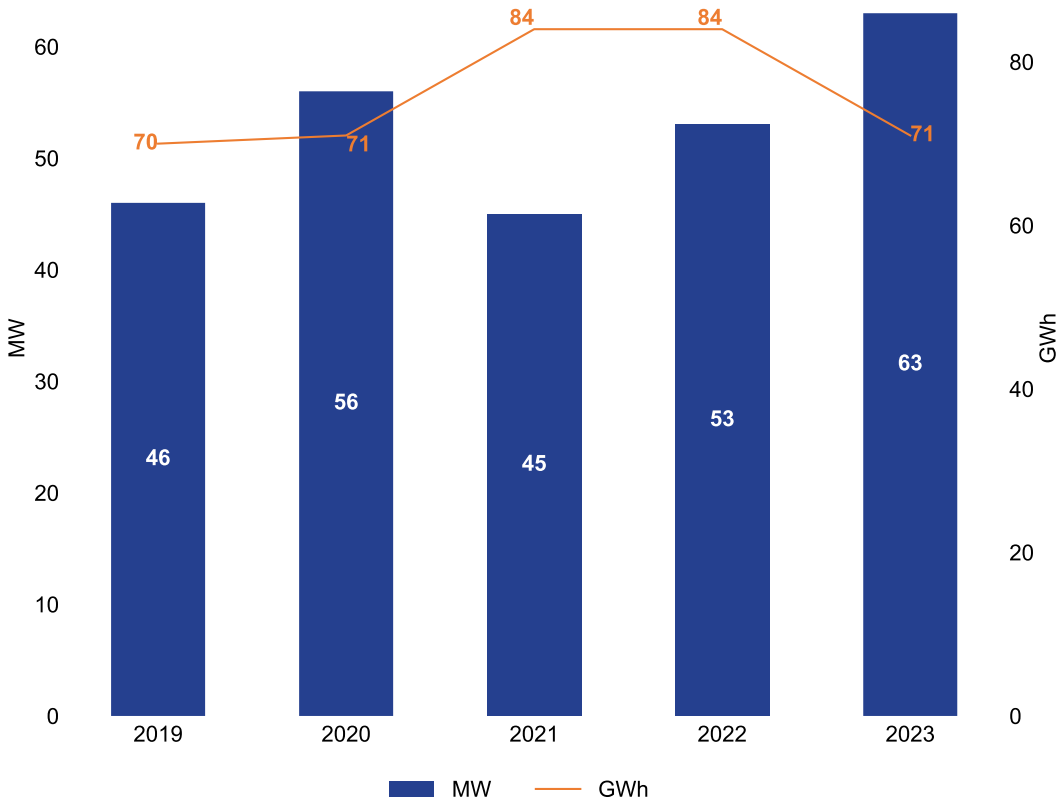
2.1 YEAR-OVER-YEAR COMPARISONS

This section provides a trend analysis for American Electric Power Texas' (AEP Texas) program performances during program year (PY) 2019 (PY2019) through PY2023. This trend analysis provides insight into the PY2023 results included in Sections 2.2 through 2.9.

2.1.1 PY2019–PY2023

PY2023 saw a slight increase in demand reductions and a decrease in energy savings across AEP Texas' portfolio (Figure 1). The addition of a new winter load management program helped AEP Texas achieve an increase in demand reductions. New federal standards in lighting and air conditioners came into effect in PY2023, decreasing energy savings. Overall, savings in PY2023 were consistent with savings in PY2019-PY2020.

Figure 1. AEP Texas Demand Reduction and Energy Savings across Program Year



Load management programs achieved the largest demand reductions for AEP Texas at 62.8 percent of its PY2023 demand reduction goal (Figure 2, left). Compared to the other ERCOT utilities, AEP Texas achieved more of their demand reduction goal through energy efficiency measures and programs—37.2 percent compared to the ERCOT IOU average of 29.8 percent.[3] Commercial market transformation programs' savings (MTP) provided the second largest demand reductions, followed by Residential MTPs.

- **Recommendation:** The PUCT and evaluation, measurement, and verification (EM&V) team should discuss AEP Texas' successful strategies used to achieve over one-third of portfolio savings through energy efficiency and any future plans to increase this percentage.

In PY2023, most of AEP Texas' energy savings (Figure 2 right) were achieved by their commercial MTPs. In contrast, commercial standard offer program (SOP) savings have decreased from prior years, which may be due to the increase in commercial MTPs.

- **Recommendation:** The PUCT and EM&V team should discuss with AEP Texas the reasons for the decrease in commercial SOP savings and future plans for balancing the program design of commercial MTPs and SOPs.

In PY2023, AEP Texas' Residential MTP and SOP delivered more than one-quarter of portfolio savings. In PY2023, low-income (LI) program and hard-to-reach (HTR) program savings have also increased by almost 10 percent from prior years.

- **Recommendation:** While the percentage of residential program savings have been fairly steady in the last two years, the PUCT and EM&V team should understand with AEP Texas what they find to be the right balance of residential SOP and HTR programs across the AEP Texas territory.
- **Recommendation:** The PUCT and EM&V team should discuss with AEP Texas how they have successfully increased savings for LI/HTR customers including differences across the distinct areas within their territory.[4]

[3] PY2023 IOU Energy Efficiency Report Volume 1, Executive Summary, Figure 4.
[4] The consumption analysis indicated strong performance of AEP's LI program (refer to Volume 1 Technical Appendix A).

Figure 2. AEP Texas Demand Reduction and Energy Savings by Program Type[5]

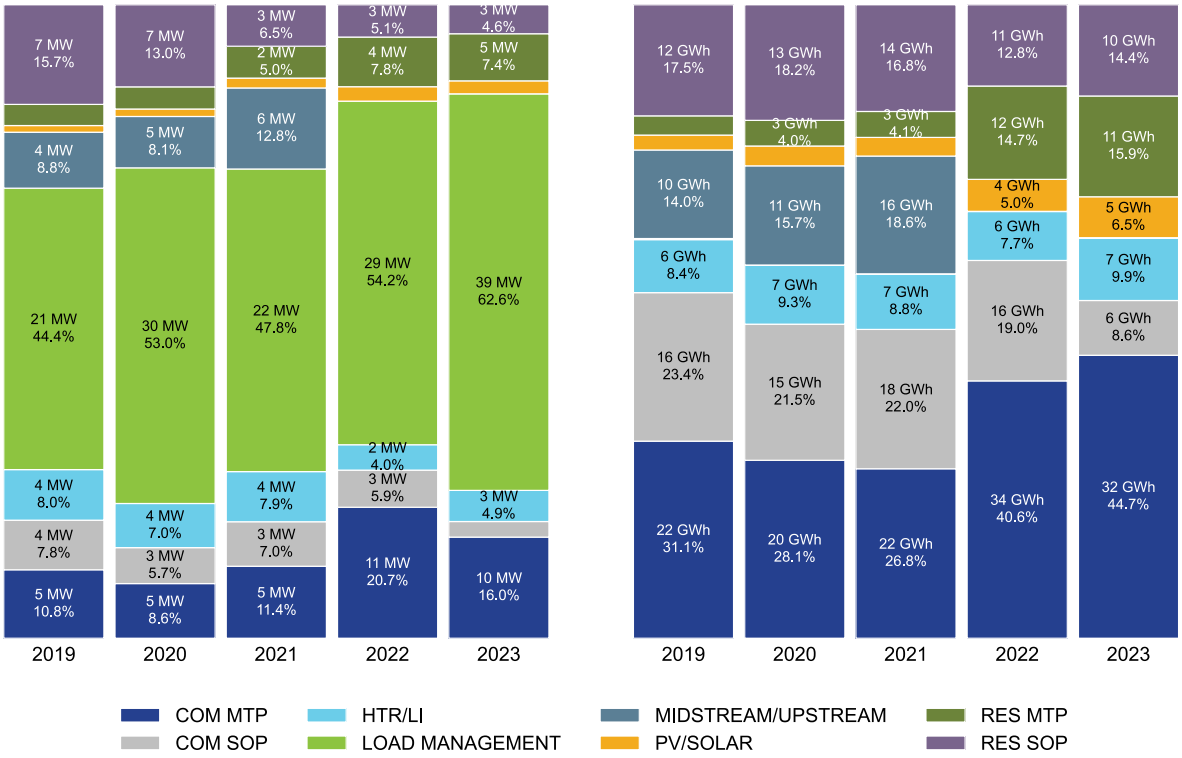
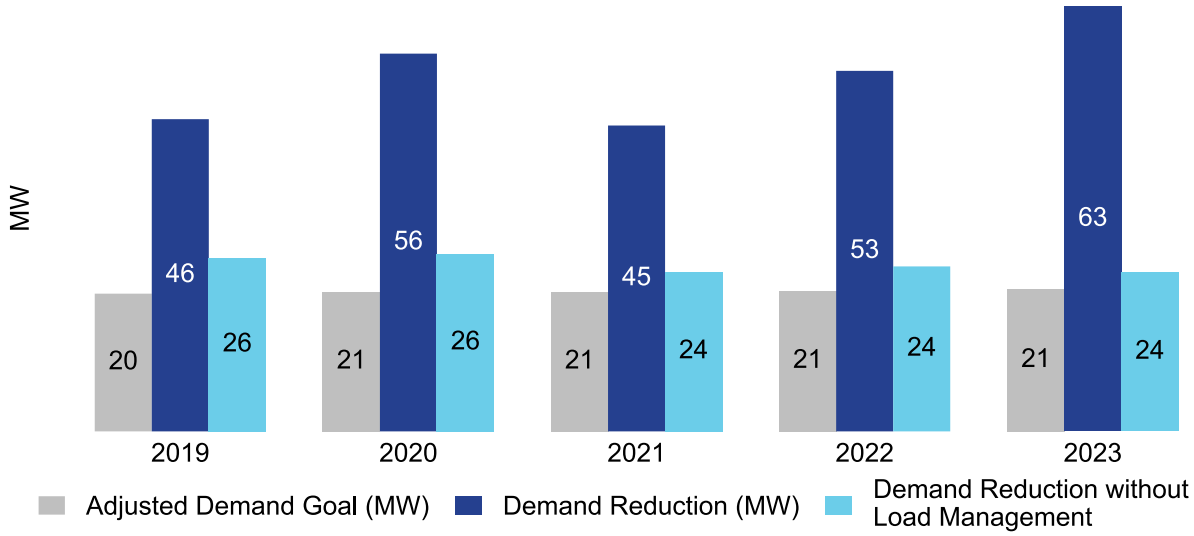


Figure 3 below illustrates how AEP Texas consistently meets their legislated goals through energy efficiency alone unlike the other ERCOT IOUs, AEP has strategically designed its portfolio to achieve the legislated goal for energy efficiency without load management programs.

[5] Demand reductions are reported in megawatts (MW) and energy savings are reported in gigawatt-hours (GWh). EM&V activities and IOU reporting are at the kW and kWh level, larger units are used for visualization purposes.

Figure 3. AEP Texas' PY2019–PY2023 Legislated Goals and Demand Reduction



2.1.1.1 Commercial Savings

In PY2023, the gross savings from AEP Texas' commercial programs (excluding load management) were:

- 11.84 megawatts (MW) of demand reduction and
- 38.62 gigawatt-hours (GWh) of energy savings.

Figure 4 depicts the demand reductions and energy savings from AEP Texas' commercial programs from PY2019 to PY2023, excluding the demand reductions from commercial load management programs. From PY2022 to PY2023, AEP Texas' commercial programs saw a decrease of 2 MWs in demand reductions, bringing the PY2023 demand reductions in-line with PY2019. Additionally, AEP Texas' commercial programs saw a decrease of 11 GWh in energy savings from PY2022 to PY2023.

Figure 4. AEP Texas' Demand Reduction and Energy Savings by Program Year—Commercial Programs, Excluding Load Management, PY2019–PY2023

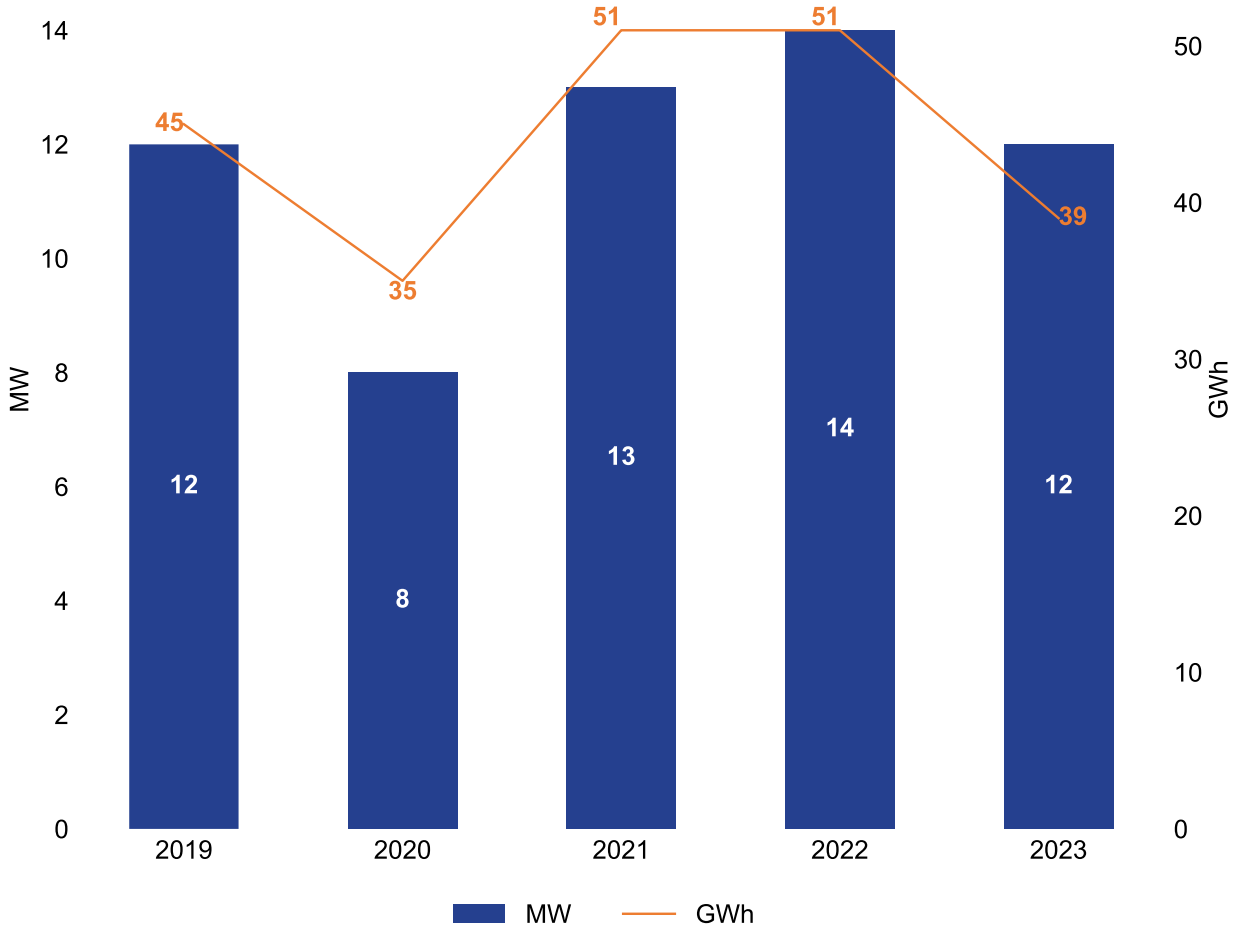
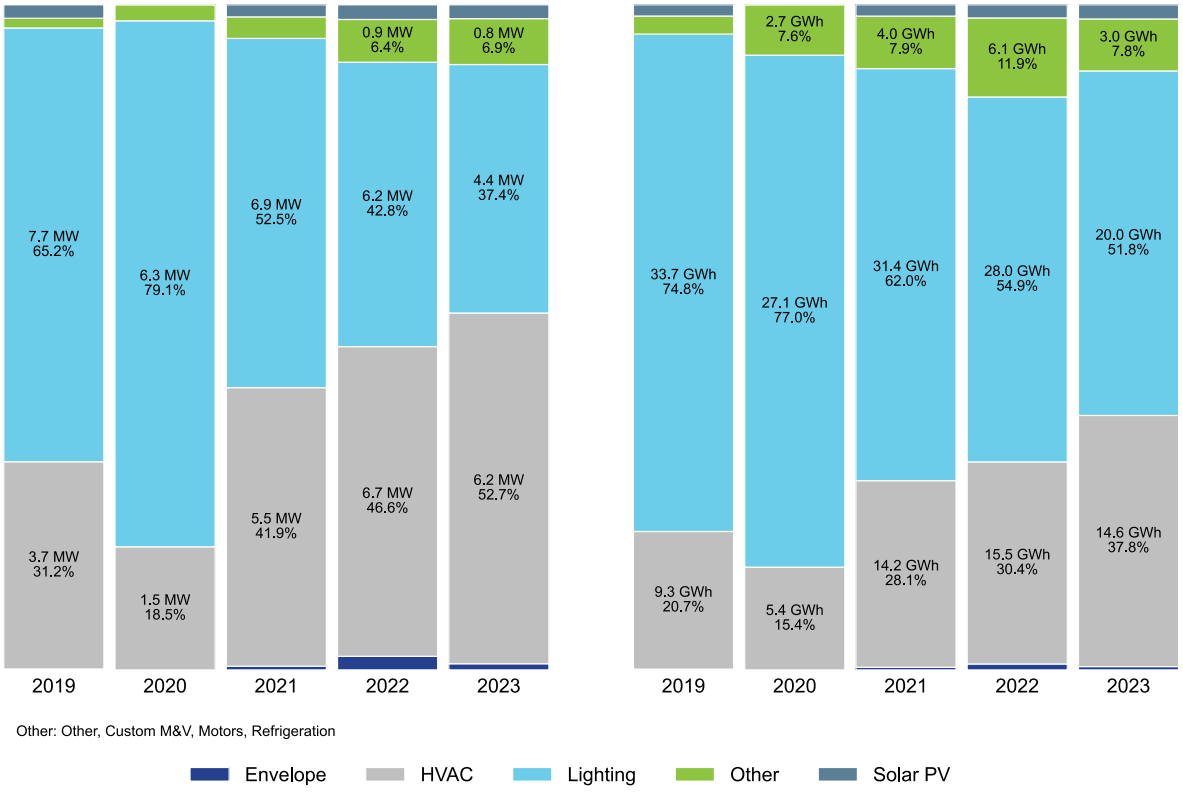


Figure 5 highlights how the proportion of demand reductions and energy savings from *heating, ventilation, and air conditioning* (*HVAC)* measures have continually increased from PY2019 to PY2023, while reductions and savings from *lighting* measures have decreased. *Lighting* measures continue to provide about one-third of demand reductions and one-half of energy savings—37 percent and 52 percent, respectively. Figure 5 also highlights the decrease in *savings from lighting measures* in comparison to *HVAC* measures, indicating that commercial programs are becoming less dependent on *lighting* projects to deliver savings.

- **Recommendation:** The PUCT and EM&V team should discuss with AEP Texas the strategies they have used to successfully increase *HVAC* in their commercial programs, and their future plans to continue diversifying their measures mix beyond *lighting*.

Figure 5. AEP Texas' Demand Reduction and Energy Savings by Measure Category—Commercial Programs, Excluding Load Management, PY2019–PY2023



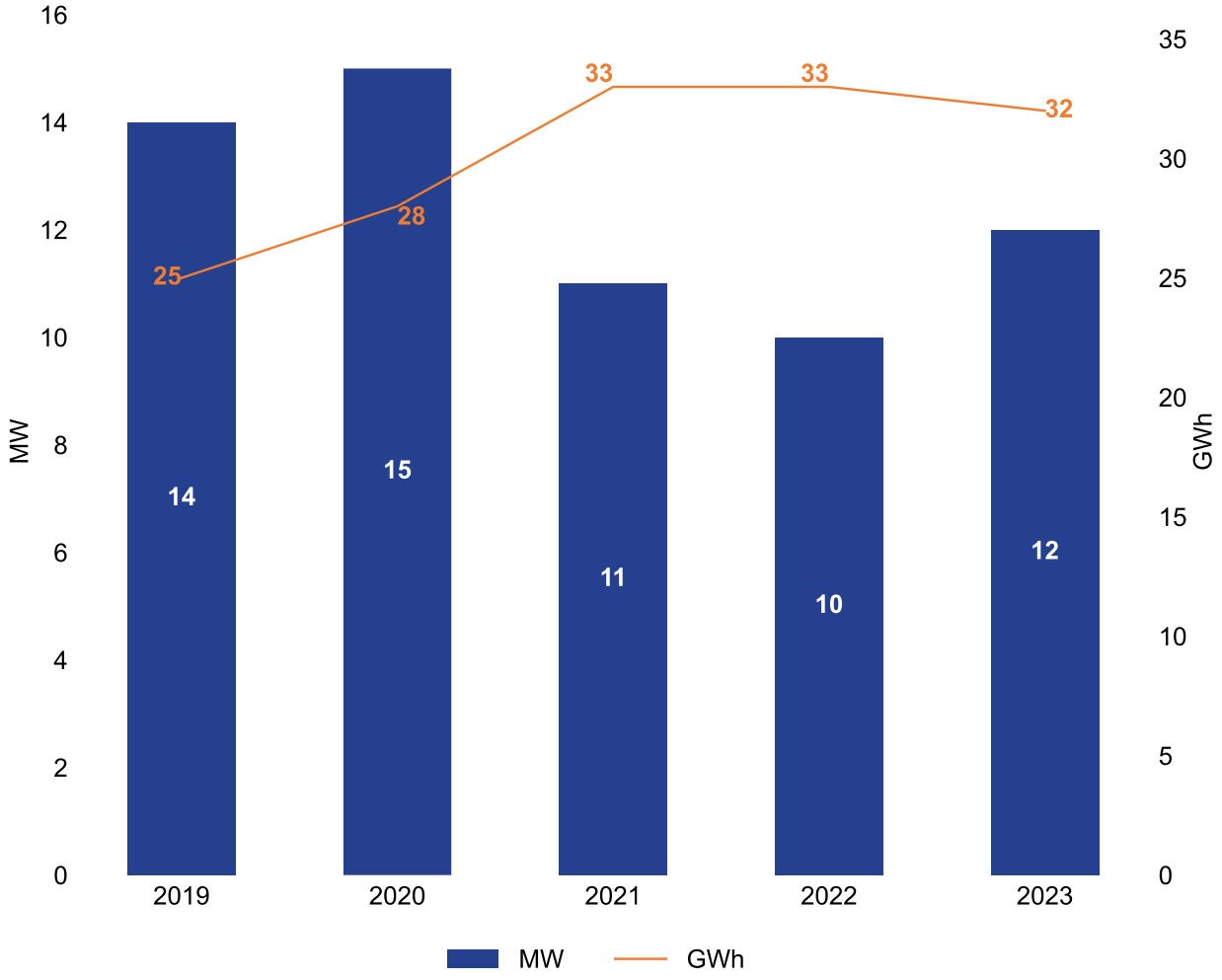
2.1.1.2 Residential Savings

The PY2023 gross savings from AEP Texas' residential sector programs (excluding load management) were:

- 11.688 MW of demand reduction and
- 32.24 GWh of energy savings.

Figure 6 shows an increase in the demand reductions achieved in PY2023 and a decrease in energy savings. Some of the decrease in demand reductions and energy savings for AEP Texas were due to changes in the residential lighting changes to the Energy Independence and Security Act (EISA) backstop in PY2022, new federal standards for HVAC in 2023, and updates to the Texas Technical Reference Manual (TRM) in PY2021 to better align TRM deemed savings with measured savings from the PY2019 consumption analysis.

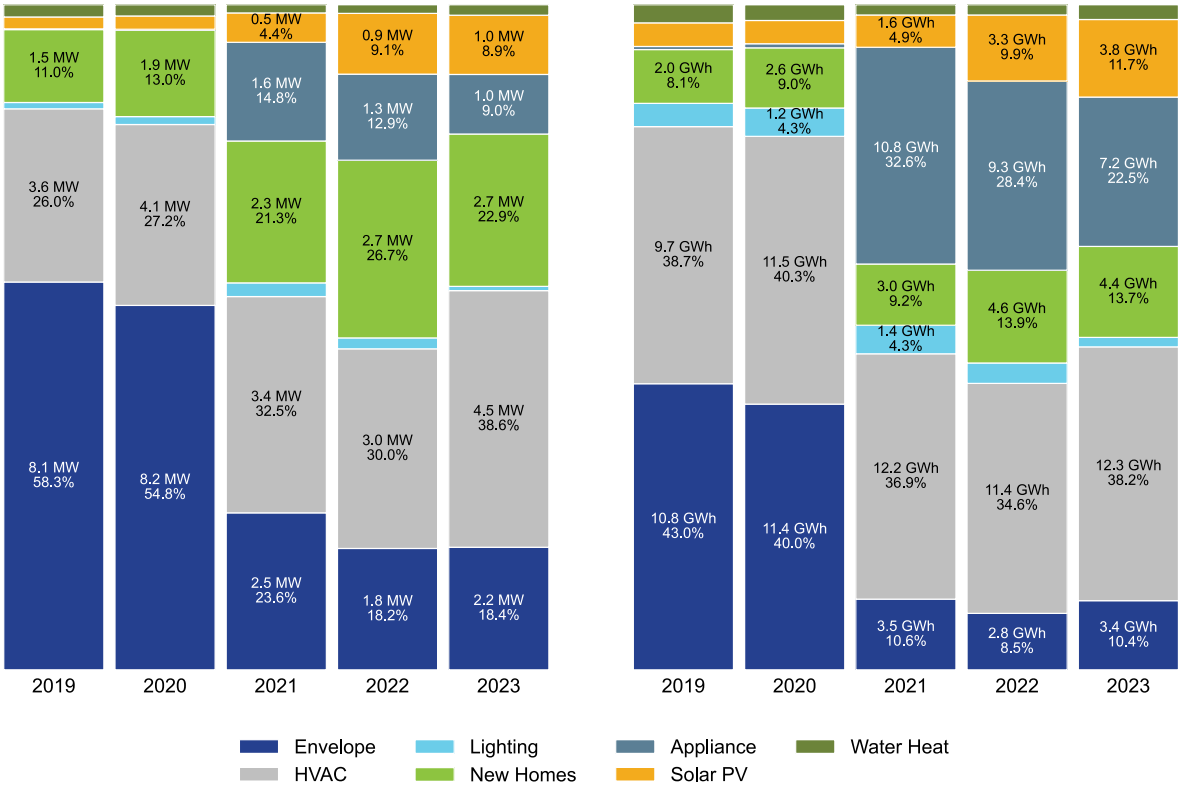
Figure 6. AEP Texas' Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023



For PY2023, AEP Texas' residential demand reductions (excluding load management) and energy savings were primarily derived from *HVAC* measures, at over one-third of both kilowatts (kW) and kilowatt-hours (kWh). Figure 7 shows the breakdown of savings by measure category, establishing *HVAC* measures as the biggest contributor to increased demand reductions and energy savings year over year, followed by *new homes* and *envelope* measures.

- **Recommendation:** The PUCT and EM&V team should discuss with AEP Texas the strategies they have used to successfully increase demand reductions and energy savings from the *HVAC* measure in their residential programs and how they plan to maintain this momentum.

Figure 7. AEP Texas' Demand Reduction and Energy Savings by Measure Category—Residential Programs, Excluding Load Management,PY2019–PY2023



2.1.1.3 Load Management Savings

The PY2023 gross savings from AEP Texas' load management programs were:

- 39.4 MW of demand reduction and
- 0.0394 GWh of energy savings.

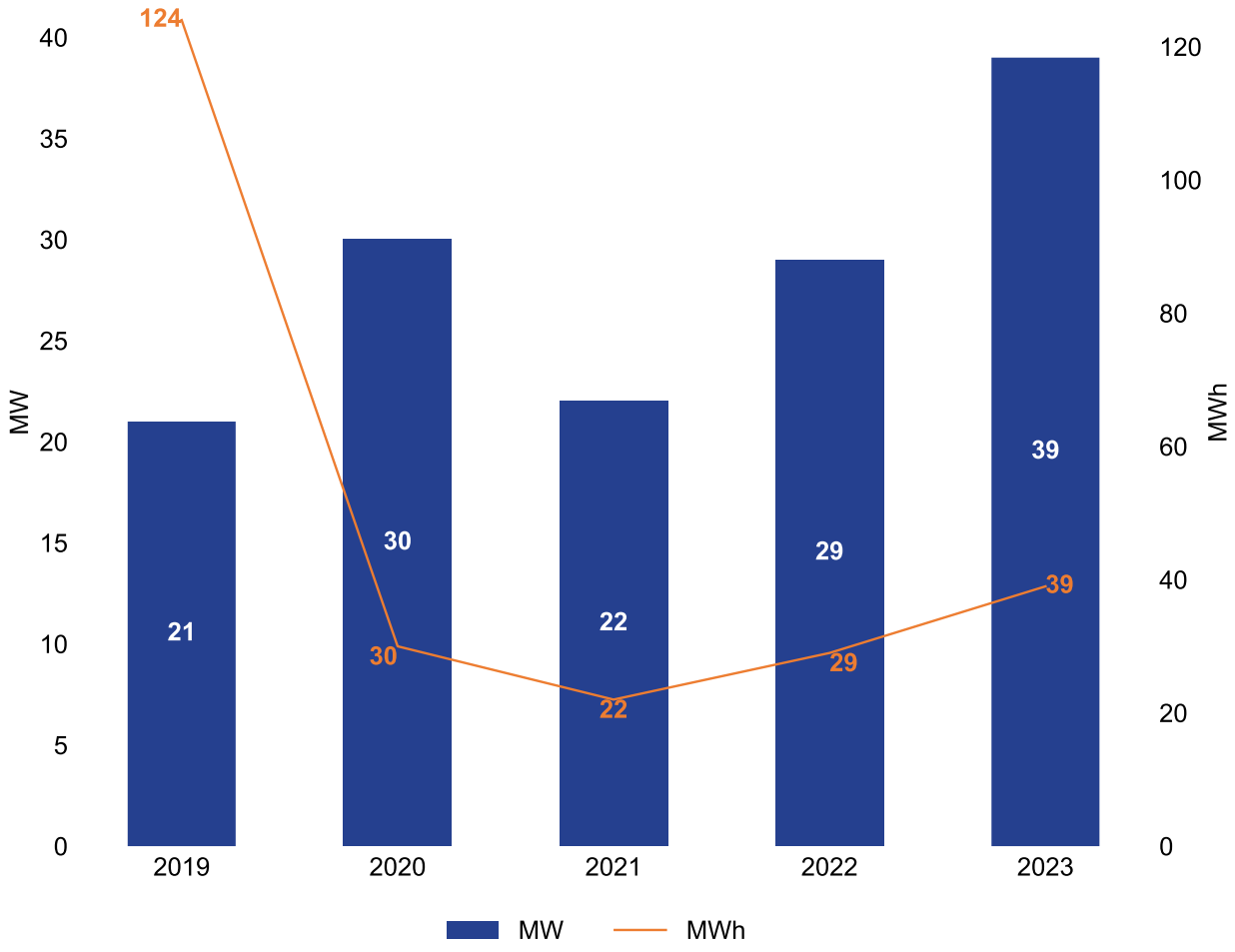
Figure 8 illustrates the demand reductions and energy savings for AEP Texas' load management programs from PY2019-PY2023, showing fairly consistent growth in demand reductions since PY2021. A decrease in program participation contributed to the dip in demand reduction in PY2021. In PY2023, the addition of the winter load management program resulted in a relatively higher increase in demand reductions.

The energy savings derived from load management programs are dependent upon the number of curtailment events called each year and their duration. Except for PY2019, AEP Texas' energy savings from load management programs have followed the pattern of demand reductions over the past few years. In PY2019, there were an increased number of events that resulted in higher energy savings than demand reductions.

Across all eight utilities, AEP achieved the highest cooperation rate—the percent of contracted load relief delivered in response to curtailment events—in its commercial load management program.

- **Recommendation:** The PUCT and EM&V team should discuss with AEP the successful strategies used to achieve a high cooperation rate in their commercial load management program.

Figure 8. AEP Texas' Demand Reduction and Energy Savings by Program Year—Load Management Programs, PY2019–PY2023

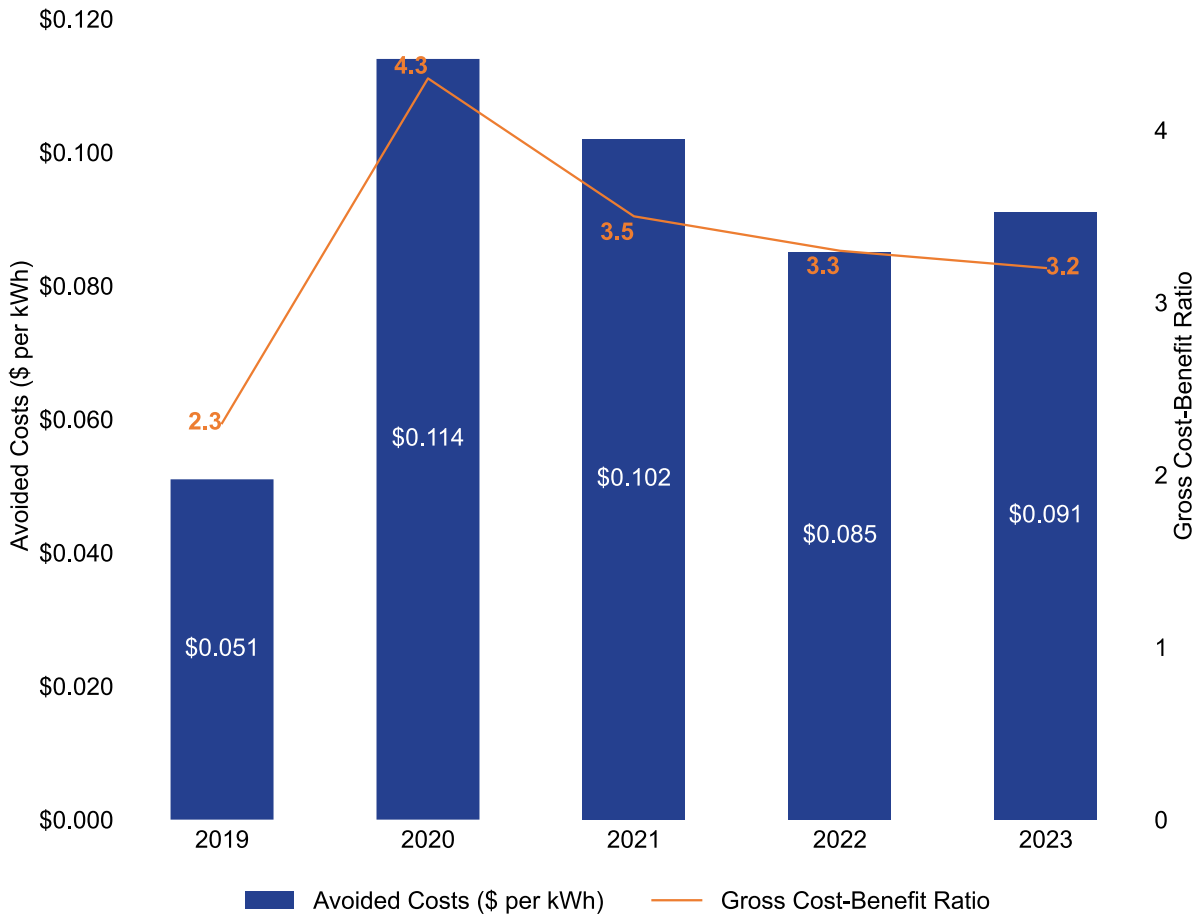


2.1.2 Cost-Effectiveness

Figure 9 overviews the avoided costs and cost-effectiveness ratios for AEP Texas over the last five years.[6]

The overall cost-effectiveness ratio has consistently remained above 2.0 for AEP Texas. While PY2020 saw a high of 4.3, the cumulative cost-effectiveness of AEP Texas' programs remains healthy at 3.2 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy.

Figure 9. AEP Texas' Gross Cost-Benefit Ratio and Avoided Cost by Program Year



2.2 KEY FINDINGS

Section 2.2 presents the evaluated savings and cost-effectiveness results for AEP Texas, both on a portfolio- and program-level. The key findings are summarized first, followed by details for each program with a *high* or *medium* evaluation priority. *Low* evaluation priority programs where claimed savings were only verified through the EM&V database are listed at the end.

[6] IOU program cost-effectiveness tests compare the benefits of the programs to the costs – a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test to assess cost-effectiveness.

2.2.1 Evaluated Savings

AEP Texas' evaluated savings for PY2023 were 62.9 MW in demand reductions and 70.9 GWh in energy savings. The overall portfolio realization rates are approximately 100 percent. AEP Texas was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (see Table 4), supporting healthy realization rates.

Table 1 shows the claimed and evaluated demand reductions for AEP Texas' portfolio and broad customer sector and program categories. Load management results are based on census reviews, and therefore precision calculations are not applicable (N/A).

Table 1. AEP Texas PY2023 Claimed and Evaluated Demand Reductions

Level of analysis	Percentage portfolio savings	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Precision at 90% confidence
Total portfolio	**100.0%**	**62,923**	**62,930**	**100.0%**	**100.0%**
Commercial	18.8%	11,840	11,840	100.0%	18.8%
Residential	16.0%	10,041	10,048	100.1%	16.0%
Low-income	2.6%	1,646	1,646	100.0%	2.6%
Load management*	62.6%	39,396	39,395	100.0%	62.6%

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Table 2 shows the claimed and evaluated energy savings for AEP Texas' portfolio and broad customer sector and program categories for PY2023.

Table 2. AEP Texas PY2023 Claimed and Evaluated Energy Savings

Level of analysis	Percentage portfolio savings	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Precision at 90% confidence
Total portfolio	**100.0%**	**70,898,720**	**70,898,719**	**100.0%**	**N/A**
Commercial	54.5%	38,621,949	38,621,949	100.0%	N/A
Residential	41.2%	29,206,964	29,206,964	100.0%	N/A
Low-income	4.3%	3,030,412	3,030,412	100.0%	N/A
Load management*	0.1%	39,396	39,395	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Program-level realization rates are discussed in the detailed findings subsections; however, it is important to note that these results should only be viewed qualitatively due to the small sample sizes at the utility program level.

In program-level realization rates, we have also included a qualitative rating of *good*, *fair*, and *limited* associated with the level of program documentation received from the utility. AEP Texas received *good* documentation scores for all evaluated programs.

2.2.2 Program Funding and Cost-Effectiveness Results

AEP Texas' total portfolio funding for PY2023 was $16,666,699 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 3.2 (or 3.4, excluding low-income programs[7]).

The more cost-effective programs were the SCORE/CitySmart MTP and the residential SMART Source Solar PV MTP, while the less cost-effective programs were the Winter Load Management SOP and the Commercial Foodservice Pilot MTP.

All of AEP Texas' programs were cost-effective, except for the Commercial Foodservice Pilot MTP. However, the Commercial Foodservice Pilot MTP was first implemented in Q3 of 2023 with no projects completed in PY2023. AEP Texas has reported that there are several completed projects for PY2024 and is expected to pass cost-effectiveness in its second year.

Table 3. AEP Texas Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**3.18**	**3.18**	**2.86**
Total portfolio excluding low-income programs	**3.42**	**3.42**	**3.05**
Commercial	**4.66**	**4.66**	**4.21**
Commercial Solutions MTP	5.31	5.31	4.66
Commercial SOP	4.57	4.57	4.14
CoolSaver A/C Tune-Up MTP	4.02	4.02	3.61
Open MTP	2.90	2.90	2.75
SCORE/CitySmart MTP	6.58	6.58	5.81
SMART Source Solar PV MTP	3.91	3.91	3.95
Residential	**2.88**	**2.88**	**2.50**
CoolSaver A/C Tune-Up MTP	2.57	2.57	2.06
High-Performance New Homes MTP**	5.18	5.18	3.63
Residential SOP	2.13	2.13	1.93

[7] Cost-effectiveness testing for low-income programs uses the Savings-to-Investment ratio as discussed in Appendix C.

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
SMART Source Solar PV MTP	5.67	5.67	5.43
Hard-to-Reach SOP	1.95	1.95	1.95
Low-income*	**2.99**	**2.99**	**2.99**
Targeted Low-Income Energy Efficiency Program*	2.99	2.99	2.99
Load management	**1.69**	**1.69**	**1.69**
Commercial Load Management SOP	1.74	1.74	1.74
Winter Load Management SOP	1.39	1.39	1.39
Pilot	**0.00**	**0.00**	**0.00**
Commercial Foodservice MTP	0.00	0.00	0.00

* The low-income program is evaluated using the Savings-to-Investment Ratio (SIR).

**Net savings for the High-Performance New Homes MTP will be updated in the final version of this report based on net-to-gross research conducted as part of the PY2023 EM&V scope.

2.3 SAVINGS DIFFERENCES

As discussed above, utilities are provided the opportunity to adjust savings at the project level based on interim EM&V findings.

Table 4 summarizes savings differences identified by the EM&V team, which AEP Texas also used to adjust their claimed savings[8]. AEP Texas adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in their June 1st Energy Efficiency Cost Recovery (EECRF) filing.

Table 4. Claimed Savings Adjustments by Program

Program	EM&V demand claimed savings adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Commercial Solutions MTP	-2.25	-8,410.00
Commercial SOP	-9.04	-25,875.79
CoolSaver A/C Tune-Up MTP (Residential)	-0.04	-154.00
High-Performance New Homes MTP	-2.49	1,707.30
Open MTP	-21.00	-32,303.00
SCORE/CitySmart MTP	-12.52	-27,152.00
Total	**-47.34**	**-92,187.49**

[8] The EM&V team requests that utilities adjust projects when evaluated and claimed savings differ by more than five percent.

2.4 DETAILED FINDINGS—COMMERCIAL

2.4.1 Commercial Solutions Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
1.9%	1,192	1,192	100.0%	8.7%	6,164,045	6,164,045	100.0%	Good

Completed desk reviews*	On-site M&V visit
7	3

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial Solutions MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for two of the projects as both projects had adjustments greater than five percent. AEP Texas accepted the evaluated results and matched the claimed savings to those of the evaluations for the two projects, resulting in a 100 percent final program realization rate for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 11-1-1-2-61971: A retail and office location installed an exterior lighting retrofit of a shared parking lot. During the desk review and on-site M&V visit, the EM&V team identified one installed fixture type that was not listed on the DesignLights Consortium® (DLC) qualified product list (QPL). This adjustment decreased demand reductions and resulted in a realization rate of 78 percent. The adjustments also decreased energy savings and resulted in a realization rate of 78 percent.

Participant ID 11-1-1-3-134081: A mall installed four new packaged air conditioning (AC) units. During the desk review, the EM&V team adjusted the calculation to use the older rating baseline (energy efficiency rating 1 (EER1)/season energy efficiency rating 1 (SEER1)(EER1/SEER1) for the AC and heat pump equipment under 5.4 tons and adjusted the capacity to match the rated capacities in the calculation. This adjustment decreased demand reductions and resulted in a realization rate of 66 percent. The adjustment also decreased energy savings and resulted in a realization rate of 92 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the seven projects that had desk reviews completed because sufficient documentation was provided for the sites. Most of these were regular lighting projects where documentation included invoices, QPL qualifications, equipment specifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment. A couple of projects were missing invoices. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

2.4.2 Commercial Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
2.5%	1,548	1,548	100.0%	8.6%	6,128,668	6,128,668	100.0%	Good

Completed desk reviews*[9]	On-site M&V visit
8	4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial SOP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for six projects. Four projects had adjustments of less than five percent compared to the originally claimed savings, while the other two projects had adjustments greater than five percent compared to the originally claimed savings. AEP Texas accepted the evaluated results and matched the claimed savings to those of the evaluations for the six projects; therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 11-4-1-2-9039: An office and manufacturing building completed an LED lighting retrofit. During the desk review, the EM&V team adjusted the fixture wattage of one LED fixture based on the DLC QPL. The control device was also removed from the savings calculations for this fixture. These adjustments slightly decreased demand reductions and resulted in a realization rate of 98 percent. The adjustments also slightly decreased energy savings and resulted in a realization rate of 96 percent.

[9] Two projects were located on the same campus and were sampled separately, although they are reported under one EM&V participant.

Participant ID 11-4-1-2-77360: A high school completed an early retirement retrofit for two air-cooled chillers. During the desk review and on-site M&V visit, the EM&V team adjusted the cooling capacity of the new units to match the Air Conditioning, Heating, and Refrigeration Institute (AHRI) tested capacity and the age of the existing units based on the serial number of the existing units. These adjustments decreased demand reductions and resulted in a realization rate of 91 percent. The adjustments also decreased energy savings and resulted in a realization rate of 92 percent.

Participant ID 11-4-1-2-79341: A secondary school installed a new air-cooled chiller in place of an existing unit. During the desk review and on-site M&V visit, the EM&V team adjusted the cooling capacity of the new unit to match the AHRI-tested capacity. This adjustment decreased demand reductions and resulted in a realization rate of 82 percent. The adjustments also slightly decreased energy savings and resulted in a realization rate of 97 percent.

Participant ID 11-4-1-2-79355: An elementary school completed an early retirement retrofit of air-cooled chillers and AC units and installed new motors and variable frequency drives (VFD) on the air handling units. During the desk review and on-site M&V visit, the EM&V team adjusted the baseline efficiencies of the existing AC units to match the prescribed assumptions in the TRM. The EM&V team also adjusted the fan motor hours of operation, load factor, and baseline motor efficiency based on the assumptions in the TRM. Overall, these adjustments slightly increased demand reductions and resulted in a realization rate of 101 percent. The adjustments also slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 11-4-1-2-79881: An elementary school completed an early retirement retrofit of air-cooled chillers and AC units and installed new motors and VFDs on the air handling units. During the desk review and on-site M&V visit, the EM&V team adjusted the baseline efficiencies of the existing AC units to match the prescribed assumptions in the TRM. The EM&V team also adjusted the fan motor hours of operation, load factor, and baseline motor efficiency based on the assumptions in the TRM. Overall, these adjustments slightly increased demand reductions and resulted in a realization rate of 101 percent. The adjustments also slightly increased energy savings and resulted in the realization rate rounding to 100 percent.

Participant ID 11-4-1-3-64925: A retail building installed new lighting and HVAC units for a major renovation of a building. During the desk review, the EM&V team adjusted the building type for both the *lighting* and *HVAC* measures based on the building description. Additionally, the EM&V team adjusted the efficiencies of the HVAC equipment to the newer rating baselines (EER2/SEER2) and adjusted the capacity to match the AHRI-rated value. Lastly, the EM&V team identified one installed fixture that was not listed within the DLC QPL. Overall, these adjustments slightly decreased demand reductions and resulted in a realization rate of 96 percent. The adjustments also decreased energy savings and resulted in a realization rate of 97 percent.

Documentation Score

The EM&V team verified key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the eight projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included invoices, QPL qualifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. One project had missing photos, and another project had no post-inspection. Overall, the EM&V team assigned a program documentation score of *good*.

2.4.3 SCORE/CitySmart Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
4.1%	2,579	2,579	100.0%	14.7%	10,419,334	10,419,334	100.0%	Good

Completed desk reviews*	On-site M&V visit
8	4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 SCORE/CitySmart MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for two projects as both projects had an adjustment of greater than five percent. AEP Texas accepted the evaluated results and matched the claimed savings to those of the evaluations for the two projects with significant adjustments. Therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 11-1-1-2-63172: A high school replaced air-cooled rooftop HVAC units. During the desk review and on-site M&V visit, the EM&V team calculated the savings using the EER1/SEER1 version of the calculator because the newly installed units did not have EER2/SEER2 AHRI ratings. This adjustment decreased demand reductions and resulted in a realization rate of 93 percent. The adjustment also slightly decreased energy savings and resulted in a realization rate of 99 percent.

Participant ID 11-1-1-3-66758: A new construction high school installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted the exterior lighting zone because the school was located in a primarily residential area. The EM&V team also adjusted three lighting fixture assumptions; two fixtures were identified as non-qualified, and the fixture wattage on the other was adjusted to match the DLC QPL listing. Overall, these adjustments decreased demand reductions and resulted in a realization rate of 78 percent. The adjustments also decreased energy savings and resulted in a realization rate of 83 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications, and AHRI certifications) for the eight projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation included invoices, QPL qualifications, equipment specifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment, which are significant efforts by the utility to verify equipment conditions and quantities. A couple of projects were missing specification sheets and invoices. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

2.4.4 Open Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
2.2%	1,354	1,354	100.0%	6.9%	4,915,529	4,915,529	100.0%	Good

Completed desk reviews*	On-site M&V visit
8	4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Open MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for five projects. Two projects had an adjustment of less than five percent, while the other three projects had an adjustment of greater than five percent compared to the originally claimed savings. AEP Texas accepted the evaluated results and matched the claimed savings to those of the evaluations for the projects with significant adjustments. Therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 11-1-1-2-14804: A warehouse completed an interior and exterior LED lighting retrofit. During the desk review, the EM&V team identified that the baseline equipment had daylighting sensors, but the sensors were not replaced. This adjustment decreased demand reductions and resulted in a realization rate of 94 percent. The adjustment also decreased energy savings and resulted in a realization rate of 95 percent.

Participant ID 11-1-1-2-62609: A retail store in a strip mall completed an interior LED lighting retrofit. During the desk review, two fixtures were identified as non-operating in the baseline equipment, and two 8-lamp fixtures were adjusted to four 4-lamp fixtures. These adjustments slightly decreased demand reductions and resulted in a realization rate of 95 percent. The adjustments also slightly decreased energy savings and resulted in a realization rate of 95 percent.

Participant ID 11-1-1-2-78287: A retail building completed an interior LED lighting retrofit. During the desk review, the EM&V team adjusted the baseline ballast factor on fluorescent lighting to a normal ballast factor. This adjustment decreased the demand reductions and resulted in a realization rate of 95 percent. The adjustments also decreased the energy savings and resulted in a realization rate of 95 percent.

Participant ID 11-1-1-2-79643: A warehouse completed an interior and exterior LED lighting retrofit. During the desk review, the EM&V team adjusted an efficient LED fixture wattage from 163 W to 164 W based on the DLC QPL. This adjustment slightly decreased the pe demand reductions and resulted in a realization rate that rounded to 100 percent. The adjustments also decreased the energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 11-1-1-3-66050: A motel installed new weatherstripping around all exterior doors. During the desk review and on-site M&V visit, the EM&V team identified doors that had partial, existing, functional weatherstripping. The EM&V team adjusted the calculation so that the gap was measured based on the existing conditions of the weatherstripping. These adjustments decreased the demand reductions and resulted in a realization rate of 60 percent. The adjustments also decreased the energy savings and resulted in a realization rate of 60 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications, and AHRI certifications) for all the projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation included invoices, QPL qualifications, equipment specifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment, which are significant efforts by the utility to verify equipment conditions and quantities. Most of the lighting projects were missing specification sheets and certifications of the installed fixtures that were identified through the model numbers. A couple of projects were missing inspection notes and photos, although they were not critical to the evaluation. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

2.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. Therefore, the scope and related findings in the following sections are limited. All residential programs and subprograms included in the consumption analysis received a tracking system review for program impacts, which included verification of claimed savings against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

2.5.1 High-Performance New Homes Market Transformation Program (MTP)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
4.3%	2,695	2,702	100.3%	6.4%	4,551,687	4,551,687	100.0%	Good

Completed desk reviews*
5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 High-Performance New Homes MTP evaluation efforts focused on desk reviews. The number of completed desk reviews for this program is listed above. Five desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team adjusted the total claimed savings for three projects. The three projects had adjustments of less than five percent compared to the originally claimed savings, and AEP Texas did not adjust to match the evaluated savings. Therefore, the final program realization rate is 100.3 percent and 100.0 percent for kilowatt and kilowatt-hour, respectively. Further details of the EM&V findings are provided below.

During the desk review process, the EM&V team identified substantial differences between the savings reported in the documentation provided and the ex-ante savings reported by the utility for all five of the sampled projects. After discussions with the EM&V team, the implementer identified a program-wide error in their system, causing the tracking system to report different ex-ante savings than calculated in the documentation, affecting all projects reported in the High-Performance New Homes MTP for PY2023. The EM&V team received corrected data from the implementer and evaluated savings using the new data, resulting in a slight adjustment to three projects.

Documentation Score

The EM&V team was able to verify key inputs and assumptions for the five projects that had desk reviews. Project documentation at these sites included a Home Energy Rating System (HERS) certificate, fuel summary reports, and new equipment specifications. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

2.6 DETAILED FINDINGS—LOAD MANAGEMENT

2.6.1 Commercial Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
55.8%	35,115	35,115	100.0%	0.1%	35,115	35,115	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the AEP Texas Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. In PY2023, the meter data were supplied in 15-minute increments. Load management events occurred on the following dates and times shown by AEP Texas' Southern and Northern territories:

- Southern territory:
  - June 6, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled[10]),
  - June 22, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled), and
  - August 15, 2023, from 1:00 p.m. to 2:00 p.m. (scheduled).

- Northern territory:
  - June 6, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled), and
  - June 22, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled).

There were no unscheduled events in PY2023. The EM&V team received the interval meter data and a spreadsheet that summarized the event-level savings for the nineteen sponsors across 385 sites. Twenty-four sites did not participate in any of the scheduled events. All sponsors had at least one site that curtailed during each event[11].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings provided for all sites. The kilowatt savings for each participating site corresponded to the kilowatt reductions that occurred at the scheduled event (no averaging was necessary because each participating site participated in only one event). The kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

[10] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for ERCOT Energy Emergency Alert Level 2 (EEA2) or system reliability.

[11] See the Report Volume 1 recommendation to monitor load management cooperation rates.

The table above shows the EM&V team (evaluated) and AEP Texas' (claimed) calculated kilowatt and kilowatt-hour savings. No adjustments were made to the program savings; however, a negligible difference in kilowatt and kilowatt-hour was a result of different rounding practices during calculations. The realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

2.6.2 Winter Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
6.8%	4,281	4,281	100.0%	0.0%	4,281	4,281	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the AEP Texas Winter Load Management SOP by applying the TRM calculation methodology to interval meter data. In PY2023, the meter data were supplied in 15-minute increments. Load management events occurred on the following date and time:

- December 16, 2022, from 9:00 a.m. to 10:00 a.m. (scheduled)

There were no unscheduled events in PY2023. The EM&V team received the interval meter data and a spreadsheet that summarized the event-level savings for the four sponsors across nine sites. One site did not participate in the scheduled event. All sponsors had at least one site that curtailed during each event.

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings provided for all sites. The kilowatt savings for each participating site corresponded to the kilowatt reductions that occurred at the scheduled event (no averaging was necessary because each participating site participated in only one event). The kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team (evaluated) and AEP Texas' (claimed) calculated kilowatt and kilowatt-hour savings. No adjustments were made to the program savings. The realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

2.7 DETAILED FINDINGS—CROSS-SECTOR

2.7.1 Residential CoolSaver A/C Tune-Up Market Transformation Program (MTP) (Medium Evaluation Priority)

Sector	Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
Residential	3.2%	1,984	1,984	100.0%	9.5%	6,726,137	6,726,137	100.0%	Good

Completed desk reviews*
5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 CoolSaver A/C Tune-Up MTP evaluation efforts focused on desk reviews and on-site M&V for the residential sector. The number of sampled and completed desk reviews and site visits for this program are listed above.

The EM&V team adjusted the claimed savings for four commercial projects. Three projects had adjustments of less than five percent, while one project had adjustments of greater than five percent compared to the originally claimed savings. AEP Texas accepted the evaluated results and matched the claimed savings to those of the evaluations for all three projects. Therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 11-1-1-2-59135: The project included a tune-up of a 1.5-ton AC unit for an apartment unit. During the desk review, the EM&V team identified a slight deviation between the claimed and evaluated kilowatt-hour savings due to rounding in the calculation process. Overall, the adjustment resulted in project-level realization rates that rounded to 100 percent for energy savings. However, demand reductions were not impacted by the adjustments, so the demand reductions remained at 100 percent.

Participant ID 11-1-1-2-60610: The project included a tune-up of a 4-ton AC unit for a single-family home. During the desk review, the EM&V team identified a slight deviation between the claimed and evaluated kilowatt-hour savings due to rounding in the calculation process. Overall, the adjustment resulted in a project-level realization rate that rounded to 100 percent for energy savings. However, demand reductions were not impacted by the adjustments, so the demand reductions remained at 100 percent.

Participant ID 11-1-1-2-72805: The project included a tune-up of a 2-ton AC unit for an apartment unit. During the desk review, the EM&V team adjusted the cooling capacity of the unit to match the documentation and identified a slight deviation between the reported and evaluated return and supply enthalpies. Overall, the adjustment resulted in a project-level realization rate that rounded to 100 percent for energy savings. However, demand reductions were not impacted by the adjustments, so the demand reductions remained at 100 percent.

Participant ID 11-1-1-2-73942: The project included a tune-up of a 2.5-ton AC unit for an apartment unit. During the desk review, the EM&V team adjusted the cooling capacity of the unit to match the documentation and identified a slight deviation between the reported and evaluated return and supply enthalpies. These adjustments slightly decreased demand reductions and resulted in a realization rate of 95 percent. The adjustments also decreased energy savings and resulted in a realization rate of 94 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions, including the project tune-up enhancements and the existing equipment specifications for all sampled units. Project documentation included an M&V plan, invoices, nameplate photos, and a data collection spreadsheet. It is noted that the documentation submitted did not meet the upgraded requirements for the tune-up program for next year. Overall, the EM&V team was satisfied with the project documentation provided for the current year and assigned a program documentation score of *good.*

2.8 DETAILED FINDINGS—PILOT

2.8.1 Commercial Foodservice Market Transformation Program (MTP) (Medium Evaluation Priority)

Sector	Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
Residential	0.0%	0	0	100.0%	0.0%	0	0	0.0%	N/A

The PY2023 Commercial Foodservice MTP evaluation was planned to be evaluated, although there were not sufficient projects. The EM&V team did not assess ex-ante claimed energy and demand savings.

2.9 SUMMARY OF LOW EVALUATION PRIORITY PROGRAMS

Table 5 summarizes claimed savings for AEP Texas' *low* evaluation priority programs in PY2023, including the programs' overall contribution to portfolio savings. *Low*-priority programs' claimed savings were verified against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

Table 5. PY2023 Claimed Savings (Low Evaluation Priority Programs)

Program	Contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)
CoolSaver A/C Tune-Up MTP (commercial)	7.8%	4,920	4,920	100.0%	14.4%	10,173,371	10,173,371	100.0%
SMART Source Solar PV MTP (commercial)	0.4%	246	246	100.0%	1.2%	821,001	821,001	100.0%
SMART Source Solar PV MTP (residential)	1.7%	1,041	1,041	100.0%	5.3%	3,759,653	3,759,653	100.0%

* Tracking system reviews conducted for each residential program included in the residential consumption analysis are not shown in this table.

3.0 CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC IMPACT EVALUATION RESULTS

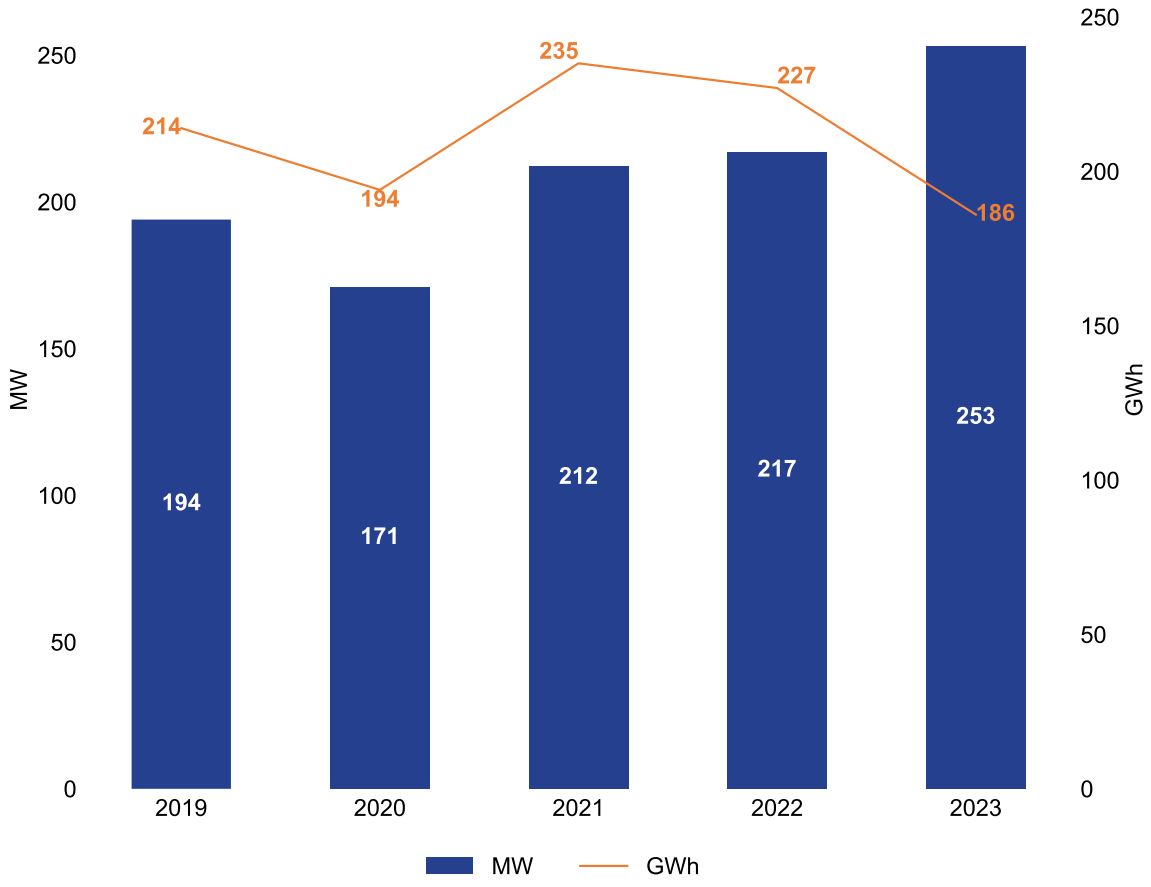
3.1 YEAR-OVER-YEAR COMPARISONS

This section provides a trend analysis for CenterPoint Energy Houston Electric's (CenterPoint) programs' performances during PY2019 through PY2023. This trend analysis provides insight into the PY2023 results included in Sections 3.2 through 3.8.

3.1.1 PY2019–PY2023

PY2023 saw decreased energy savings but increased demand reductions across CenterPoint's portfolio (Figure 10). The demand reduction increase was driven by an increase in load management programs, including the addition of a winter load management program in PY2023. New federal standards in *lighting* and *air conditioners* came into effect in PY2023, decreasing energy savings across all utilities.

Figure 10. CenterPoint's Demand Reduction and Energy Savings, PY2019-PY2023



Load management programs achieved 76.8 percent of demand reduction goals for PY2023. (Figure 11, left). CenterPoint has the largest percentage of demand reductions delivered by load management of all of the eight IOUs and is above the ERCOT average percentage of 70.1 percent.[12]

- **Recommendation:** The PUCT and EM&V team should discuss with CenterPoint their reasons for having the largest percentage of demand reductions from load management programs across all the IOUs and if there are plans to increase the percentage of demand reductions from energy efficiency in future program years.

In PY2023, the energy savings (Figure 11, right) for the Commercial Standard Offer Program (SOP) increased significantly from prior levels.

- **Recommendation:** The PUCT and EM&V team should discuss CenterPoint's successful strategies used to increase Commercial SOP participation.

In PY2023, savings from CenterPoint's LI and HTR programs doubled but remained at a lower percentage of portfolio savings than the other ERCOT utilities.

- **Recommendation:** The PUCT and EM&V team should discuss with CenterPoint the opportunities to increase participation in the LI/HTR program.

While CenterPoint has historically had the largest percentage of savings from residential programs across the eight IOUs through its New Homes program—and still does in PY2023, as seen in the Residential MTP category below (Figure 11, right)—the percentage of savings from this program decreased in PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with CenterPoint their future plans to continue to balance retrofit and new construction projects to serve residential customers.

[12] ERCOT, Volume 1, Executive Summary, Figure 4.

Figure 11. CenterPoint's Demand Reduction and Energy Savings by Program Type, PY2019-PY2023[13]

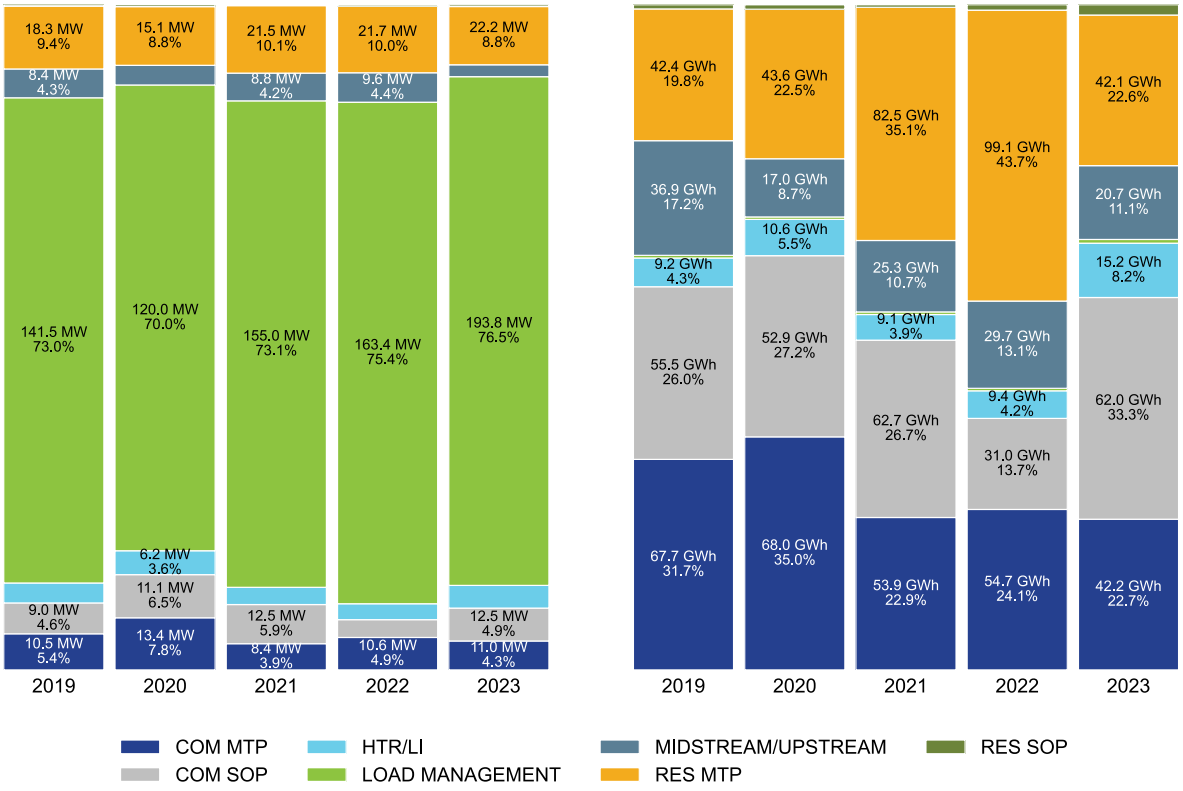


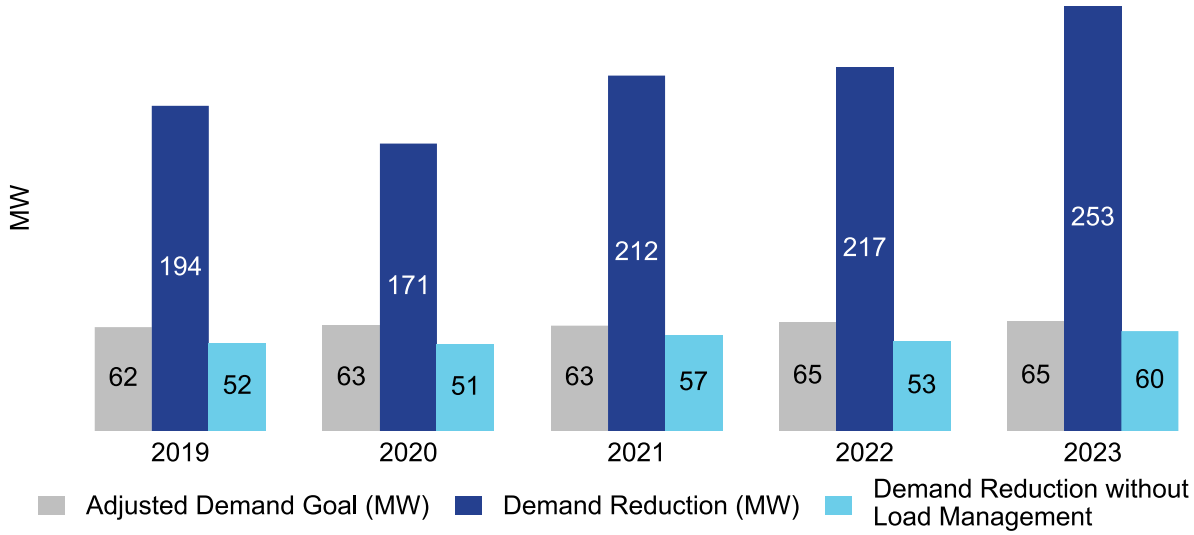
Figure 12 below highlights how CenterPoint has consistently not met its legislated demand reduction goals with energy efficiency alone[14].

- **Recommendation:** The PUCT and EM&V team should discuss CenterPoint's program design strategies to fully meet the legislated energy efficiency goal without load management programs and what challenges they anticipate in doing so, if any.

[13] Demand reductions are reported in megawatts (MW), and energy reductions are reported in gigawatt-hours (GWh).

[14] CenterPoint has had the higher demand reduction goal of four-tenths of one percent of summer weather-adjusted peak demand instead of the previous "floor" of 30 percent of demand growth.

Figure 12. CenterPoint's Legislated Goals and Demand Reduction, PY2019–PY2023



3.1.1.1 Commercial Savings

The PY2023 claimed savings from CenterPoint's commercial sector programs are:

- 24.045 MW of demand reduction and
- 107.25 GWh of energy savings.

From PY2022 to PY2023, CenterPoint's commercial programs saw an increase of 4 MW in demand reduction, the highest amount of the past five years (Figure 13). Similarly, energy savings increased by 15 GWh from PY2022 to PY2023.

Figure 13. CenterPoint's Demand Reduction and Energy Savings by Program Year—Commercial Programs, Excluding Load Management, PY2019–PY2023

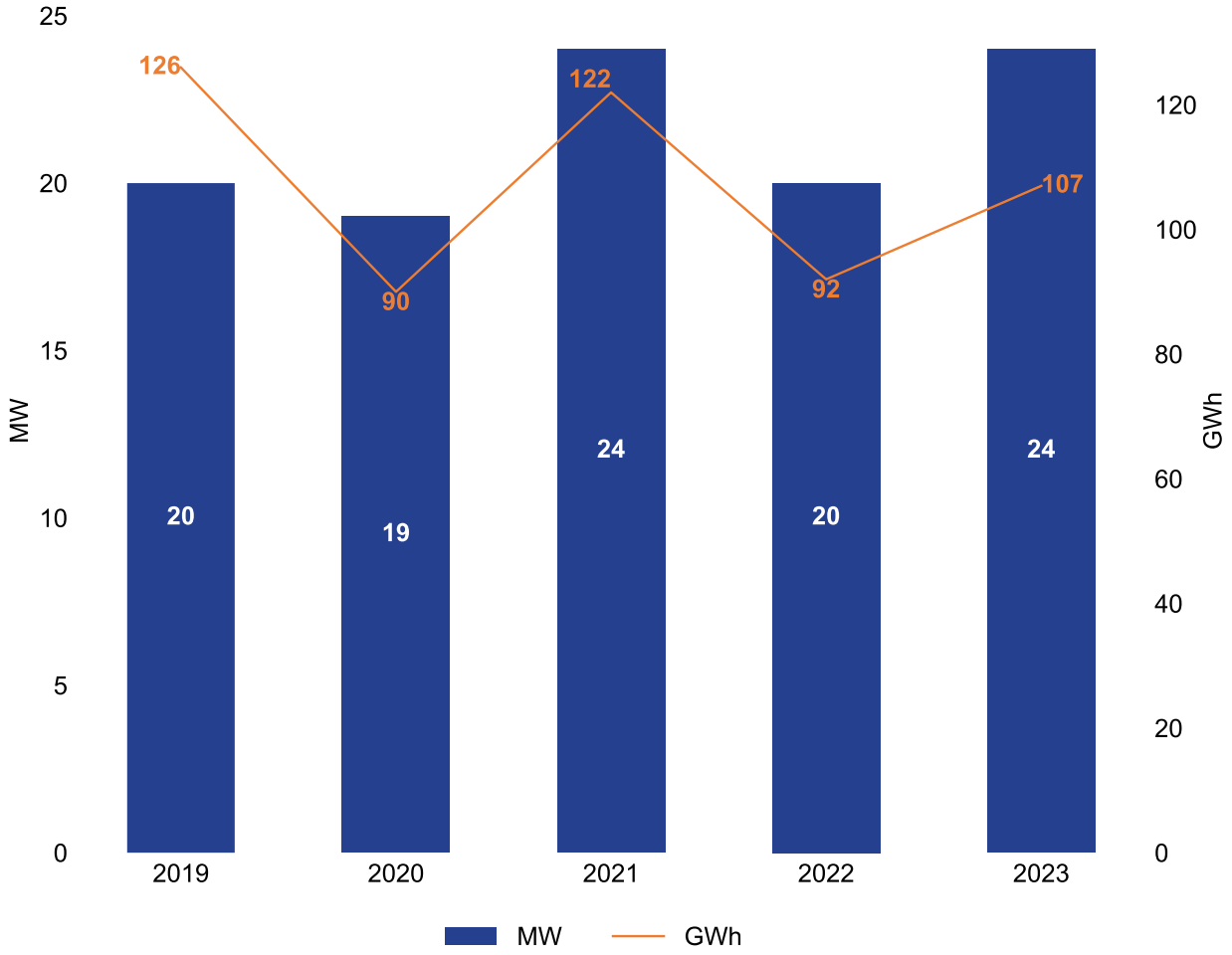
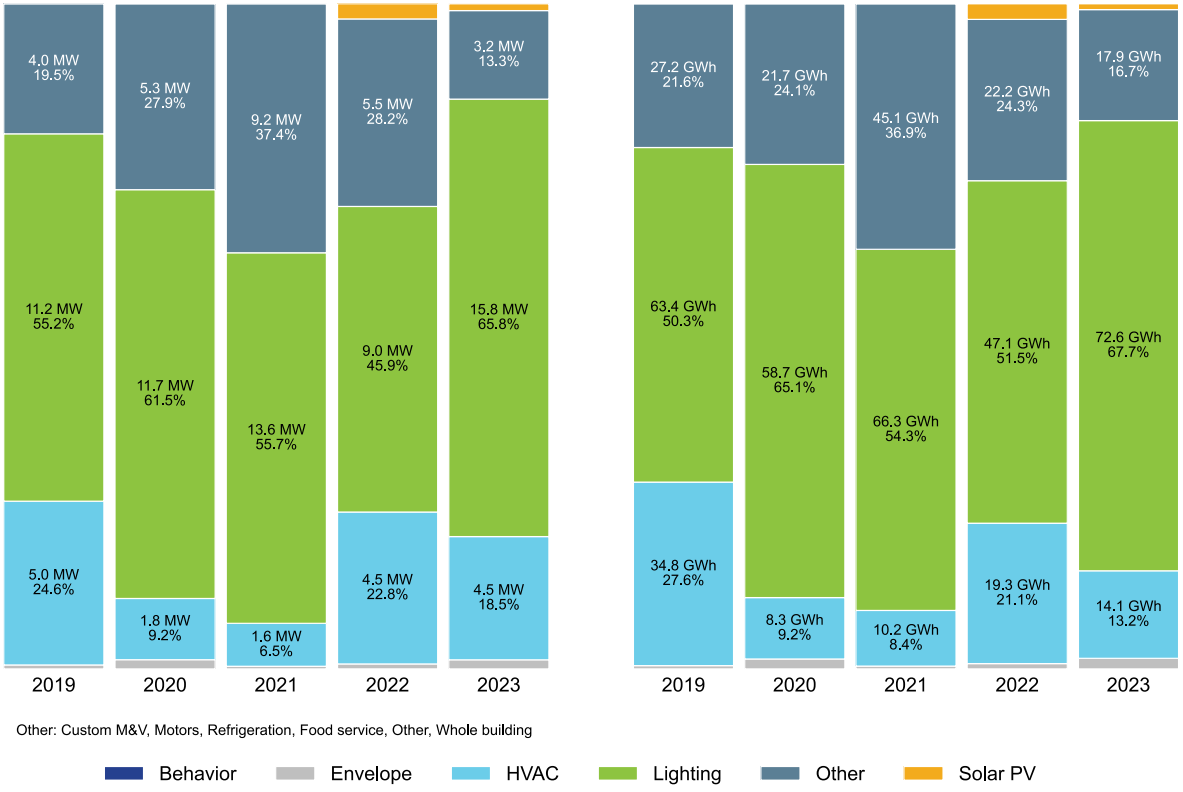


Figure 14 highlights *lighting* measures increased to the highest savings amounts over the past five years for CenterPoint—both the demand reduction and energy savings represented approximately two-thirds of the savings. *HVAC* measures remained level for demand reductions and had a decrease in energy savings (19 GWh to 14 GWh), and the overall proportion of the program savings dropped below 20 percent because of the increase in the *lighting* measure savings.

Figure 14 also highlights that the savings from measures outside of *HVAC* and *lighting* significantly decreased in PY2022 to the lowest amount in the past five years, despite the successful increase of food service and refrigeration measures through the commercial High-Efficiency Food Service MTP.

- **Recommendation:** The PUCT and EM&V team should discuss with CenterPoint the strategies and plans to diversify the commercial measure mix beyond *lighting* and any challenges seen recently in completing *HVAC* commercial projects.

Figure 14. Distribution of CenterPoint's Demand Reduction and Energy Savings by Measure Category—Commercial Programs, Excluding Load Management, PY2019–PY2023



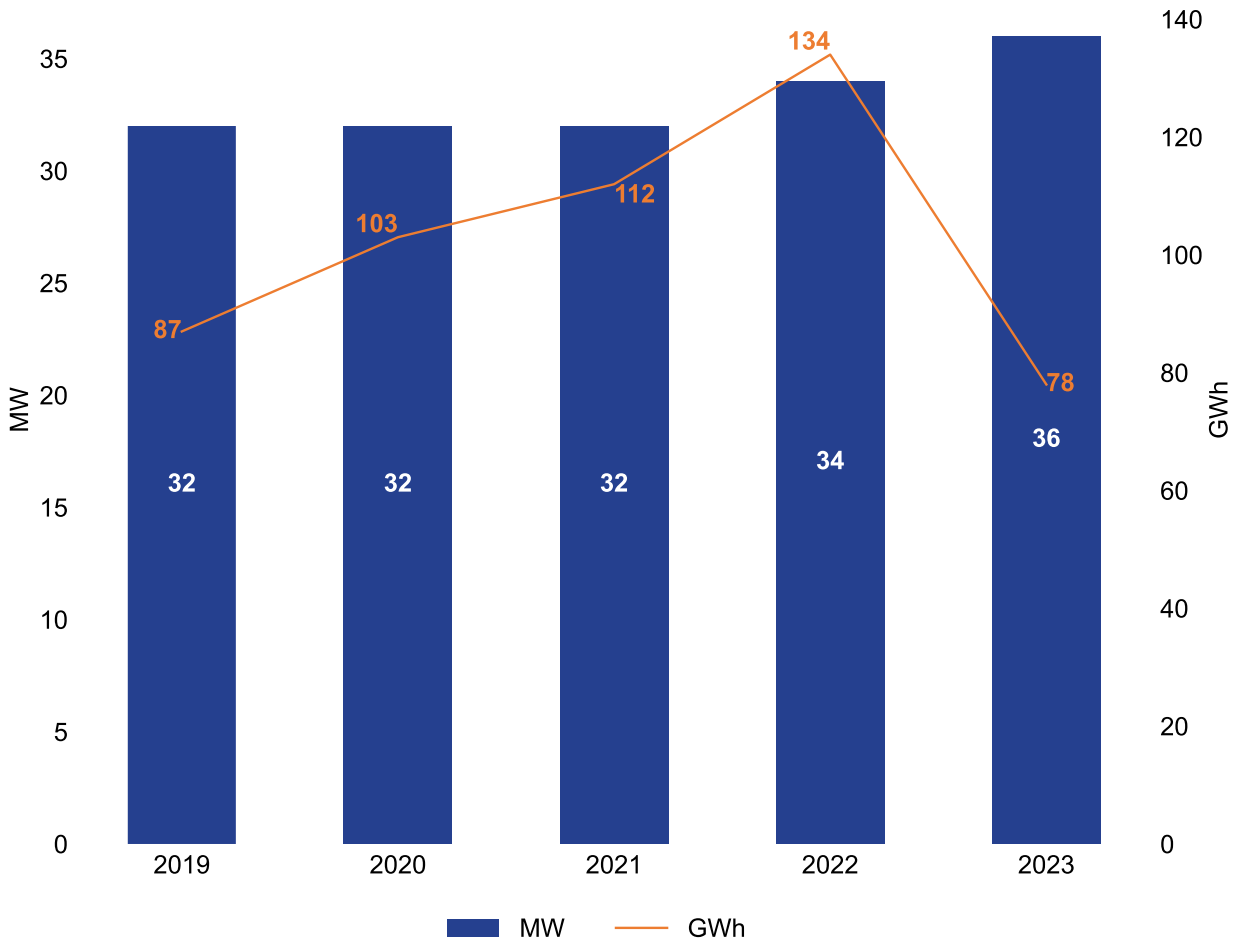
3.1.1.2 Residential Savings

The PY2023 gross savings from CenterPoint's residential sector programs (excluding load management) were:

- 35.531 MW of demand reduction and
- 77.85GWh of energy savings.

In PY2023, demand reductions achieved by CenterPoint's residential programs were the highest in the last five years, while energy savings were the lowest. The main drivers of this decrease were changes to the EISA backstop in PY2022, new federal standards for HVAC in 2023, and updates to the TRM in PY2021. Residential lighting savings decreased significantly in CenterPoint's portfolio in PY2023 to roughly one percent.

Figure 15. CenterPoint's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023

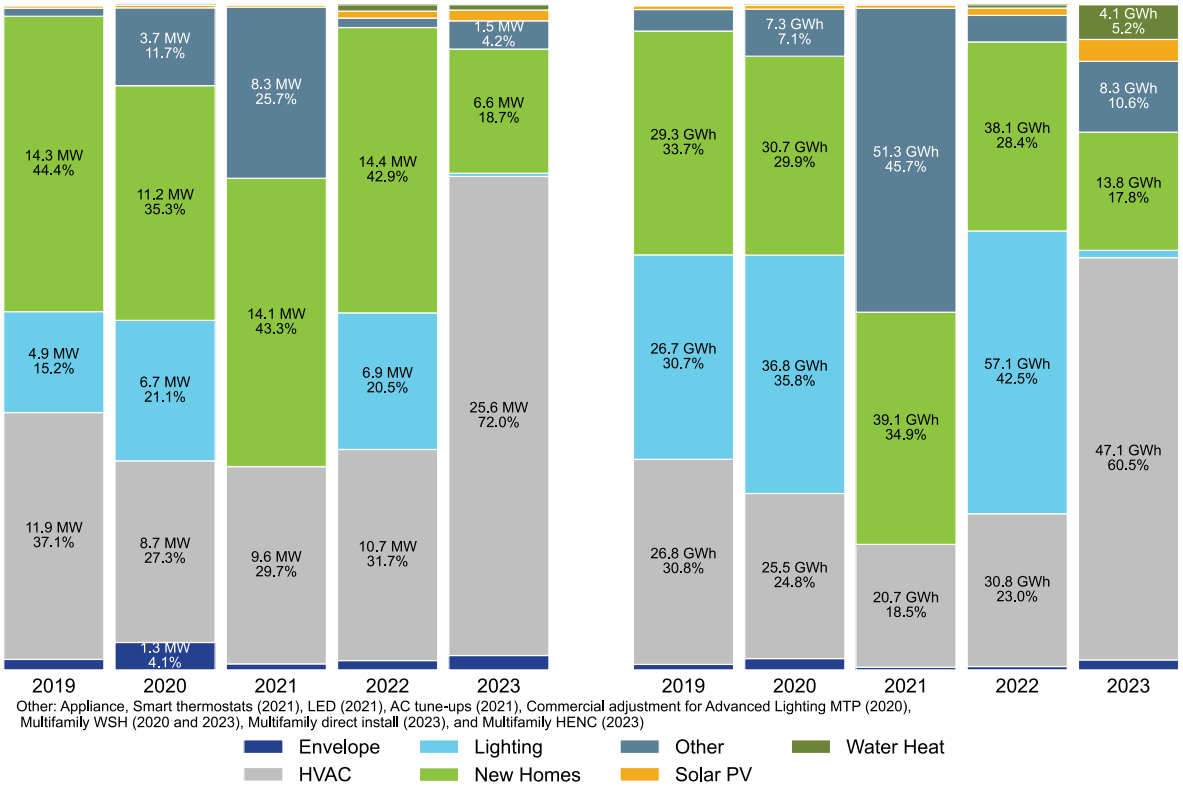


In PY2023, CenterPoint's residential demand reductions (excluding load management) and energy savings were primarily derived from *HVAC* measures representing almost three-fourths of kilowatts and nearly two-thirds of kilowatt-hours.

Figure 16 shows the breakdown of reductions and savings by measure category for PY2019-PY2023, demonstrating that demand reductions from *HVAC* measures more than doubled year over year, followed by *new homes* and *appliance* measures as the second and third largest contributors. Energy savings from *lighting* measures decreased substantially, going from 42.5 percent of energy savings in PY2022 to 1.1 percent in PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with CenterPoint the successful strategies they have employed to increase *HVAC* residential projects.

Figure 16. Distribution of CenterPoint's Demand Reduction and Energy Savings by Measure Category—Residential Programs PY2019–PY2023



3.1.1.3 Load Management Savings

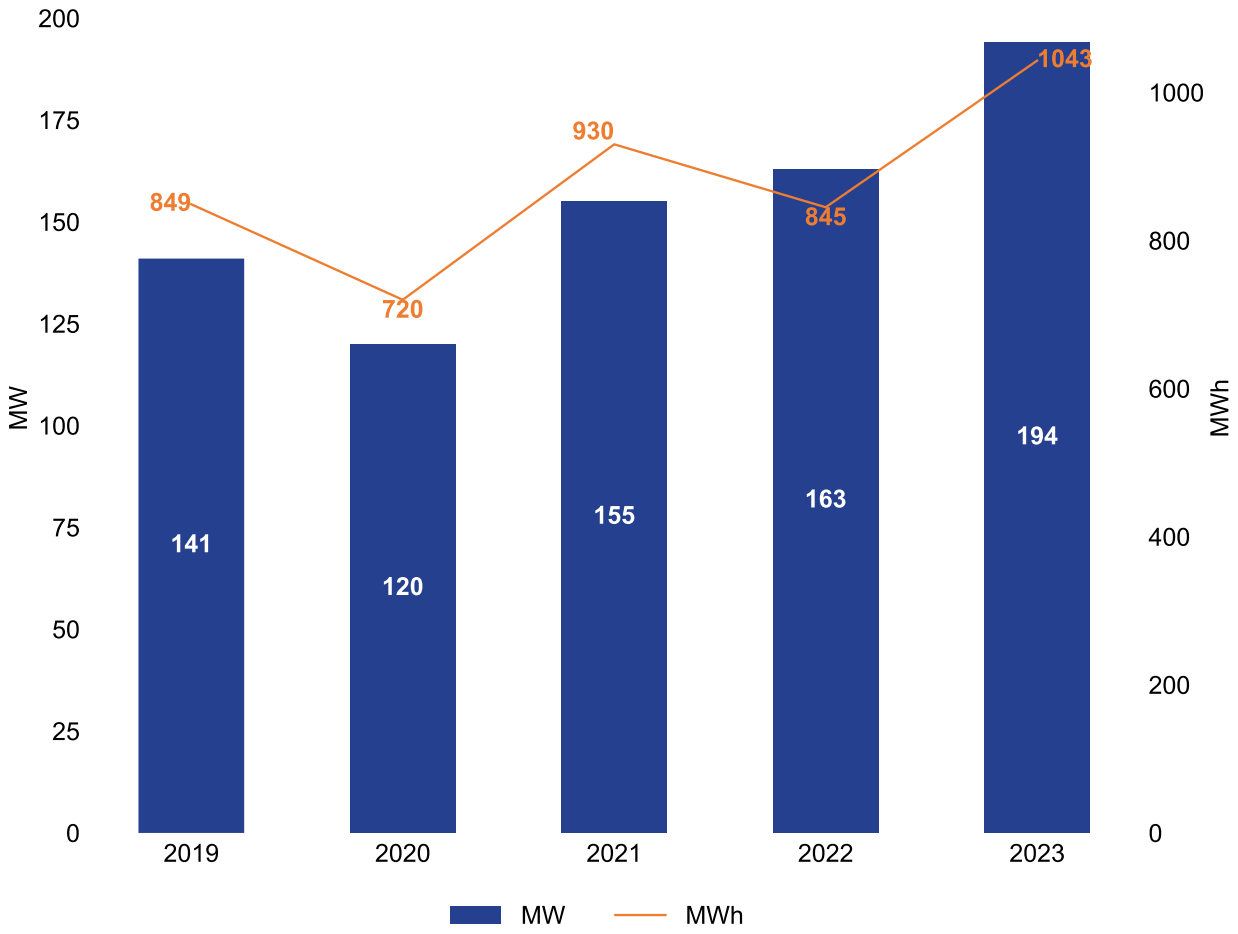
The PY2023 gross savings from CenterPoint's load management programs were:

- 193.79 MW of demand reduction and
- 1.043 GWh of energy savings.

Figure 17 summarizes the demand and energy savings for CenterPoint's load management programs from PY2019-PY2023, showing fairly consistent growth in demand reductions since PY2021. The addition of the winter load management program in PY2023 is the main driver of the relatively higher percentage increase in demand reduction.

Energy savings achieved by load management programs depend upon the number of curtailment events called each year and their duration. Overall, energy savings have followed the demand reduction pattern over the past few years.

Figure 17. CenterPoint's Demand Reduction and Energy Savings by Program Year—Load Management Programs, PY2019–PY2023



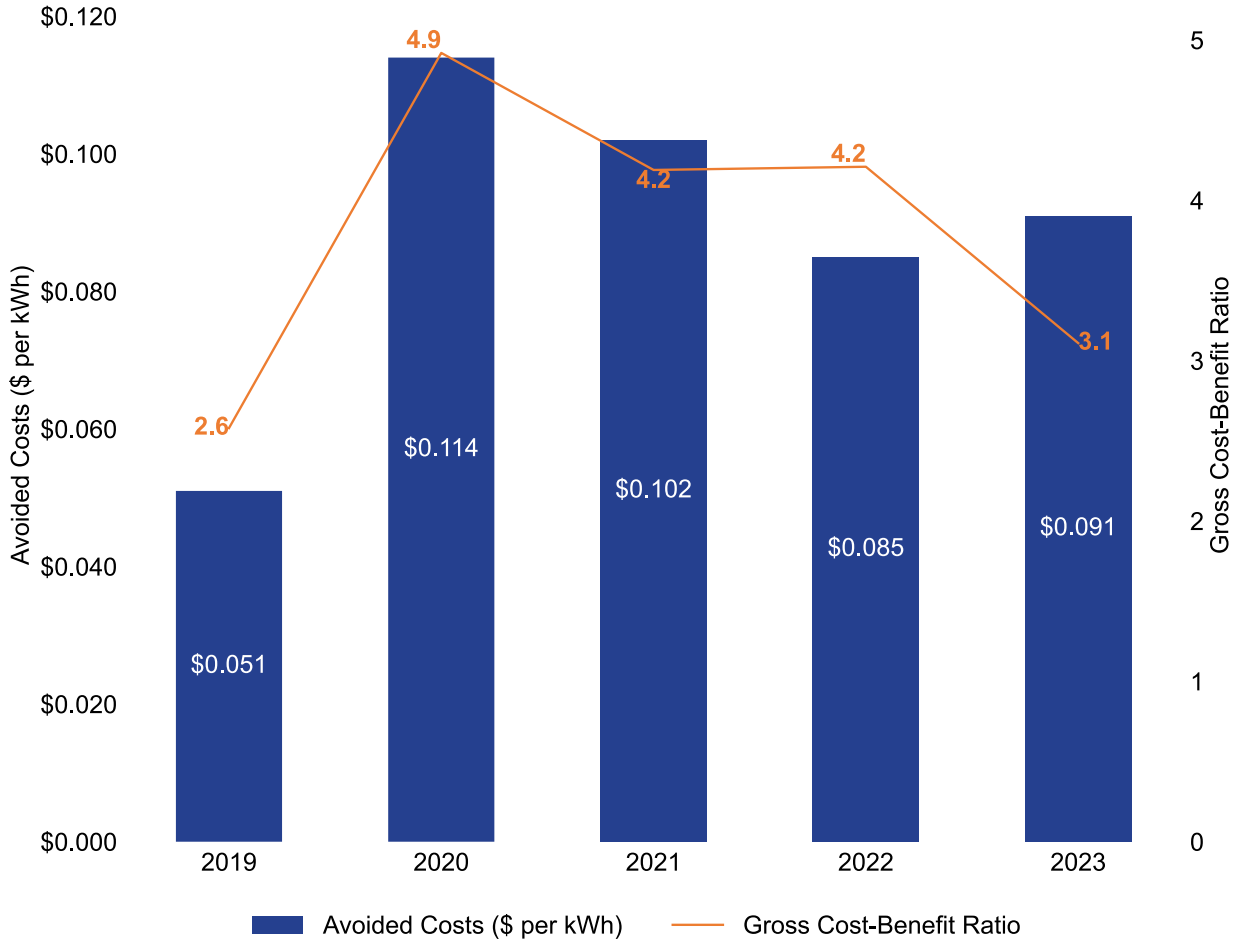
3.1.2 Cost-Effectiveness

Figure 18 overviews the avoided costs and cost-effectiveness ratios for CenterPoint from PY2019-PY2023.[15]

The overall cost-effectiveness ratio for CenterPoint has consistently remained above 2.0 from PY2019-PY2023. While PY2020 saw a high of 4.9, the cumulative cost-effectiveness of CenterPoint's programs remains healthy at 3.1 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy.

[15] IOU program cost-effectiveness tests compare the benefits of the programs to the costs – a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

Figure 18. CenterPoint's Gross Cost-Benefit Ratio and Avoided Cost by Program Year



3.2 KEY FINDINGS

This section presents the evaluated savings and cost-effectiveness results for CenterPoint, both at the portfolio- and program-level. The key findings are summarized first, followed by details for each program's portfolio with a *high* or *medium* evaluation priority. *Low* evaluation priority programs where claimed savings were only verified through the EM&V database are listed at the end.

3.2.1 Evaluated Savings

CenterPoint's evaluated savings for PY2023 were 253.4 MW in demand reductions and 186.1 GWh in energy savings. The overall portfolio realization rates were approximately 100 percent. CenterPoint was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (see Table 9), supporting healthy realization rates.

Table 6 shows the claimed and evaluated demand reductions for CenterPoint's portfolio and broad customer sector and program categories. Residential and load management results are based on census reviews, and therefore, precision calculations are not applicable (N/A).

Table 6. CenterPoint PY2023 Claimed and Evaluated Demand Savings

Level of analysis	Percentage portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate	Precision at 90% confidence
Total portfolio	**100.0%**	**253,362**	**253,362**	**100.0%**	**N/A**
Commercial	9.5%	24,045	24,045	100.0%	N/A
Residential	10.8%	27,293	27,293	100.0%	N/A
Low-income	3.3%	8,238	8,238	100.0%	N/A
Load management*	76.5%	193,786	193,786	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Table 7 shows the claimed and evaluated energy savings for CenterPoint's portfolio and broad customer sector and program categories for PY2023.

Table 7. CenterPoint PY2023 Claimed and Evaluated Energy Savings

Level of analysis	Percentage portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate	Precision at 90% confidence
Total portfolio	**100.0%**	**186,110,161**	**186,110,161**	**100.0%**	**N/A**
Commercial	57.6%	107,251,949	107,251,949	100.0%	N/A
Residential	34.2%	63,603,423	63,603,423	100.0%	N/A
Low-income	7.6%	14,212,152	14,212,152	100.0%	N/A
Load management*	0.6%	1,042,637	1,042,637	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Program-level realization rates are discussed in the detailed findings subsections. However, it is important to note that these results should only be viewed qualitatively due to the small sample sizes at the utility program level.

In program-level realization rates, we have also included a qualitative rating of *good*, *fair*, and *limited* associated with the level of program documentation received from the utility. CenterPoint received *good* documentation scores for all evaluated programs, except the Commercial High-Efficiency Foodservice MTP, which received a *fair* documentation score.

3.2.2 Program Funding and Cost-Effectiveness Results

CenterPoint's total portfolio funding for PY2023 was $39,539,578 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 3.1 (or 3.4, excluding low-income programs).

The more cost-effective programs were the Commercial Retail Products and Services MTP and the Residential and Small Commercial SOP; the less cost-effective programs were the Multifamily MTP Hard-to-Reach program and the Commercial Winter Load Management (Pilot) program. All of CenterPoint's programs were cost-effective in 2023, except for the Multifamily MTP Hard-to-Reach program, with a cost-effective ratio of just under 1.0; the EM&V team will discuss with CenterPoint opportunities to improve the program's cost-effectiveness in the next program year.

Table 8. CenterPoint Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	3.11	3.11	2.69
Total portfolio excluding low-income programs	3.40	3.40	2.90
Commercial	**4.02**	**4.02**	**3.60**
Commercial MTP (SCORE, Healthcare, Data Center)	3.40	3.40	2.99
Commercial SOP	4.66	4.66	4.22
Commercial High-Efficiency Foodservice	2.22	2.22	1.95
Retro-Commissioning MTP	1.88	1.88	1.69
Retail Products and Services MTP	7.51	7.51	6.78
Residential	**3.57**	**3.57**	**2.71**
Residential and Small Commercial SOP	6.29	6.29	5.72
Midstream MTP (HVAC and Pool Pump Distributor)	2.45	2.45	2.06
Retail Products and Services MTP	3.52	3.52	2.82
Multifamily Market Rate MTP	2.20	2.20	1.76
High-Efficiency Homes MTP**	4.31	4.31	3.02
Hard-to-Reach SOP	1.66	1.66	1.66
Multifamily MTP Hard-to-Reach	0.94	0.94	0.94
Low-income*	**3.21**	**3.21**	**3.21**
Targeted Low-Income MTP (Agencies in Action)*	3.21	3.21	3.21
Load management	**1.61**	**1.61**	**1.61**
Commercial Load Management SOP	1.75	1.75	1.75
Commercial Winter Load Management (Pilot)	1.21	1.21	1.21
Residential Load Management SOP	1.58	1.58	1.58

* The low-income program is evaluated using the Savings-to-Investment Ratio (SIR).

**Net savings for the High-Efficiency Homes MTP will be updated in the final version of this report based on net-to-gross research conducted as part of the PY2023 EM&V scope.

3.3 SAVINGS DIFFERENCES

As discussed above, utilities are provided the opportunity to adjust reductions and savings at the project level based on interim EM&V findings. Table 9 summarizes the claimed savings adjustments identified by the EM&V team, which CenterPoint also used to adjust their claimed savings. The EM&V team requests that utilities adjust projects when evaluated and claimed savings differ by more than five percent. CenterPoint adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in their June 1st EECRF filing.

Table 9. Claimed Savings Adjustments by Program

Program	EM&V demand claimed reductions adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Commercial MTP (SCORE, Healthcare, Data Center)	-86.38	-571,901
Commercial SOP	-11.93	-318,662
Commercial High-Efficiency Foodservice MTP	-1.04	-7,266
Retro-Commissioning MTP	-167.08	-1,574,754
REP MTP (Commercial CoolSaver)	-13.21	-13,977
Targeted Low-Income MTP (Agencies in Action)	1.45	1,275.69
Residential & Small Commercial SOP (residential)	0.80	-3,116
CenterPoint Energy High-Efficiency Home MTP	0.01	0.10
Total	**-277.37**	**-2,488,400.21**

3.4 DETAILED FINDINGS—COMMERCIAL

3.4.1 Commercial Market Transformation Program (MTP) (SCORE, Healthcare, Data Center) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
2.9%	7,374	7,374	100.0%	18.1%	33,685,487	33,685,487	100.0%	Good

Completed desk reviews*	On-site M&V visit
20	10

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial MTP (SCORE, Healthcare, Data Center) evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for six projects; three had adjustments of greater than five percent compared to the originally claimed savings, while three had less than five percent. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluations for the projects with significant adjustments; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-68723: A school gym installed LED high bays to replace metal halide fixtures. During the desk review and on-site M&V visit, the EM&V team adjusted the quantity of non-operating fixtures in the calculation to match the quantity in the documentation. This adjustment decreased demand reductions and resulted in a realization rate of 96 percent. The adjustments also decreased energy savings and resulted in a realization rate of 96 percent.

Participant ID 1-2-1-2-68776: A library performed an early replacement of air conditioners and water-cooled chillers. During the desk review and on-site M&V visit, the EM&V team adjusted the chiller full load efficiency to match the rated capacity in the Air Conditioning, Heating, and Refrigeration Institute (AHRI) ratings. This adjustment increased demand reductions and resulted in a realization rate of 159 percent. The adjustment did not affect energy savings, so the realization rate is 100 percent.

Participant ID 1-2-1-2-68856: A junior high school upgraded custom controls. The savings were determined by an M&V method. During the desk review and on-site M&V visit, the EM&V team used the raw data to complete an alternate regression analysis. The regression identified cooling degree days, heating degree days, occupancy, and summer occupancy as independent variables. The daily occupancy for staffing hours was increased, and the variable of occupancy was reduced to 0.25. The evaluation also completed a winter hourly demand model and summer hourly demand model to determine PDPF hour savings. The model identified that the summer peak was reduced more, which varies from the submitted documentation. However, it was more dependent on the hourly occupancy than the temperature. These adjustments decreased demand reductions and resulted in a realization rate of 78 percent. The adjustments also increased energy savings and resulted in a realization rate of 146 percent.

Participant ID 1-2-1-3-104479: A new construction elementary school installed interior and exterior LED lighting. During the desk review, the EM&V team added 250 W of tradeable wattage to the outdoor entry canopies and subtracted it from the outdoor parking areas and drives; this allowed all space types to meet codes and allow for exterior lighting energy savings. That adjustment increased demand reductions and resulted in a realization rate of 113 percent. The adjustment also increased energy savings and resulted in a realization rate of 129 percent.

Participant ID1-2-1-3-105949: A data center installed LED lighting with occupancy sensors to replace fluorescent, metal halide, and halogen lighting. During the desk review, the EM&V team adjusted baseline and retrofit fixture quantities to match the values on the post-inspection form. These adjustments decreased demand reductions and resulted in a realization rate of 99 percent. The adjustments also decreased energy savings and resulted in a realization rate of 99 percent.

Participant ID 1-2-1-3-97775: A middle school installed LED lighting to replace metal halide lighting in one of its gyms. During the desk review, the EM&V team adjusted one fixture quantity to match the quantity in the post-installation photos. Wattage for the same fixture was also adjusted to match the DesignLights Consortium qualified products list (DLC QPL). These adjustments decreased demand reductions and resulted in a realization rate of 99 percent. The adjustments also increased energy savings and resulted in a realization rate of 99 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the 20 projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation included M&V plans, invoices, QPL qualifications, pre-inspection and post-inspection notes, project savings calculators, and photographic documentation of existing and new equipment, which are significant efforts by the utility to verify equipment conditions and quantities. Complete documentation enhances the accuracy and transparency of project savings and the ease of evaluation. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

3.4.2 Commercial Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
5.0%	12,534	12,534	100%	33.3%	62,042,628	62,042,628	100.0%	Good

Completed desk reviews*	On-site M&V visit
18	9

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial SOP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for 11 projects; 9 had adjustments of greater than five percent compared to the originally claimed savings, and 2 had adjustments of less than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluations for the nine projects; therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-65344: A new construction warehouse installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted exterior lighting zones, types, and areas to match information from satellite photos. These adjustments increased demand reductions and resulted in a realization rate of 110 percent. The adjustments also increased energy savings and resulted in a realization rate of 115 percent.

Participant ID 1-2-1-2-65359: A new construction warehouse installed interior and exterior energy-efficient lighting. During the desk review and on-site M&V visit, the EM&V team adjusted exterior lighting zones, types, areas, and quantities to match information from the on-site visit. Interior lighting controls, control types, and space conditioning were also adjusted to match information from the on-site visit. These adjustments increased demand reductions and resulted in a realization rate of 112 percent. The adjustments also increased energy savings and resulted in a realization rate of 117 percent.

Participant ID 1-2-1-2-65363: A new construction warehouse installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted exterior lighting zones, types, areas, and wattages to match information from the documentation. Interior lighting controls, control types, and space conditioning were also adjusted to match information from the post-installation photos and the DLC QPL. These adjustments increased demand reduction savings and resulted in a realization rate of 125 percent. The adjustments also increased energy savings and resulted in a realization rate of 136 percent.

Participant ID 1-2-1-2-65375: A new construction warehouse installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted exterior lighting zones, types, areas, quantities, and wattages to match information from the documentation. Interior lighting controls, control types, and space conditioning were also adjusted to match information from the post-installation documentation. These adjustments increased demand reductions and resulted in a realization rate of 117 percent. The adjustments also increased energy savings and resulted in a realization rate of 123 percent.

Participant ID 1-2-1-2-65441: A new construction warehouse installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted exterior lighting zones, types, and areas to match information from the post-installation documentation. This adjustment increased demand reductions and resulted in a realization rate of 104 percent. The adjustments also increased energy savings and resulted in a realization rate of 105 percent.

Participant ID 1-2-1-2-65497: A convenience store installed an interior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the wattage of one fixture to match the DLC QPL. This adjustment decreased demand reduction savings and resulted in a realization rate of 99 percent. The adjustments also decreased energy savings and resulted in a realization rate of 99 percent.

Participant ID 1-2-1-2-65670: A large retail store in a strip mall installed LED lighting to replace existing indoor lighting. During the desk review and on-site M&V visit, the EM&V team adjusted the wattages of five fixture types to match the rated wattage in the DLC QPL. These adjustments decreased demand reductions and resulted in a realization rate of 98 percent. The adjustments also decreased energy savings and resulted in a realization rate of 98 percent.

Participant ID 1-2-1-2-65682: A retail store installed LED lighting to replace interior fluorescent and compact fluorescent lighting. During the desk review and on-site M&V visit, the EM&V team adjusted the building type to an *enclosed mall* from a *strip mall*. The lighting quantities were also adjusted to match the findings from the on-site visit. These adjustments decreased demand reductions and resulted in a realization rate of 59 percent. The adjustments also decreased energy savings and resulted in a realization rate of 72 percent.

Participant ID 1-2-1-2-65845: A strip mall installed LED tubes and screw-in lamps to replace incandescent and fluorescent lighting. During the desk review, the EM&V team adjusted the building type from a *strip mall* to *stand-alone retail*. This adjustment did not affect demand reductions, so the realization rate is 100 percent. The adjustment decreased energy savings and resulted in a realization rate of 93 percent.

Participant ID 1-2-1-2-65866: A new construction warehouse installed interior and exterior LED lighting. During the desk review and on-site M&V visit, the EM&V team adjusted the exterior lighting zones and areas to match the site plan drawings and site findings. These adjustments increased demand reductions and resulted in a realization rate of 118 percent. The adjustments also increased energy savings and resulted in a realization rate of 125 percent.

Participant ID 1-2-1-2-65955: A new construction warehouse installed interior and exterior LED lighting, as well as multiple lighting controls. During the desk review, the EM&V team adjusted the exterior area types from the building facade to the loading dock, drive/parking area, and entry canopy. The documentation did not provide adequate site drawings to determine the exact areas of each exterior lighted area. The evaluation assumed a 1,000-by-100-foot loading dock area. The other three sides of the building were assumed to have a ten-foot drive lane along the building, and the area of the entry canopy was estimated. These adjustments increased demand reductions and resulted in a realization rate of 106 percent. The adjustments also increased energy savings and resulted in a realization rate of 109 percent.

Documentation Score

The EM&V team mostly verified key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the 18 projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included invoices, QPL qualifications, pre-installation and post-installation inspection notes, project savings calculators, specification sheets, and photographic documentation of existing and new equipment. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

3.4.3 Commercial High-Efficiency Foodservice Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.2%	502	502	100.0%	1.6	3,046,075	3,046,075	100.0%	Fair

Completed desk reviews*	On-site M&V visit
7	4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial High-Efficiency Foodservice MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for five projects; four projects had adjustments of greater than five percent compared to the originally claimed savings, while the other project had an adjustment of less than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluations for the projects with significant adjustments; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-65120: A college kitchen purchased a combination oven. During the desk review and on-site M&V visit, the EM&V team completed the prescribed calculation instead of using the deemed savings amount. The documentation did not identify how the ex-ante savings were determined; therefore, the reason for the adjustment is unknown. Additionally, the steam-cooking-mode efficiency-value-input was adjusted from 58 percent to 57 percent based on EM&V gathered ENERGY STAR certification. These adjustments increased demand reductions and resulted in a realization rate of 113 percent. The adjustments also increased energy savings and resulted in a realization rate of 106 percent.

Participant ID 1-2-1-2-65163: A school district purchased three electric steam cookers. During the desk review, the EM&V team adjusted the energy savings to match the deemed values from the TRM. The documentation did not identify how the ex-ante savings were determined; therefore, the reason for the adjustment is unknown. This adjustment did not affect demand reductions, so the realization rate was 100 percent. The adjustment decreased energy savings and resulted in a realization rate of 67 percent.

Participant ID 1-2-1-2-65233: A school purchased convection ovens and reach-in freezers. During the desk review and on-site M&V visit, the EM&V team adjusted the freezer type from *glass door* to *solid door*. This adjustment decreased demand reductions and resulted in a realization rate of 62 percent. The adjustment also decreased energy savings and resulted in a realization rate of 54 percent.

Participant ID 1-2-1-3-72826: A neurological institute purchased demand-controlled kitchen ventilation, an electric steam cooker, a dishwasher, and a solid-door reach-in refrigerator. During the desk review, the EM&V team adjusted the dishwasher type from *low temp.* to *high temp./electric water heater with electric booster heater* to match the value in the tracking data image file. This adjustment decreased demand reductions and resulted in a realization rate of 91 percent. The adjustment also decreased energy savings and resulted in a realization rate of 90 percent.

Participant ID 1-2-1-3-72935: A restaurant purchased demand-controlled kitchen ventilation controls and electric steam cookers. During the desk review and on-site M&V visit, the EM&V team adjusted the cooker type from *boiler* to *steam generator*. This adjustment decreased demand reductions and resulted in a realization rate of 93 percent. The adjustment also decreased energy savings and resulted in a realization rate of 96 percent.

Documentation Score

The EM&V team was able to partially verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the seven projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation was minimal as a result of this being a midstream program. However, no ENERGY STAR certifications were provided when required by the TRM. Also, some projects were missing specification sheets and photos. Overall, the EM&V team was somewhat satisfied with the project documentation provided and assigned a program documentation score of *fair*.

3.4.4 Retro-Commissioning Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.1%	160	160	100.0%	1.2%	2,211,261	2,211,261	100.0%	Good

Completed desk reviews*	On-site M&V visit
3	1

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Retro-Commissioning MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for all three projects reviewed; two had adjustments of greater than five percent compared to the originally claimed savings, while the other project had an adjustment of less than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluations for the three projects; therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-68339: A school district completed a retro-commissioning project for a high school and elementary school by replacing failed thermostats, adjusting setpoints, reducing minimum airflow, and adjusting the chilled water reset. During the desk review, the EM&V team adjusted the post-installation airflow volumes to support equal cooling at the conditions with a higher cold deck cooling point. The ex-ante calculation adjusted the PDPF calculation to use the *Top 20 Hours* regardless of the weekend because the calculation uses the average monthly peak demand savings, which the evaluation found to be more conservative. The EM&V team adjusted the hours to match the hour-ending values in the PDPF table, which increased the number of occupied hours in the PDPF calculation and increased the demand reduction. Overall, these adjustments increased demand reductions and resulted in a realization rate of 134 percent. The adjustments decreased energy savings and resulted in a realization rate of 98 percent.

Participant ID 1-2-1-2-68659: An elementary school completed a retro-commissioning project by adjusting schedules, minimum fan speeds, outside air treatment, and air supply temperatures. During the desk review and on-site M&V visit, the EM&V team used the TMY3 defined in the TRM to develop the hourly temperature bins, which increased the savings for two measures and decreased savings for two measures. The EM&V team also completed a PDPF calculation for the peak demand by identifying the occupied hours and kilowatt savings per temperature bin. Overall, these adjustments decreased demand reductions and resulted in a realization rate of 99 percent. The adjustments increased energy savings and resulted in a realization rate of 112 percent.

Participant ID 1-2-1-3-97663: A university campus completed two retro-commissioning measures that reduced the runtime of air handlers and increased the use of outside air for cooling. During the desk review, the EM&V team eliminated the late start time on weekdays because the correspondence noted that the adjustment in start time was completed but reverted. The participant intended to re-complete the adjustment but did not return with documentation that it was completed. The Sunday shutdown was verified. The hourly savings based on temperature were used in the PDPF calculation, and it was found that the peak energy savings only happened in winter between temperatures 39ºF and 55ºF. Only four of the *Top 20 Hours* included a temperature in this range. These adjustments decreased demand reductions and resulted in a realization rate of nine percent. The adjustments also decreased energy savings and resulted in a realization rate of 92 percent.

Documentation Score

The EM&V team verified key inputs and assumptions (equipment quantity, equipment capacity, QPL qualifications) for the three projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included M&V plans, drawings, invoices, pre-installation and post-installation inspection notes, project savings calculators, specification sheets, and photographic documentation of existing and new equipment. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

3.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. Therefore, the scope and related findings in the following sections are limited. All residential programs and subprograms included in the consumption analysis received a tracking system review for program impacts, which included verification of claimed savings against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

3.5.1 High-Efficiency Home Market Transformation Program (MTP)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
6.5%	16,348	16,348	100.0%	14.2%	26,344,284	26,344,284	100.0%	Good

Completed desk reviews*
5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 High-Efficiency Home MTP evaluation efforts focused on desk reviews. The number of completed desk reviews for this program is listed above. Five desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team did not adjust the claimed savings for any of the five projects. CenterPoint accepted the evaluated results and matched the claimed savings for all five projects; therefore, the final program realization rates are 100 percent.

Documentation Score

The EM&V team was able to verify most of the key inputs and assumptions, including the project scope, baselines, and equipment specifications for most of the measures of the sampled projects that had desk reviews. However, there was limited documentation for the smart thermostat measures. Overall, the EM&V team was mostly satisfied with the project documentation provided and assigned a program documentation score of *good*.

3.5.2 Midstream Market Transformation Program (MTP) (HVAC and Pool Pump Distributors)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
1.1%	2,869	2,869	100.0%	4.0%	7,385,351	7,385,351	100.0%	Good

Completed desk reviews*
4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Midstream MTP (HVAC and Pool Pump Distributor) evaluation efforts focused on desk reviews. The number of completed desk reviews for this program is listed above. Four desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team adjusted the claimed savings for two projects; both projects had adjustments of greater than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and matched the claimed savings for the two projects; therefore, the final program realization rates are 100 percent. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-63603: A single-family home replaced a split system air conditioning (AC) unit with a new central AC unit early. During the desk review, the EM&V team adjusted the cooling capacity of the existing and installed units to the respective nominal capacities since the existing unit's rated capacity could not be determined. Overall, the adjustments resulted in project-level realization rates of 71 percent and 76 percent for demand reductions and energy savings, respectively.

Participant ID 1-2-1-2-63901: A single-family home replaced a split system AC unit with a new central AC unit early. During the desk review, the EM&V team adjusted the cooling capacity of the existing and installed units to the respective nominal capacities since the existing unit's rated capacity could not be determined. Also, the EM&V team adjusted the efficiency from seasonal energy efficiency ratio 1/energy efficiency ratio 1 (SEER1/EER1) to SEER2/EER2. Overall, the adjustments resulted in project-level realization rates of 61 percent and 67 percent for demand reductions and energy savings, respectively.

Documentation Score

The EM&V team was sufficiently able to identify the key inputs and assumptions, including the project scope, baselines, and equipment specifications for most of the measures of the sampled projects that had desk reviews. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team was mostly satisfied with the project documentation provided and assigned a program documentation score of *good*.

3.5.3 Multifamily Market Transformation Program (MTP) Market Rate

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.4%	927	927	100.0%	1.8%	3,284,815	3,284,815	100.0%	Good

Completed desk reviews*
4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Multifamily MTP Market Rate evaluation efforts focused on desk reviews. The sample of completed desk reviews for this program is listed above.

The EM&V team adjusted the claimed savings for four projects; all four projects had adjustments greater than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and adjusted claimed savings to match the evaluated; therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below. Each project listed below was for the same location, so the project description and savings are similar to one another.

Participant ID 1-2-1-2-63068: An apartment complex replaced their boiler for a one-bedroom unit. During the desk review, the EM&V team found that the kilowatt savings did not match the calculator provided for a one-bedroom unit. The EM&V team was able to identify that the reference cell for kilowatt was referring to an Excel file for a different multifamily building. The adjustment decreased demand reductions and resulted in a realization rate of 88 percent. However, the adjustment did not affect the energy savings; therefore, the realization rate remains at 100 percent.

Participant ID 1-2-1-2-63101: An apartment complex replaced their boiler for a one-bedroom unit. During the desk review, the EM&V team found that the kilowatt savings did not match the calculator provided for a one-bedroom unit. The EM&V team was able to identify that the reference cell for kilowatt was referring to an Excel file for a different multifamily building. The adjustment decreased demand reductions and resulted in a realization rate of 88 percent. However, the adjustment did not affect the energy savings; therefore, the realization rate remains at 100 percent.

Participant ID 1-2-1-2-63318: An apartment complex replaced their boiler for a one-bedroom unit. During the desk review, the EM&V team found that the kilowatt savings did not match the calculator provided for a one-bedroom unit. The EM&V team was able to identify that the reference cell for kilowatt was referring to an Excel file for a different multifamily building. The adjustment decreased demand reductions and resulted in a realization rate of 88 percent. However, the adjustment did not affect the energy savings; therefore, the realization rate remains at 100 percent.

Participant ID 1-2-1-2-63360: An apartment complex replaced their boiler for a two-bedroom unit. During the desk review, the EM&V team found that the kilowatt savings did not match the calculator provided for a one-bedroom unit. The EM&V team was able to identify that the reference cell for kilowatt was referring to an Excel file for a different multifamily building. The adjustment decreased demand reductions and resulted in a realization rate of 88 percent. However, the adjustment did not affect the energy savings; therefore, the realization rate remains at 100 percent.

Documentation Score

The EM&V team verified key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the four projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included savings calculators, site plans, applications, invoices, and photos of the equipment nameplate. The spreadsheet calculator included the site measurements collected and the calculation of energy savings for each unit. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

3.6 DETAILED FINDINGS—LOAD MANAGEMENT

3.6.1 Commercial Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
57.7%	146,293	146,293	100.0%	0.5%	867,641	867,641	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. In PY2023, load management events occurred on the following dates and times:

- July 13, 2023, from 1:00 p.m. to 4:00 p.m. (scheduled[16]); and
- August 8, 2023, from 1:00 p.m. to 4:00 p.m. (scheduled).

[16] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for ERCOT Energy Emergency Alert Level 2 (EEA2) or system reliability.

The EM&V team received interval meter data and a spreadsheet summarizing the event-level savings for the 27 sponsors across 334 sites. Twenty-six sites did not participate in the first event, 22 sites did not participate in the second event, and eight sites did not have any load data associated with them as they did not participate in any event. All sponsors had at least one site that curtailed during each event[17].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings CenterPoint provided for all sites except for one site with partial meter data for one of the events. Savings for that meter were not considered since limited data were available during the event period.

The kilowatt savings for each participating site corresponded to the average of the energy reduced across both events. If a site participated in only one event, the kilowatt savings corresponded to the energy reduced during that event. The kilowatt-hour savings for each participating site and event were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team's (evaluated) and CenterPoint's (claimed) calculated kilowatt and kilowatt-hour savings. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluated savings; therefore, the final program realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

3.6.2 Commercial Winter Load Management Pilot (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
5.1%	12,821	12,821	100.0%	0.0%	70,980	70,980	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the Commercial Winter Load Management Pilot by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. In PY2023, load management events occurred on the following dates and times:

- February 3, 2023, from 6:00 a.m. to 9:00 a.m. (scheduled); and
- February 28, 2023, from 6:00 p.m. to 9:00 p.m. (scheduled).

[17] See the Report Volume 1 recommendation to monitor load management cooperation rates.

The EM&V team received interval meter data and a spreadsheet summarizing the event-level savings for the 18 sponsors across 105 sites. Fifteen sites did not participate in the first event, 18 sites did not participate in the second event, and 8 sites did not have any load data associated with them as they did not participate in any event. All sponsors had at least one site that curtailed during each event.

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings CenterPoint provided for all sites, except for a few differences due to rounding.

The kilowatt savings for each participating site corresponded to the average of the energy reduced across both events. If a site participated in only one event, the kilowatt savings corresponded to the energy reduced during that event. The kilowatt-hour savings for each participating site and event were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team's (evaluated) and CenterPoint's (claimed) calculated kilowatt and kilowatt-hour savings. CenterPoint accepted rounding differences in the evaluated results and matched the claimed savings to those of the evaluated savings; therefore, the final program realization rate for both kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

3.6.3 Residential Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
13.7%	34,672	34,672	100.0%	0.1%	104,016	104,016	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the Residential Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. In PY2023, load management events occurred on the following dates and times:

- July 13, 2023, from 1:00 p.m. to 4:00 p.m. (scheduled); and
- August 8, 2023, from 1:00 p.m. to 4:00 p.m. (scheduled).

The EM&V team received the interval meter data and spreadsheets detailing the CenterPoint calculated baseline load, event load, and savings results for each service provider and meter.

After the EM&V team applied the *High 3 of 5* baseline calculation method, it was found that the evaluated kilowatt savings matched the kilowatt savings CenterPoint provided for most participating meters. Minor differences were a result of calculating the kilowatt savings for meters with partial data (per the TRM, savings may still be calculated for less than two percent of meters that fail to record data sufficient to apply the *High 3 of 5* calculation method).

The kilowatt savings for each participating meter corresponded to the average of the energy reduced across both events. If a meter participated in only one event, the kilowatt savings corresponded to the energy reduced during that event. The kilowatt-hour savings for each participating meter were calculated by multiplying the kilowatt reductions for each event by the total number of event hours. Program-level savings were calculated by adding all meter-level savings.

The table above shows the EM&V team's (evaluated) and CenterPoint's (claimed) calculated kilowatt and kilowatt-hour savings. CenterPoint accepted the evaluated results and matched the claimed savings to those of the evaluated savings; therefore, the final program realization rate is 100 percent, with a documentation score of *good*.

3.7 DETAILED FINDINGS—CROSS-SECTOR

3.7.1 Retail Products and Services Market Transformation Program (MTP)

Sector	Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
Residential	2.4%	6,081	6,081	100.0%	12.2%	22,731,321	22,731,321	100.0%	Good

Completed desk reviews*
4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Retail Products and Services MTP evaluation efforts focused on residential desk reviews for the HVAC tune-ups component. The number of sampled and completed desk reviews and site visits for this program are listed above. The PY2022 Retail Electric Provider MTP evaluation included a review of commercial impacts, and this evaluation builds on that evaluation. For additional details, see Section 4.6.1 of the CenterPoint Impact Evaluations Report Program Year 2022.

The EM&V team adjusted the claimed savings for all four projects; one had an adjustment greater than five percent, while the other three projects had adjustments less than five percent compared to the originally claimed savings. CenterPoint accepted the evaluated results and adjusted claimed savings to match the evaluated; therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 1-2-1-2-01: The project included a tune-up of a 3-ton AC unit at a multifamily residence. During the desk review, the EM&V team adjusted the elevation of the tune-up location from 118 feet to 70 feet. There was also a variation between the claimed savings and the calculated savings, which was noted in documentation as an adjustment approved by engineering. There was no further documentation, although the ex-ante savings are more conservative than the calculated savings; therefore, the ex-post peak kilowatt savings were set to match the ex-ante peak kilowatt saving, which resulted in a project-level realization rate of 100 percent for demand reductions. However, energy savings had a slight adjustment from the elevation difference, which rounded to a realization rate of 100 percent.

Participant ID 1-2-1-2-02: The project included a tune-up of a 1.5-ton AC unit at a multifamily residence. During the desk review, the EM&V team identified that the site elevation was not entered in the calculation. The tune-up location elevation of 69 feet was used by the EM&V team, which resulted in a slight deviation between the claimed and evaluated kilowatt-hour savings. Overall, the adjustment resulted in a project-level realization rate that rounded to 100 percent for energy savings. However, demand reductions were not impacted by the adjustments and remained at 100 percent.

Participant ID 1-2-1-2-03: The project included a tune-up with refrigerant charge adjustment of a 2-ton AC unit at a multifamily residence. During the desk review, the EM&V team identified that the site elevation was not entered in the calculation. The tune-up location elevation of 63 feet was used by the EM&V team, which resulted in a slight deviation between the claimed and evaluated kilowatt-hour savings. Overall, the adjustment resulted in a project-level realization rate that rounded to 100 percent for energy savings. However, demand reductions were not impacted by the adjustments and remained at 100 percent.

Participant ID 1-2-1-2-04: The project included a tune-up with refrigerant charge adjustment of a 1.5-ton AC unit at a multifamily residence. During the desk review, the EM&V team identified that the site elevation was not entered in the calculation. The tune-up location elevation of 82 feet was used by the EM&V team, which resulted in a slight deviation between the claimed and evaluated kilowatt-hour savings. In addition, the EM&V team calculated a slight adjustment to the return air and supply air enthalpy, which adjusted the capacity and performance of the AC unit for both the before and after conditions of the unit. These adjustments decreased demand reductions and resulted in a realization rate of 92 percent. The adjustments also decreased energy savings and resulted in a realization rate of 92 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions, including the project tune-up enhancements and the existing equipment specifications for all sampled units. Project documentation included an M&V plan, invoices, nameplate photos, and a data collection spreadsheet. It is noted that the documentation submitted will not meet the upgraded requirements for next year's HVAC tune-ups program. Overall, the EM&V team was satisfied with the project documentation provided for the current year and assigned a program documentation score of *good.*

3.8 SUMMARY OF TRACKING-SYSTEM-ONLY EVALUATED PROGRAMS

Table 10 summarizes claimed savings for CenterPoint's programs in PY2023 that only received a tracking system review for program impacts. The programs' claimed savings were verified against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

Table 10. PY2023 Claimed Savings (Tracking-System-Only Evaluated Programs)*

Program	Contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)
Retail Products and Services (commercial)	1.4%	3,475	3,475	100.0%	3.4%	6,266,498	6,266,498	100.0%
Multi-Family MTP Hard-to-Reach	0.1%	160	160	100.0%	0.3%	463,268	463,268	100.0%

* Tracking system reviews conducted for each residential program included in the residential consumption analysis are not shown in this table

4.0 ONCOR ELECTRIC DELIVERY COMPANY, LLC IMPACT EVALUATION RESULTS

4.1 YEAR-OVER-YEAR COMPARISONS

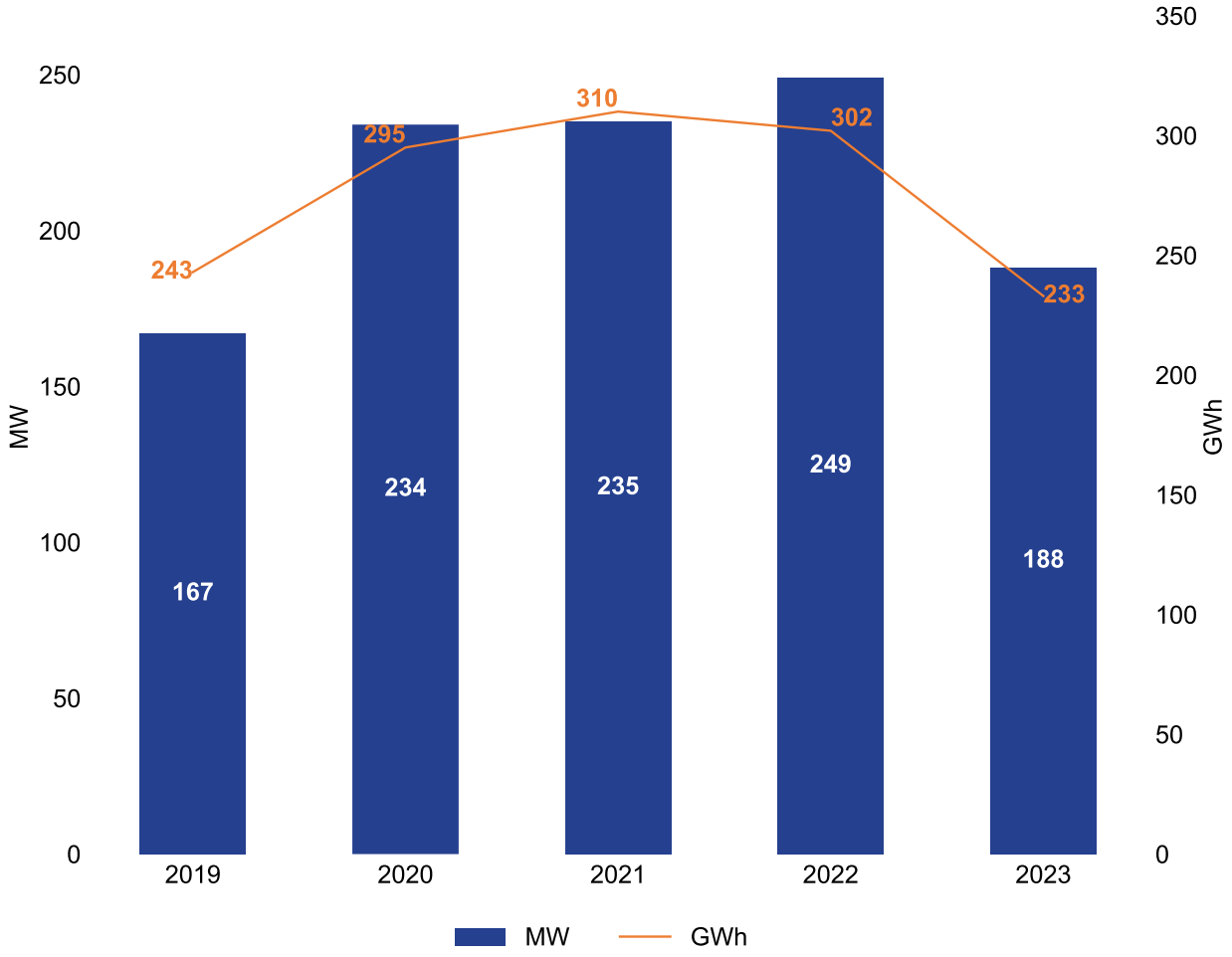
This section provides a trend analysis for Oncor's program performance from PY2019 to PY2023. This trend analysis provides insight into the PY2023 results included in Sections 4.2 through 4.10.

4.1.1 PY2019–PY2023

PY2023 saw a decrease in demand reductions and energy savings across Oncor's portfolio (Figure 19). Across all IOUs, the decrease in energy savings was primarily a result of new federal standards in *lighting and air conditioners* that came into effect in PY2023. However, Oncor saw the largest decrease from prior years when compared to other IOUs. Unlike the other ERCOT IOUs, Oncor introduced a winter load management program to their portfolio in PY2022 and, therefore, did not benefit from the same PY2023 increase in demand reductions as the other ERCOT IOUs.

- **Recommendation:** The PUCT and EM&V team should discuss the challenges Oncor faced in responding to the federal baseline changes and any strategies or future plans they have to return energy savings and demand reductions to levels they have achieved in prior years.

Figure 19. Oncor's Demand Reduction and Energy Savings, PY2019-PY2023



Load management programs accounted for 64.8 percent of Oncor's demand reduction goal for PY2023 (Figure 20, left). While slightly less than prior years, Oncor programs achieved more demand reductions through energy efficiency programs than the ERCOT IOU average—35.2 percent compared to the 29.8 percent average.[18] The programs contributing to the energy efficiency demand reductions were the midstream/upstream programs, LI program, HTR program, Residential SOP, and Commercial SOP.

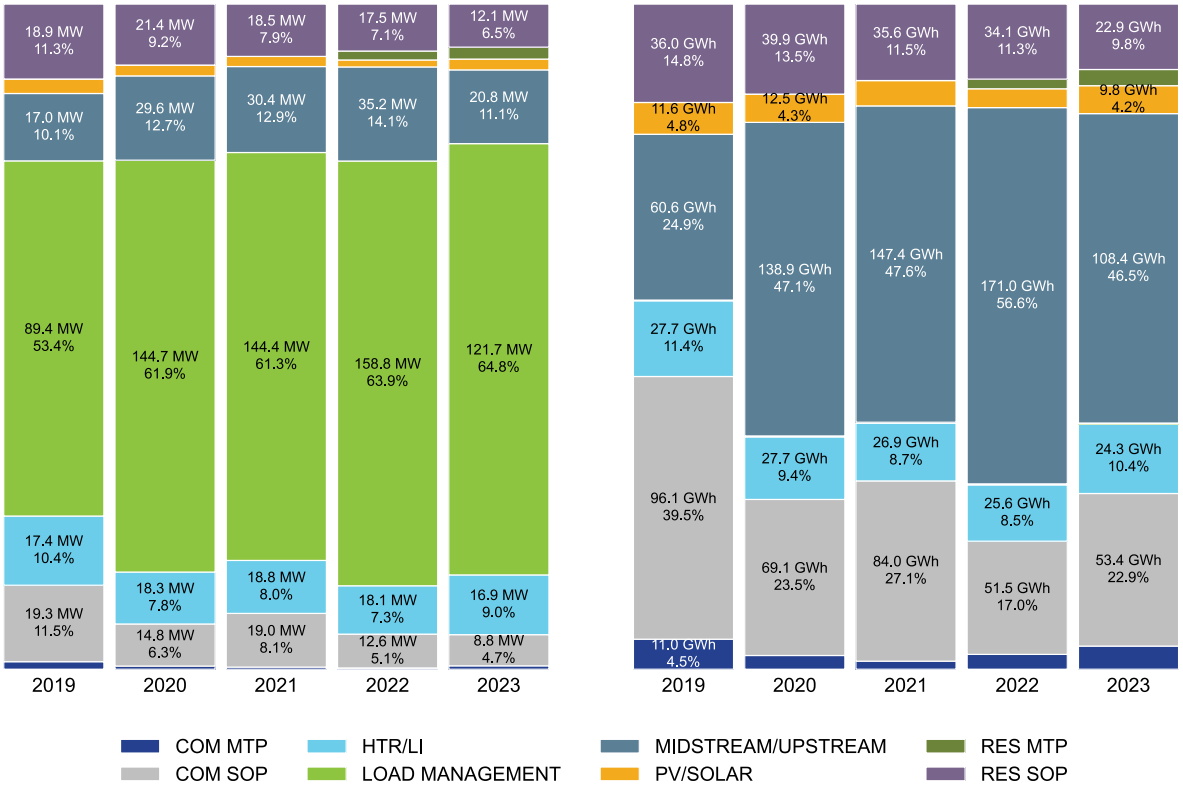
- **Recommendation:** The PUCT and EM&V team should discuss Oncor's successful strategies used to achieve over one-third of portfolio savings through energy efficiency and any future plans to increase this percentage.

[18] ERCOT, Volume 1, Executive Summary, Figure 4).

Energy savings (Figure 20, right) from upstream and midstream programs[19] have been increasing as part of Oncor's portfolio savings in recent years. This program type decreased in PY2023 primarily as a result of changes to federal standards for residential lighting, as discussed above. Notable increases in PY2023 include Commercial SOP and LI/HTR programs.

- **Recommendation:** The PUCT and EM&V team should discuss with Oncor the changes in the mix of measures offered through their upstream/midstream program in response to the federal standard changes and if future plans include transitions to other programs.
- **Recommendation:** The PUCT and EM&V should discuss with Oncor how they have successfully increased savings for LI/HTR customers, including differences across the distinct areas within their territory.[20]

Figure 20. Oncor's Demand Reduction and Energy Savings by Program Type, PY2019-PY2023[21]



[19] Upstream and midstream programs primarily served residential customers through retailers and commercial customers through product distributors.

[20] The consumption analysis indicated strong performance across all of Oncor's residential retrofit programs including the highest savings delivered through its LI program (refer to Volume 1, Technical Appendix A).

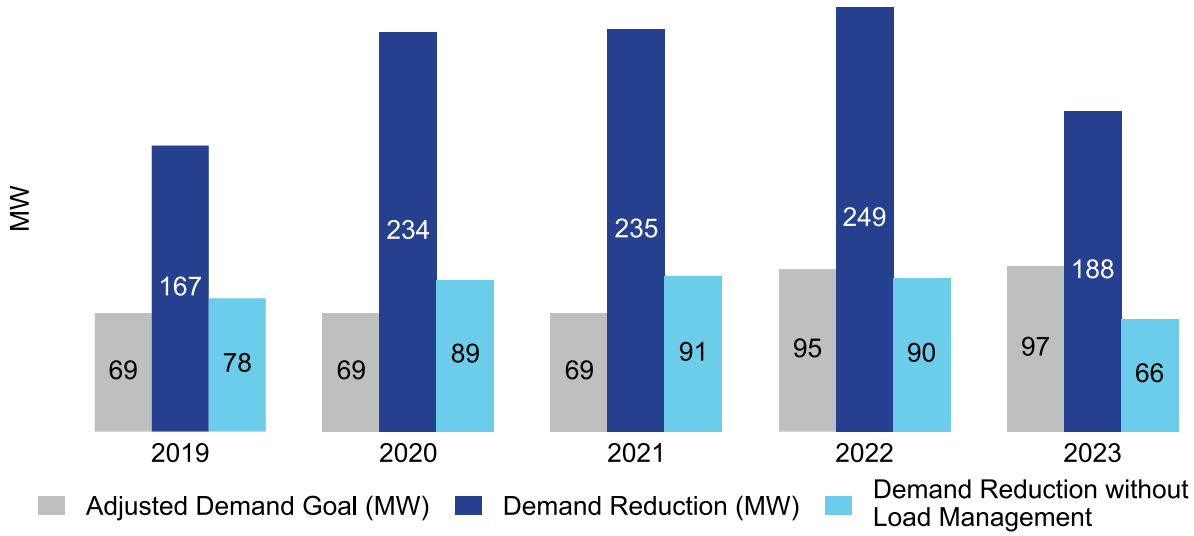
[21] Demand reductions are reported in megawatts (MW), and energy reductions are reported in gigawatt-hours (GWh).

Figure 21 depicts Oncor's performance against its legislated demand reduction goal from PY2019-PY2023, both with and without load management.

Oncor met its legislated demand reduction goals with energy efficiency alone from PY2019−PY2021; however, Oncor has not met the legislated goal with just energy efficiency since PY2022.[22]

- **Recommendation:** The PUCT and EM&V team should discuss Oncor's strategies used previously used to fully meet the legislated demand reduction goal through energy efficiency without load management and what challenges may exist with the higher demand goal, if any.

Figure 21. Oncor's Legislated Goals and Demand Reduction, PY2019–PY2023



4.1.1.1 Commercial Savings

The PY2023 gross savings from Oncor's commercial sector programs, excluding load management, were:

- 14.07 MW of demand reduction and
- 75.80 GWh of energy savings.

Figure 22 depicts the demand reductions and energy savings achieved by Oncor's commercial programs, excluding load management, from PY2019-PY2023.

Oncor's commercial programs saw a decrease of 7 MW in demand reductions from PY2022 to PY2023. Similarly, energy savings decreased by 15 GWH from PY2022 to PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with Oncor the reasons for the PY2023 decrease in commercial savings and its future plans to address this.

[22] In PY2022, Oncor's legislated demand reduction goal moved from the "floor" of '30 percent of demand growth' to the higher 'four-tenths of one percent of summer weather-adjusted peak demand' goal.

Figure 22. Oncor's Demand Reduction and Energy Savings by Program Year—Commercial Programs, Excluding Load Management, PY2019–PY2023[23]

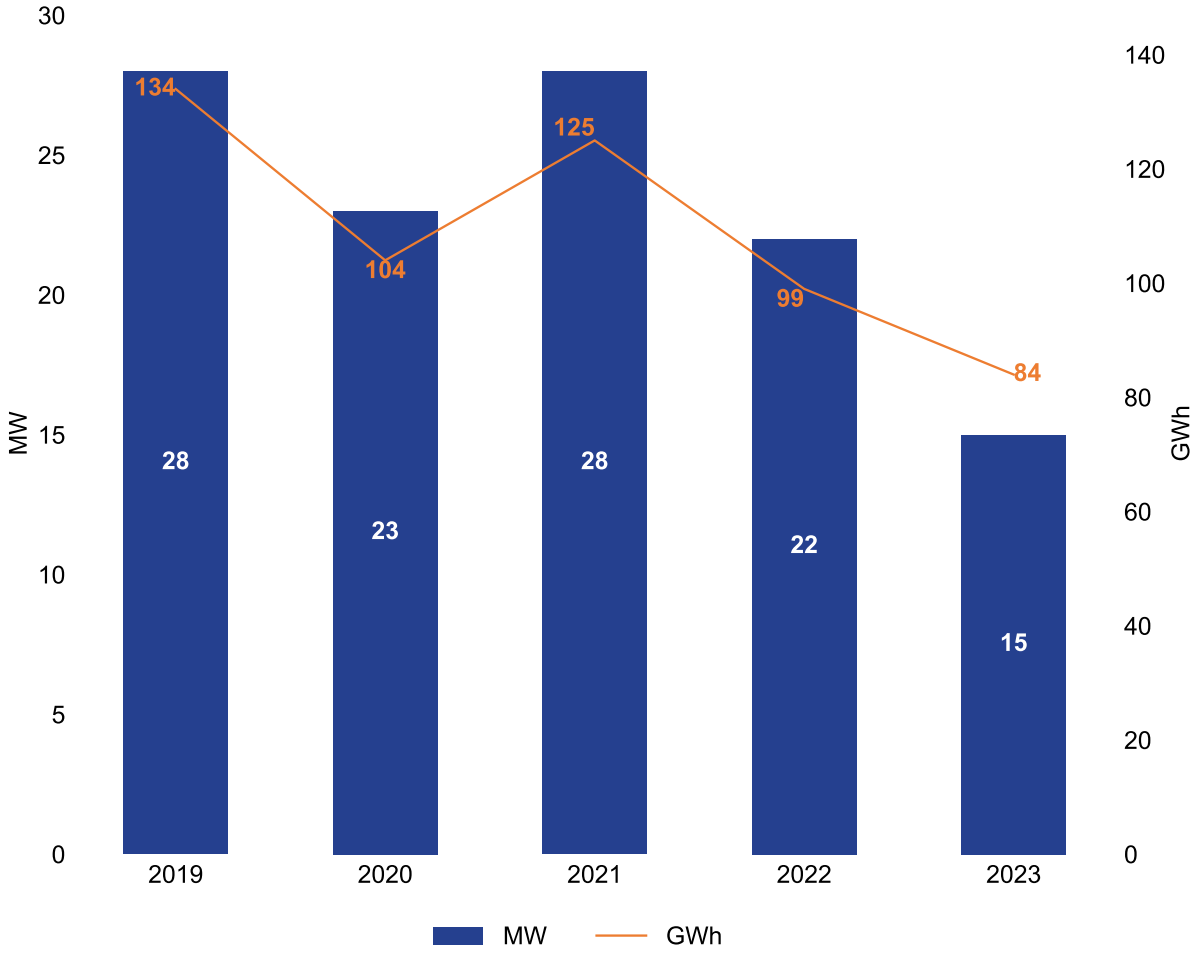


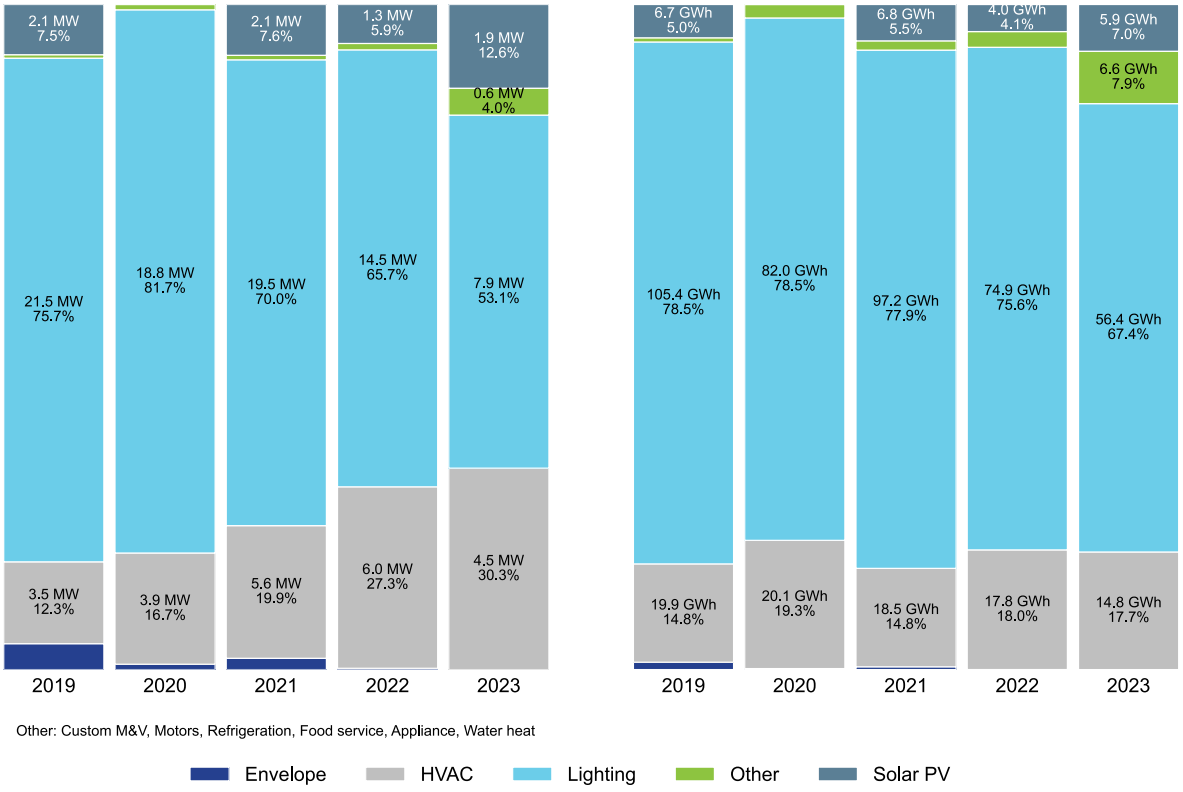
Figure 23 presents the breakdown of savings between measure categories.

In PY2023, the *lighting* measure accounted for over one-half of the demand reduction and energy savings—53 percent and 67 percent, respectively—but have decreased to the lowest savings amount in the past five years. The *HVAC* measure increased to 30 percent of demand reductions but slightly decreased to 18% of energy savings—the lowest from the past three years. The *solar PV* measure savings increased slightly in PY2023, and the new Strategic Energy Management MTP pilot first claimed savings in PY2023 (shown as the *other* category).

- **Recommendation:** The PUCT and EM&V team should discuss with Oncor the plans to continue to diversify the commercial measure mix beyond *lighting*, including the potential of the Strategic Energy Management MTP pilot to meet customer needs more comprehensively.

[23] The megawatt and gigawatt-hour numbers in Figure 22, include energy savings of 7.9 GWh and demand savings of .9 MW from the Strategic Energy Management MTP pilot.

Figure 23. Distribution of Oncor's Demand Reduction and Energy Savings by Measure Category—Commercial Programs Excluding Load Management PY2019–PY2023[24]



4.1.1.2 Residential Savings

The PY2023 gross savings from Oncor's residential sector programs (excluding load management) were:

- 51.02 MW of demand reduction and
- 147.11 GWh of energy savings.

Figure 24 depicts the demand reductions and energy savings achieved by Oncor's residential programs, excluding load management, from PY2019-PY2023.

Oncor's residential programs saw a decrease in demand reductions and energy savings achieved in PY2023—resulting in the second-lowest reductions and savings in the last five years. Some of the decreases in demand reductions and energy savings for Oncor were affected by changes in the residential lighting changes EISA backstop in PY2022, new federal standards for HVAC in 2023, and updates to the TRM in PY2021.

[24] The megawatt and gigawatt-hour numbers in Figure 23 include energy savings of 7.9 GWh and demand savings of .9 MW from the Strategic Energy Management MTP pilot.

Figure 24. Oncor's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023[25]

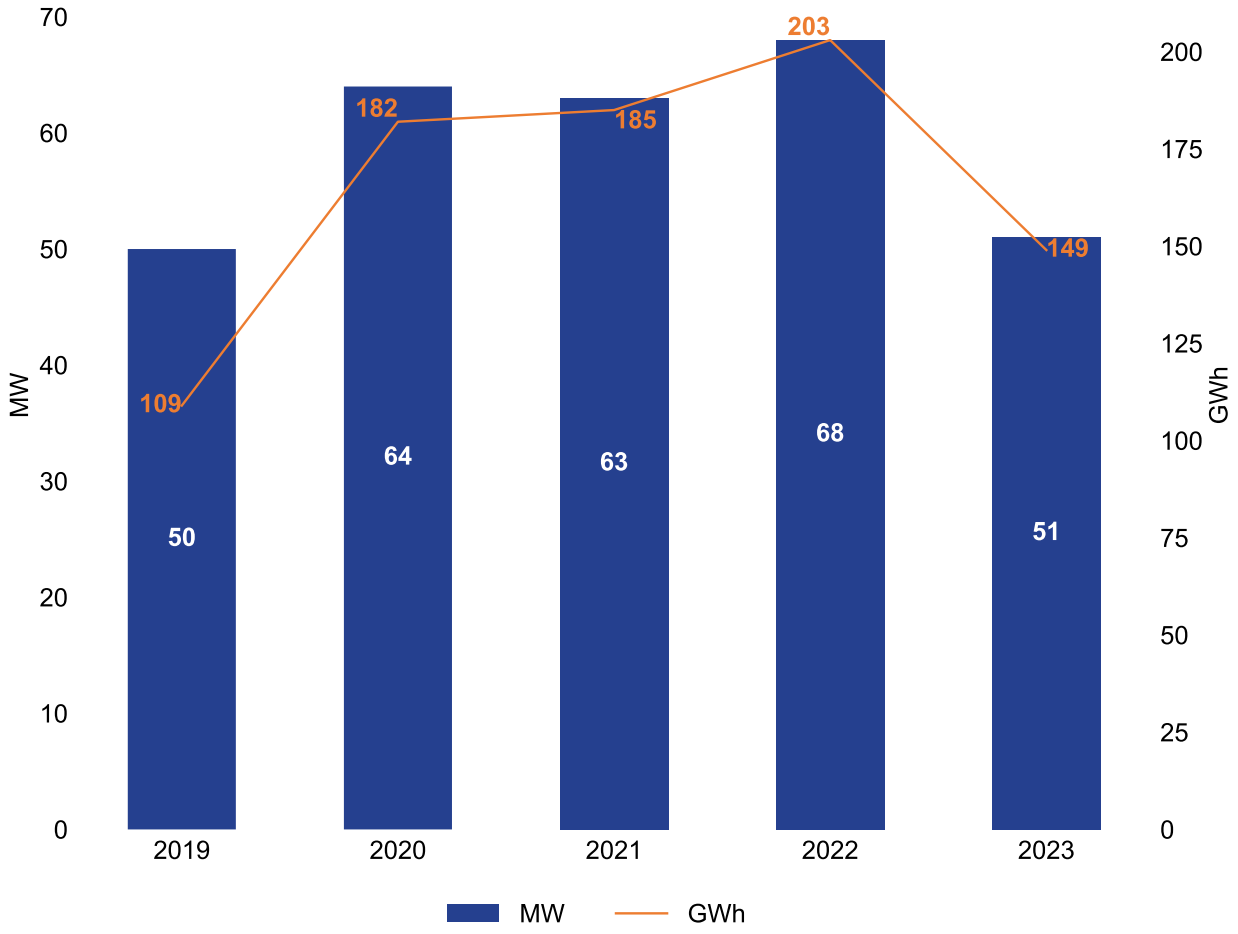


Figure 25 shows the breakdown of savings by measure category for Oncor's residential programs (excluding load management).

HVAC measures were the largest contributor to demand reductions, having increased by 4.5 percent in PY2023 to 19.9 MW. *Lighting* measures were the second largest contributor to demand reductions at 16.4 MW—an 8.1 percent decrease from PY2022. *Envelope* measures were the third largest contributor to demand reductions.

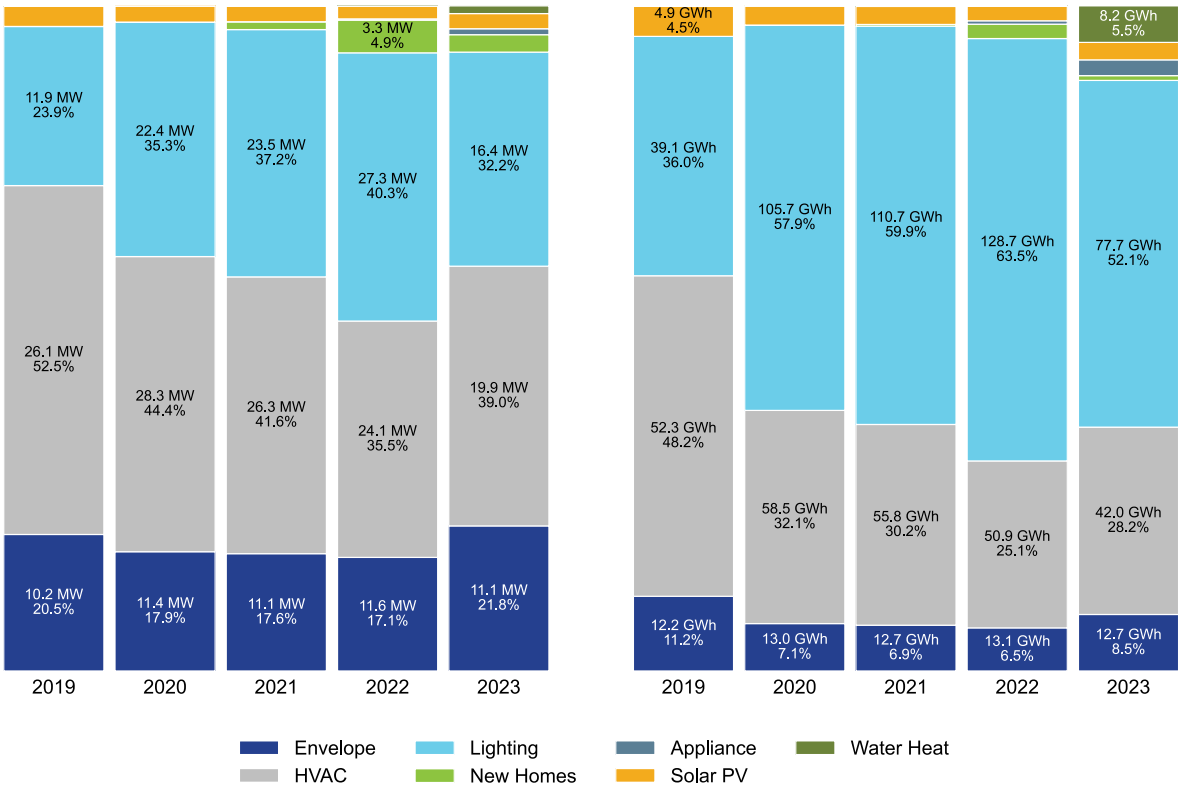
Lighting is still the largest contributor to Oncor's energy savings, having a decrease of 11.4 percent in PY2023 to 77.7 GWh. *HVAC* measures were the second largest contributor to energy savings in PY2023, having a slight increase of 3.1 percent from PY2022 to 42.0 GWh. *Envelope* measures were the third largest contributor to energy savings.

[25] The gigawatt-hour numbers in Figure 24 include energy savings of 1.9 GWh from the Multifamily Smart Thermostat Direct Install pilot.

In PY2023, Oncor's residential programs also saw an uptick in demand reductions and energy savings from *water heating* measures, primarily driven by *pipe insulation* and *heat pump water heaters* delivered through their Retail Products program.

- **Recommendation:** The PUCT and EM&V team should discuss Oncor's successes and challenges in diversifying the residential measure mix, including the traction gained in heat pump water heaters.

Figure 25. Distribution of Oncor's Demand Reduction and Energy Savings by Measure Category—Residential Programs PY2019–PY2023[26]



4.1.1.3 Load Management Savings

The PY2023 gross savings from Oncor's load management programs were:

- 121.69 MW of demand reduction and
- 0.365 GWh of energy savings.

Figure 26 depicts the changes in demand reductions and energy savings for Oncor's load management programs from PY2019-PY2022.

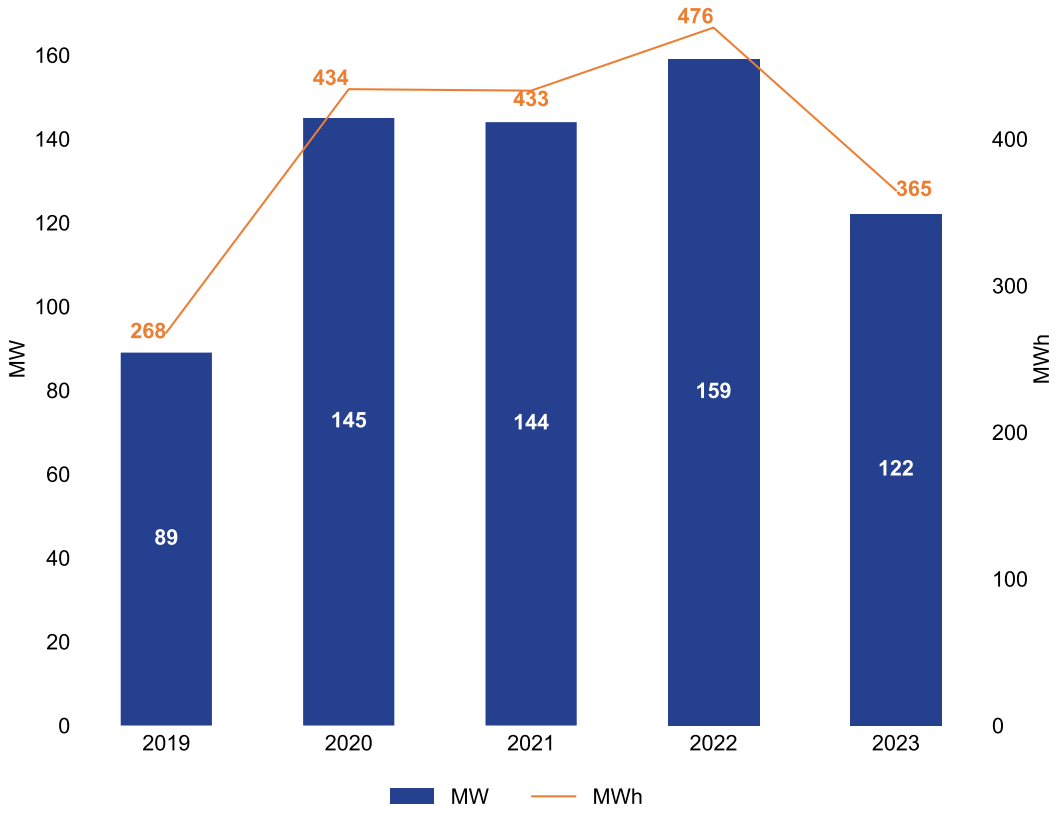
Oncor's load management programs saw relatively stable demand reductions from PY2020−PY2022 and a considerable decrease in PY2023.

[26] The gigawatt-hour numbers in Figure 24, include energy savings of 1.9 GWh from the Multifamily Smart Thermostat Direct Install pilot.

The main driver of the increase in demand reductions in PY2022 was the addition of the winter load management pilot, followed by a growth in program participation. Although the winter load management program was offered in PY2023 and the number of enrolled participants continued to increase, demand reductions decreased in PY2023 due to a low cooperation level—the ratio of enrolled participants compared to participants that curtailed when an event was called.

Energy savings depend upon the number of curtailment events called each year and their duration. Overall, energy savings for Oncor's load management programs have followed the demand reduction pattern over the past few years.

Figure 26. Oncor's Demand Reduction and Energy Savings by Program Year—Load Management Programs, PY2019–PY2023

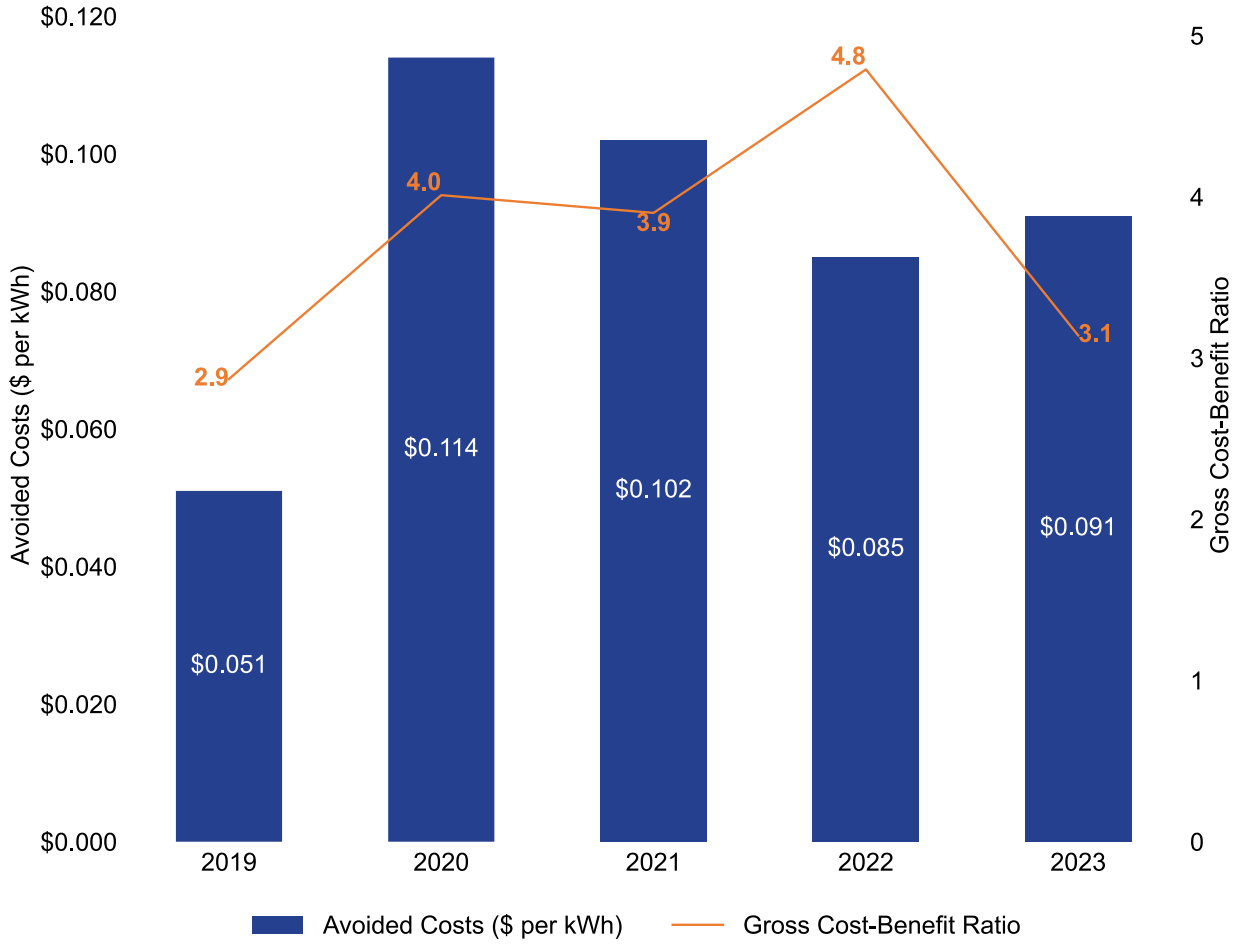


4.1.2 Cost-Effectiveness

Figure 27 overviews the avoided costs and cost-effectiveness ratios for Oncor over the last five years.[27] The overall cost-effectiveness ratio has consistently remained above 2.0 for Oncor. While PY2022 saw a high of 4.8, the cumulative cost-effectiveness of Oncor's programs remains healthy at 3.1 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy.

[27] IOU program cost-effectiveness tests compare the benefits of the programs to the costs – a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

Figure 27. Oncor's Gross Cost-Benefit Ratio and Avoided Cost by Program Year, PY2019-PY2023



4.2 KEY FINDINGS

This section presents the evaluated savings and cost-effectiveness results for Oncor, both at the portfolio- and program-level. The key findings are summarized first, followed by details for each program with a *high* or *medium* evaluation priority. *Low* evaluation priority programs where claimed savings were only verified through the EM&V database are listed at the end.

4.2.1 Evaluated Savings

Oncor's evaluated savings for PY2023 were 189.34 MW in demand reduction and 233 GWh in energy savings. The overall portfolio realization rates were approximately 100 percent. Oncor was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (see Table 14), supporting healthy realization rates.

Table 11 shows the claimed and evaluated demand savings for Oncor's portfolio and broad customer sector and program categories. Residential and load management results are based on census reviews, and therefore, precision calculations are not applicable (N/A).

Table 11. Oncor PY2023 Claimed and Evaluated Demand Reductions

Level of analysis	Percentage portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Precision at 90% confidence
Total portfolio	**100.0%**	**187,668**	**189,335**	**100.9%**	**N/A**
Commercial	7.5%	14,067	14,069	100.0%	N/A
Residential	25.0%	46,850	46,850	100.0%	N/A
Low-income**	2.2%	4,166	4,166	100.0%	N/A
Load management* **	64.8%	121,690	123,355	101.4%	N/A
Pilot	0.5%	895	895	0.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

** Low-income and load management pilot programs are included in sector roll-ups instead of the Pilot roll-up.

Table 12 shows the claimed and evaluated energy savings for Oncor's portfolio and broad customer sector and program categories for PY2023.

Table 12. Oncor PY2020 Claimed and Evaluated Energy Savings

Level of analysis	Percentage portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Precision at 90% confidence
Total portfolio	**100.0%**	**232,966,716**	**232,988,790**	**100.0%**	**N/A**
Commercial	32.5%	75,797,173	75,816,958	100.0%	N/A
Residential	59.3%	138,213,946	138,213,947	100.0%	N/A
Low-income**	3.8%	8,892,705	8,892,768	100.0%	N/A
Load management* **	0.2%	365,071	370,065	101.4%	N/A
Pilot	4.2%	9,697,820	9,695,052	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

** Low-income and load management pilot programs are included in sector roll-ups instead of the Pilot roll-up.

Program-level realization rates are discussed in the detailed findings subsections. However, it is important to note that these results should only be viewed qualitatively due to the small sample sizes at the utility program level.

In program-level realization rates, we have also included a qualitative rating of *good*, *fair*, and *limited* associated with the level of program documentation received from the utility. Oncor received *good* documentation scores for all evaluated programs except for the Low-Income HVAC Tune-Up Market Transformation Program (MTP)(Pilot), which received a *fair* documentation score.

4.2.2 Program Funding and Cost-Effectiveness Results

Oncor's total portfolio funding for PY2023 was $52,057,138 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 3.1 (or 3.4, excluding low-income programs).

The more cost-effective programs were the Commercial Retail Platform MTP and the Low-Income Multifamily Smart Thermostat Direct Install MTP[28]); the less cost-effective programs were the Small Business Direct Install MTP and the Commercial Winter Load Management SOP (Pilot), with the Small Business Direct Install MTP not passing cost-effectiveness. Due to low performance, the Small Business Direct Install MTP was discontinued in mid-2023. The EM&V team's understanding is that Oncor has developed a new program approach to continue to assist historically under-served segments, such as rural small businesses, in future program years. All of Oncor's other programs were cost-effective in 2023.

Table 13. Oncor Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**3.14**	**3.14**	**2.88**
Total portfolio excluding low-income programs	**3.43**	**3.43**	**3.13**
Commercial	**4.33**	**4.33**	**3.97**
Commercial SOP	4.71	4.71	4.28
Solar PV SOP	2.49	2.49	2.52
Small Business Direct Install MTP	0.77	0.77	0.73
Retail Platform MTP	19.35	19.35	17.42
Commercial Midstream MTP	1.84	1.84	1.63
Residential	**3.49**	**3.49**	**3.17**
Home Energy Efficiency SOP	2.01	2.01	2.01
Solar PV SOP	2.70	2.70	2.59
Retail Platform MTP	7.71	7.71	6.94
Residential New Homes Construction MTP**	1.82	1.82	1.27
Hard-to-Reach SOP	2.78	2.78	2.78

[28] The latter is calculated based on the Savings-to-Investment Ratio, SIR.

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Low-income*	**2.05**	**2.05**	**2.05**
Low-Income Multifamily Smart Thermostat Direct Install* MTP	8.52	8.52	8.52
Low-Income HVAC Tune-Up MTP (A/C Tune-Ups)*	4.65	4.65	4.65
Targeted Weatherization Low-Income SOP*	1.53	1.53	1.53
Load management	**1.30**	**1.32**	**1.32**
Commercial Load Management SOP	1.31	1.34	1.34
Commercial Winter Load Management SOP (Pilot)	1.22	1.22	1.22
Residential Load Management SOP	1.35	1.35	1.35
Pilot	**2.57**	**2.57**	**2.20**
Strategic Energy Management MTP (Pilot)	2.56	2.55	2.23
Multifamily Smart Thermostat Direct Install MTP	2.61	2.61	2.09
Master-Metered Smart Thermostat Direct Install MTP	N/A	N/A	N/A

* The low-income programs are evaluated using the Savings-to-Investment Ratio (SIR).

**Net savings for the Residential New Homes Construction MTP will be updated in the final version of this report based on net-to-gross research conducted as part of the PY2023 EM&V scope.

4.3 SAVINGS DIFFERENCES

As discussed above, utilities are provided the opportunity to adjust savings at the project level based on interim EM&V findings. Table 14 summarizes the claimed savings adjustments recommended by the EM&V team, which Oncor also used to adjust their claimed savings. The EM&V team requests that utilities adjust projects when evaluated and claimed savings differ by more than five percent. Oncor adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in their June 1st EECRF filing.

Table 14. Claimed Savings Adjustments by Program

Program	EM&V demand claimed reduction adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Commercial Midstream MTP	-1.34	-16,223.30
Commercial SOP	15.51	172,211.80
Small Business Direct Install MTP	-1.63	-10,069.40
Strategic Energy Management MTP (Pilot)	3.86	-101,265.00
Residential New Home Construction	0.79	1,705.02
Total	**17.19**	**46,359.12**

4.4 DETAILED FINDINGS—COMMERCIAL

4.4.1 Commercial Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
4.7%	8,792	8,793	100.0%	22.9%	53,443,611	53,443,241	100.0%	Good

Completed desk reviews*	On-site M&V visit
26	13

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial SOP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for 12 projects; 4 had an adjustment of less than five percent adjustments, and 8 projects had an adjustment of greater than five percent compared to the originally claimed savings. Oncor accepted the evaluated results and did not match the claimed kilowatt-hour and kilowatt savings for the projects with less than a five percent adjustment. Including the non-adjusted values, the final program realization rate rounds to 100 percent. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-2-16427: A new manufacturing plant installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted the exterior area to separate the outdoor parking areas and drives and outdoor loading docks. The EM&V team also adjusted fixture wattages based on the wattages found on the DesignLights Consortium (DLC) qualified product list (QPL). Lastly, some of the fixture models were adjusted based on the post-installation report. Overall, these adjustments increased demand reductions and resulted in a realization rate of 115 percent. The adjustments also increased energy savings and resulted in a realization rate of 112 percent.

Participant ID 4-5-1-2-17512: A multifamily property installed new heat pumps and smart thermostats in the units. During the desk review, the EM&V team adjusted the efficiency of the units controlled to match the new heat pumps installed. This adjustment did not impact the demand reductions and resulted in a realization rate of 100 percent. This adjustment increased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 4-5-1-2-17561: Outdoor lighting was replaced with new LED lighting in five different parking areas. During the desk review and on-site M&V visit, the EM&V team identified that less than ten percent of the lighting fixtures were non-operational when replaced, so the ex-ante adjustment for non-operating fixtures was removed. This adjustment increased demand reductions and resulted in a realization rate of 112 percent. The adjustment also increased energy savings and resulted in a realization rate of 112 percent.

Participant ID 4-5-1-2-17591: A new construction warehouse installed *interior and exterior LED lighting.* During the desk review, the EM&V team removed the 23 W non-qualifying LED fixture because they were not included in the engineering drawings, and the post-inspection stated that the fixture's light did not reach the pavement. One fixture was adjusted from 209.5 W to 220 W based on the DLC QPL, and the control type for the fixtures was adjusted from *multiple* to *OS*. A second fixture wattage was adjusted from 10.5 W to 25 W based on the ENERGY STAR product listing. Overall, these adjustments slightly decreased demand reductions and resulted in a realization rate of 99 percent. The adjustments also slightly decreased energy savings and resulted in a realization rate of 99 percent.

Participant ID 4-5-1-2-17611: An auto repair shop completed an interior and exterior LED lighting retrofit. During the desk review, the EM&V team adjusted the percentage of non-operational interior fixtures to 25.27 percent and the non-operational exterior fixtures to 0 percent. These adjustments increased demand reductions and resulted in a realization rate of 166 percent. The adjustments also increased energy savings and resulted in a realization rate of 230 percent.

Participant ID 4-5-1-2-17632: A pharmacy completed an interior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted baseline fixture types and quantities based on submitted fixture mapping and photo documentation. This adjustment slightly decreased demand reductions and resulted in a realization rate of 97 percent. The adjustments also slightly decreased energy savings and resulted in a realization rate of 97 percent.

Participant ID 4-5-1-2-17670: A high school sports complex completed an interior and exterior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the percentage of non-operational interior fixtures to 10 percent and the non-operational exterior fixtures to 18.73 percent. These adjustments increased demand reductions and resulted in a realization rate of 110 percent. This adjustment also increased energy savings and resulted in a realization rate of 111 percent.

Participant ID 4-5-1-2-17720: A warehouse completed an interior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team found that the difference in savings was attributed to the order of calculations, which is not prescribed within the TRM. The realization rate was going to be adjusted to 100 percent for both energy and demand savings; however, the utility made the adjustments in their tracking system. This adjustment decreased demand reductions and resulted in a realization rate of 77 percent. The adjustment also decreased energy savings and resulted in a realization rate of 77 percent.

Participant ID 4-5-1-2-17763: A restaurant in a strip mall completed an exterior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the non-operational fixture percentage to less than ten percent of the baseline fixtures, which eliminated the adjustment factor on the savings. This adjustment increased demand reductions and resulted in a realization rate of 114 percent. The adjustments also increased energy savings and resulted in a realization rate of 114 percent.

Participant ID 4-5-1-2-17791: A warehouse completed an interior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the control to be completed by occupancy sensors from multiple because the sensors do not meet the specifications of multiple controls. This adjustment decreased demand reductions and resulted in a realization rate of 81 percent. The adjustments also decreased energy savings and resulted in a realization rate of 81 percent.

Participant ID 4-5-1-3-20114: An office building installed ten new water-cooled direct expansion (DX) air-conditioning units. During the desk review, the EM&V team adjusted the cooling capacity to match the rated capacity. This adjustment slightly decreased demand reductions but resulted in a realization rate that rounded to 100 percent. This adjustment also slightly decreased energy savings but resulted in a realization rate that rounded to 100 percent.

Participant ID 4-5-1-3-20446: A new construction warehouse installed LED lighting. During the desk review, the EM&V team added the exterior lighting savings; the ex-ante claimed interior lighting savings only. This adjustment increased demand reductions and resulted in a realization rate of 115 percent. This adjustment also increased energy savings and resulted in a realization rate of 119 percent.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity; equipment capacity; QPL qualifications; Air Conditioning, Heating, and Refrigeration Institute certifications) for the 26 projects that had desk reviews because sufficient documentation was provided for the sites. However, a few projects had missing or incomplete documentation, including certifications, savings calculations, invoices, photos, and limited inspection notes. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, however, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

4.4.2 Small Business Direct Install Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.0%	65	65	100.0%	0.1%	296,275	296,430	100.1%	Good

Completed desk reviews*	On-site M&V visit
6	4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Small Business Direct Install MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for four projects. One project had less than five percent adjustments, and the other three projects had adjustments greater than five percent compared to the originally claimed savings. Oncor accepted the evaluated results and did not match the claimed kilowatt-hour and kilowatt savings for the projects with less than a five percent adjustment. Including the non-adjusted values, the final program realization rate is approximately 100 percent. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-3-48704: A fast food restaurant completed an interior and exterior LED retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the percentage of non-operational interior fixtures to 33 percent and the non-operational exterior fixtures to 100 percent. The EM&V team calculated the savings by obtaining the quantities and fixture types from the detailed photo documentation. The adjustments decreased demand reductions and resulted in a realization rate of 48 percent. The adjustments also decreased energy savings and resulted in a realization rate of 51 percent.

Participant ID 4-5-1-3-48730: A small restaurant completed an interior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the percentage of non-operational fixtures to less than ten percent, which removed an adjustment factor in the savings calculation. The fixture wattage for the LED tubes installed was adjusted to 14 W from 15 W based on the DLC QPL. These adjustments slightly increased demand reductions and resulted in a realization rate of 101 percent. The adjustments also slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 4-5-1-3-48772: A donut shop completed an interior LED retrofit. During the desk review, the EM&V team adjusted the percentage of non-operational fixtures to 30 percent. The EM&V team calculated the savings by obtaining the quantities and fixture types from the detailed photo documentation. These adjustments increased demand reductions and resulted in a realization rate of 124 percent. The adjustment also increased energy savings and resulted in a realization rate of 123 percent.

Participant ID 4-5-1-3-48776: A barbershop completed an interior and exterior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the exterior fixtures from a 60 W fixture to four LED tubes. The fixture wattage for the LED tubes installed was adjusted to 14 W from 15 W based on the DLC QPL. The EM&V team included the front door fixtures based on the provided photos. The quantity and type of baseline and installed fixtures were adjusted based on the main area shown in the photos provided. These adjustments increased demand reductions and resulted in a realization rate of 134 percent. The adjustment also increased energy savings and resulted in a realization rate of 131 percent.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity; equipment capacity; QPL qualifications; Air Conditioning, Heating, and Refrigeration Institute certifications) for the six projects that had desk reviews because sufficient documentation was provided for the sites. However, a few projects had missing documentation, including photos and savings calculations, invoices, photos, and limited inspection notes, which made verifying demand reductions and/or energy savings difficult. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, however, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

4.4.3 Commercial Midstream Market Transformation Program (MTP)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.3%	644	644	100.0%	1.0%	2,320,605	2,320,605	100.0%	Good

Completed desk reviews*	On-site M&V visit
8	5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial Midstream MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for one project, which had adjustments greater than five percent compared to the originally claimed savings. Oncor accepted the evaluated results and matched the claimed kilowatt-hour and kilowatt savings. The final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-2-17502: A midstream purchase of three packaged air-conditioning units for an entertainment venue. During the desk review and on-site M&V visit, the EM&V team adjusted the building type from *large office* to *public assembly*. The adjustments decreased demand reductions and resulted in a realization rate of 85 percent. The adjustments also decreased energy savings and resulted in a realization rate of 68 percent.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications, AHRI certifications) for the eight projects that had desk reviews because sufficient documentation was provided for the sites. Good documentation was provided for a midstream program. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team was satisfied with the project documentation provided and assigned a *good* program documentation score.

4.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. Therefore, the scope and related findings in the following sections are limited. All residential programs and subprograms included in the consumption analysis received a tracking system review for program impacts, which included verification of claimed savings against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

4.5.1 Residential New Home Construction Market Transformation Program (MTP)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
1.8%	3,361	3,361	100.0%	2.4%	5,667,460	5,667,460	100.0%	Good

Completed desk reviews*
5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Residential New Home Construction MTP evaluation efforts focused on desk reviews. The number of completed desk reviews for this program is listed above. Five desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team adjusted the claimed savings for all five projects. One project had adjustments of less than five percent compared to the originally claimed savings, while four projects had adjustments of greater than five percent compared to the originally claimed savings. Oncor accepted the evaluated results and matched the claimed savings for the four projects with significant adjustments; therefore, the final program realization rates were 100 percent for both demand reductions and energy savings. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-2-33590: The energy efficiency project included whole-home new construction savings along with the installation of a heat pump and an ENERGY STAR thermostat for a single-family home. During the desk review, the EM&V team adjusted the capacities and efficiencies using seasonal energy efficiency rating 2/energy efficiency rating 2 (SEER2/EER2) ratings found in the AHRI certifications. Overall, the adjustments resulted in project-level realization rates of 121 percent and 65 percent for demand reductions and energy savings, respectively.

Participant ID 4-5-1-2-33681: The energy efficiency project included whole-home new construction savings along with the installation of a central air conditioner and an ENERGY STAR thermostat for a single-family home. During the desk review, the EM&V team determined that rounding was the reason for the slight deviation in demand reductions. Overall, the adjustments resulted in a project-level realization rate of 103 percent for demand reductions, while energy savings remained unchanged at 100 percent. The adjustments did not impact the energy savings, so the project-level realization for energy savings remains at 100 percent. Because the project was within the adjustment threshold, the utility did not adjust ex-ante savings to match the ex-post savings.

Participant ID 4-5-1-2-35705: The energy efficiency project included whole-home new construction savings along with the installation of a central air conditioner and an ENERGY STAR thermostat for a single-family home. During the desk review, the EM&V team found significant discrepancies compared to the ex-ante savings reported in the fuel summary report. Also, the EM&V team adjusted the SEER value used from SEER2 to SEER. Overall, the adjustments resulted in project-level realization rates of 117 percent and 161 percent for demand reductions and energy savings, respectively.

Participant ID 4-5-1-2-35725: The energy efficiency project included whole-home new construction savings along with the installation of a central air conditioner and an ENERGY STAR thermostat for a single-family home. During the desk review, the EM&V team found significant discrepancies compared to the ex-ante savings reported in the fuel summary report. Overall, the adjustments resulted in project-level realization rates of 143 percent and 208 percent for demand reductions and energy savings, respectively.

Participant ID 4-5-1-2-37106: The energy efficiency project included whole-home new construction savings along with the installation of a central heat pump, an ENERGY STAR thermostat, an ENERGY STAR dishwasher, and an ENERGY STAR refrigerator for a single-family home. During the desk review, the EM&V team found significant discrepancies compared to the ex-ante savings reported in the fuel summary report. The EM&V team found that the appliances were included in the new homes model, which may be the reason for the deviation in savings. Overall, the adjustments resulted in project-level realization rates of 91 percent and 95 percent for demand reductions and energy savings, respectively.

Documentation Score

The EM&V team was able to verify all of the key inputs and assumptions, including the project scope, baselines, and equipment specifications for most of the measures of the sampled projects that had desk reviews. The documentation provided was very good. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good.*

4.6 DETAILED FINDINGS—LOW-INCOME

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. Therefore, the scope and related findings in the following sections are limited. All low-income programs and subprograms included in the consumption analysis received a tracking system review for program impacts, which included verification of claimed savings against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

4.6.1 Low-Income HVAC Tune-Up Market Transformation Program (Pilot) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
1.0%	1,888	1,888	100.0%	1.8%	4,167,414	4,167,477	100.0%	Fair

Completed desk reviews*
4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Low-Income HVAC Tune-Up MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for all four projects, which all had an adjustment of less than five percent. Oncor accepted the evaluated results and did not match the claimed savings for the four projects. The final program realization rates for both demand reductions and energy savings were rounded to 100 percent. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-2-23999: An apartment unit received a tune-up for a 1.5-ton air conditioning (AC) unit. During the desk review, the EM&V team adjusted the elevation to 50 feet based on the site address. This adjustment did not affect demand reductions, so the realization rate is 100 percent. However, the adjustment slightly increased energy savings and resulted in a realization rate of 102 percent.

Participant ID 4-5-1-2-24039: An apartment unit in the same building as the previously described project received a tune-up for a 1.5-ton AC unit. During the desk review, the EM&V team made the same adjustment to the elevation based on the site address. This adjustment did not affect demand reductions, so the realization rate is 100 percent. However, the adjustment slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 4-5-1-2-24357: An apartment unit received a tune-up for a 1.5-ton AC unit. During the desk review, the EM&V team adjusted the elevation to 118 feet based on the site address. This adjustment slightly increased demand reductions and resulted in a realization rate of 101 percent. The adjustment also slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 4-5-1-2-25114: A manufactured home received a tune-up for a 3-ton AC unit. During the desk review, the EM&V team adjusted the elevation to 50 feet based on the site address. This adjustment did not affect demand reductions, so the realization rate is 100 percent. However, the adjustment slightly increased energy savings and resulted in a realization rate of 101 percent.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., calculation methodology; equipment capacity) for the four projects that had desk reviews because sufficient documentation was provided for the sites. However, some projects were missing documentation, such as invoices and customer information. It is noted that the documentation submitted did not meet the upgraded requirements for the Low-Income HVAC Tune-Up MTP for next year. Complete documentation enhances the accuracy and transparency of project savings along with ease of evaluation. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair*.

4.7 DETAILED FINDINGS—LOAD MANAGEMENT

4.7.1 Commercial Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
38.8%	72,713	74,358	102.3%	0.1%	218,138	223,074	102.3%	Good

Completed desk reviews*
N/A

**The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants. Claimed savings are conservative as they only include the amount of demand reduction in participation contracts.

The EM&V team evaluated the Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. A single load management event occurred on June 16, 2023, from 3:00 p.m. to 6:00 p.m. (scheduled). There were no unscheduled events in PY2023[29].

The EM&V team received the interval meter data and spreadsheets detailing the Oncor calculated baseline load, event load, and savings results for the 15 sponsors across 882 sites. Three hundred and ninety-six sites did not participate in the scheduled event. All sponsors had at least one site that curtailed during the scheduled event[30].

[29] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for ERCOT Energy Emergency Alert Level 2 (EEA2) or system reliability.

[30] See the Report Volume 1 recommendation to monitor load management cooperation rates.

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated kilowatt savings matched the claimed kilowatt savings Oncor provided for all sites except those with negative savings. While reviewing individual meter savings differences, the EM&V team found that Oncor uses a conservative approach by not setting savings to zero in cases where the calculation methodology produced negative savings. Per the TRM, the negative savings can be set to zero for cases that produce negative savings.

After calculating the kilowatt savings, the kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team's (evaluated) and Oncor's (claimed) calculated kilowatt and kilowatt-hour savings. After setting the negative savings to zero, the EM&V team calculated additional achieved savings of 1,645 kW and 4,936 kWh. The realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

4.7.2 Residential Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
14.2%	26,699	26,699	100.0%	0.0%	80,098	80,097	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the Residential Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. A single load management event occurred on June 16, 2023, from 3:00 p.m. to 6:00 p.m. (scheduled). There were no unscheduled events in PY2023.

The EM&V team received the interval meter data and spreadsheets detailing the Oncor calculated baseline load, event load, and savings results for each service provider and meter. Additionally, Oncor provided documentation for meters that received zero savings from the calculation or had no meter data available during the event but were confirmed as having participated by the service provider. These meters totaled 0.3 percent of the program population and were included for each service provider by applying the average savings (per the TRM, savings may still be calculated for less than two percent of meters that fail to record data sufficient to apply the *High 3 of 5* baseline calculation method).

After the EM&V team applied the *High 3 of 5* baseline calculation method, it was found that the evaluated kilowatt savings matched the claimed kilowatt reductions Oncor provided for all participating meters. The kilowatt-hour savings for each participating meter were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all meter-level savings.

The table above shows both the EM&V team's (evaluated) and Oncor's (claimed) calculated kilowatt and kilowatt-hour savings. No adjustments were made to the program savings; however, a negligible difference in kilowatt and kilowatt-hour was a result of different rounding practices during calculations. The realization rate for both kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

4.7.3 Winter Commercial Emergency Load Management Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
11.9%	22,278	22,298	100.1%	0.0%	66,835	66,894	100.1%	Good

Completed desk reviews*
N/A

**The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants. Claimed savings are conservative as they only include the amount of demand reduction in participation contracts.

The EM&V team evaluated the Winter Commercial Emergency Load Management MTP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments. A single load management event occurred on December 12, 2022, from 7:00 a.m. to 10:00 a.m. (scheduled).[31] There were no unscheduled events in PY2023.

The EM&V team received the interval meter data and spreadsheets detailing the Oncor calculated baseline load, event load, and savings results for the five sponsors across 26 sites. Two sites did not participate in the scheduled event. All sponsors had at least one site that curtailed during the scheduled event.

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated kilowatt savings matched the claimed kilowatt savings Oncor provided for all sites except those with negative savings. While reviewing individual meter savings differences, the EM&V team found that Oncor uses a conservative approach by not setting savings to zero in cases where the calculation methodology produced negative savings. Per the TRM, the negative savings can be set to zero for cases that produce negative savings.

[31] Due to generator issues, one meter had a separate scheduled event on February 24, 2023, from 3:00 p.m. to 6:00 p.m.

After calculating the kilowatt savings, the kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team (evaluated) and Oncor's (claimed) calculated kilowatt and kilowatt-hour savings. After setting the negative savings to zero, the EM&V team calculated additional achieved savings of 20 kW and 59 kWh. The realization rate for kilowatt and kilowatt-hour is just over 100 percent, with a documentation score of *good*.

4.8 DETAILED FINDINGS—CROSS-SECTOR PROGRAMS

4.8.1 Retail Products Market Transformation Program (MTP)

Sector	Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
Residential	9.3%	17,481	17,481	100.0%	39.6%	92,195,406	92,195,406	100.0%	Good

Completed desk reviews*
4

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Retail Products MTP evaluation efforts focused on desk reviews for residential smart thermostats. The number of completed desk reviews for this program is listed above. Four desk reviews were completed for smart thermostats to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team did not adjust the claimed savings for any of the five projects; therefore, the final program realization rate is 100 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, ENERGY STAR qualifications) for the projects that had desk reviews because sufficient documentation was provided for the sites. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

4.9 DETAILED FINDINGS—PILOT PROGRAMS

4.9.1 Strategic Energy Management Market Transformation Program (Pilot) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
0.5%	895	895	100.0%	3.4%	7,807,985	7,805,217	100.0%	Good

Completed desk reviews*	Completed On-site M&V
6	2

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Strategic Energy Management (SEM) MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for one project. The one project had an adjustment that was greater than five percent compared to the originally claimed savings. Oncor accepted the evaluated results and partially adjusted the claimed kilowatt-hour and kilowatt savings. The final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 4-5-1-2-46039: A manufacturing plant implemented three projects related to compressed air checks, one lighting retrofit, one compressed air wand, one preheater retirement, one year-end shutdown, and one weekend shutdown while in the first year of the SEM program. During the desk review, the EM&V team adjusted the shutdown period portion of the project to consist of four weekend days and seven weekday days, adjusted the weather to use NASA Power Data for Brownwood, TX, and excluded the first data point of the year, which corresponded with New Years' Day weekend. For the compressed air projects, the EM&V team adjusted the operating hours and line pressure, and specifically for the air wand project, the EM&V team adjusted the number of shifts from 3 to 2.5. Lastly, the EM&V team used the PDPF method to determine kilowatt reductions for the project components. Overall, these adjustments slightly increased demand reductions and resulted in a realization rate of 103 percent. However, the adjustments decreased energy savings and resulted in a realization rate of 95 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., calculation methodology, equipment capacity) for the six projects that had desk reviews because sufficient documentation was provided for the sites. Some of the projects were missing documentation, such as post-inspection reports. However, the utility and implementer had regular communication with the implementer throughout the year as projects evolved to support communal understanding. Complete documentation enhances the accuracy and transparency of project savings and the ease of evaluation. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

4.10 SUMMARY OF TRACKING-SYSTEM-ONLY EVALUATED PROGRAMS

Table 10 summarizes claimed savings for Oncor's programs in PY2023 that only received a tracking system review for program impacts. The programs' claimed savings were verified against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

Table 15. PY2023 Claimed Savings (Tracking-System-Only Evaluated Programs)*

Program	Contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)
Retail Products MTP (commercial)	1.4%	2,683	2,683	100.0%	6.0%	13,861,056	13,861,056	100.0%
Master-Metered Smart Thermostat Direct Install (Pilot)	0.0%	0	0	0.0%	0.0%	0	0	0.0%
Multifamily Smart Thermostat Direct Install MTP (Pilot)**	0.0%	0	0	0.0%	0.8%	1,889,836	1,889,836	100.0%
Low-Income Multifamily Smart Thermostat Direct Install MTP (Pilot)**	0.0%	0	0	0.0%	0.3%	766,815	766,815	100.0%
Solar PV SOP (residential)	0.6%	1,167	1,167	100.0%	1.7%	3,910,668	3,910,668	100.0%
Solar PV SOP (commercial)	1.0%	1,883	1,883	100.0%	2.5%	5,875,626	5,875,626	100.0%
Hard-to-Reach SOP	6.8%	12,694	12,694	100.0%	6.6%	15,426,762	15,426,762	100.0%

* Tracking system reviews conducted for each residential program included in the residential consumption analysis are not shown in this table.

** Program data were not available for comprehensive evaluation activities to be conducted in PY2023.

5.0 TEXAS-NEW MEXICO POWER COMPANY IMPACT EVALUATION RESULTS

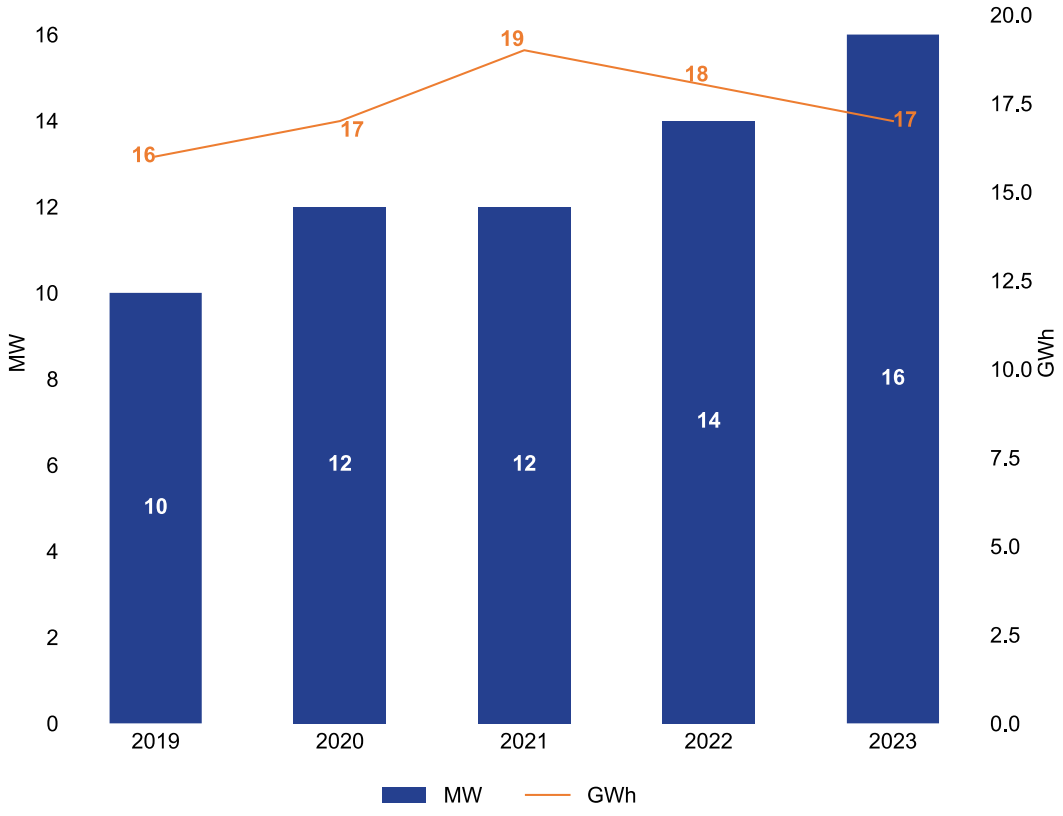
5.1 YEAR-OVER-YEAR COMPARISONS

This section provides a trend analysis for Texas-New Mexico Power Company's (TNMP) program performance during program year (PY) 2019 (PY2019) through PY2023. This trend analysis provides insight into the PY2023 results included in Sections 5.2 through 5.6.

5.1.1 PY2019–PY2023

PY2023 saw a slight increase in demand reductions and a decrease in energy savings across TNMP's portfolio (Figure 28). Savings in PY2023 are consistent with savings in PY2020. New federal standards in lighting and air conditioners came into effect in PY2023, decreasing energy savings across all utilities. The addition of a new winter load management program helped TNMP achieve an increase in demand reductions.

Figure 28. TNMP's Demand Reduction and Energy Savings across Program Years, PY2019-PY2023[32]



[32] Demand reductions are reported in megawatts (MW) and energy reductions are reported in gigawatt-hours (GWh).

Load management programs achieved 63.6 percent of TNMP's demand reduction goal in PY2023 (Figure 29, left). Compared to the other ERCOT utilities, TNMP programs achieved more demand reductions through energy efficiency programs than average—36.4 percent compared to the 29.8 percent average. [33] Commercial MTPs, residential SOPs, LI programs, and HTR programs were all contributors to TNMP's demand reductions beyond load management.

- **Recommendation:** The PUCT and EM&V team should discuss TNMP's successful strategies used to achieve over one-third of portfolio savings through energy efficiency and any future plans to increase this percentage.

In PY2023, energy savings (Figure 29 right) were achieved by the commercial MTPs. TNMP does not offer a Commercial SOP like the other ERCOT utilities.

- **Recommendation:** The PUCT and evaluation, measurement, and verification (EM&V) team should discuss with TNMP the reasons for not offering a Commercial SOP, and future plans for balancing the program design of commercial MTPs and SOPs.

The percentages of reductions and savings from each program type across program years have remained relatively consistent, though it is worth noting the growth in LI and HTR programs in PY2023. TNMP had the largest percentage of reductions and savings from LI and HTR programs among the ERCOT IOUs.

- **Recommendations:** The PUCT and EM&V team should discuss with TNMP how they have successfully increased savings to LI/HTR customers, including differences across the distinct areas within their territory.[34]

[33] PY2023 Investor-Owned Utilities Energy Efficiency Portfolio Report, Volume 1, Executive Summary, Figure 4.

[34] The consumption analysis indicated strong performance of TNMP's' LI program (refer to Volume 1 Technical Appendix A).

Figure 29. TNMP's Demand Reduction and Energy Savings by Program Type, PY2019-PY2023[35]

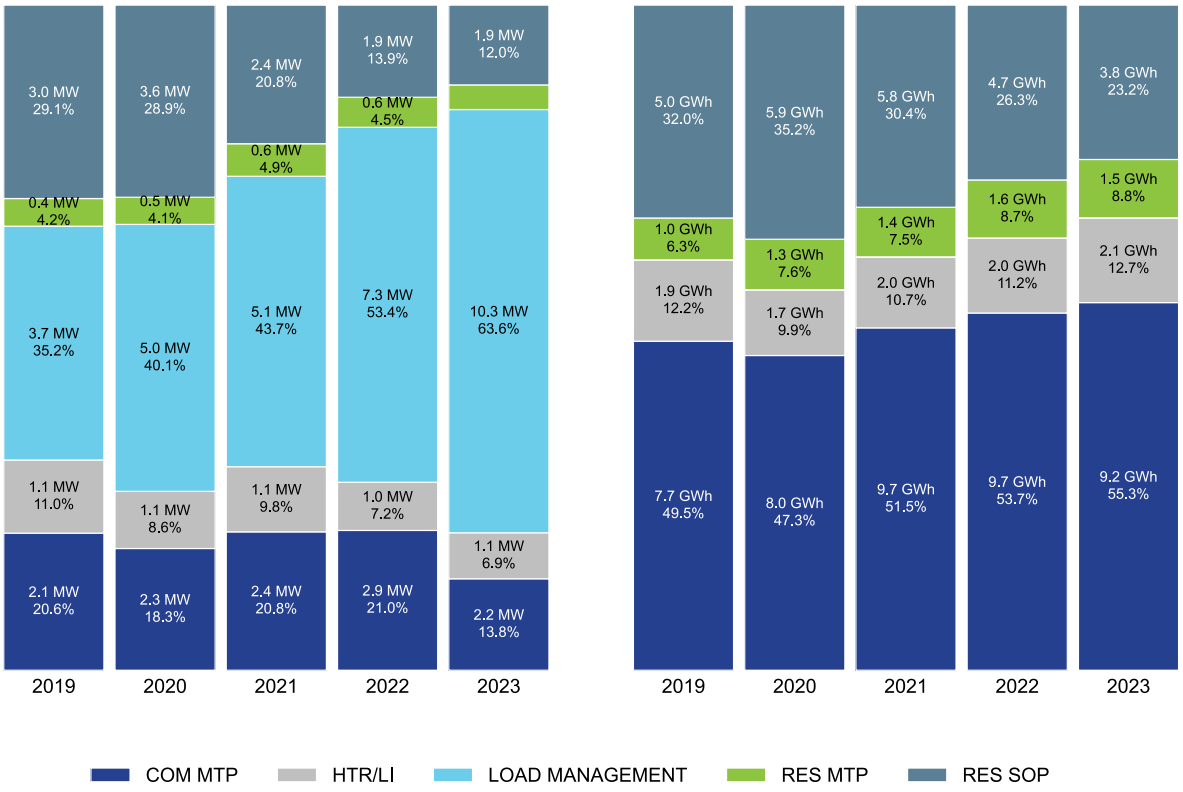
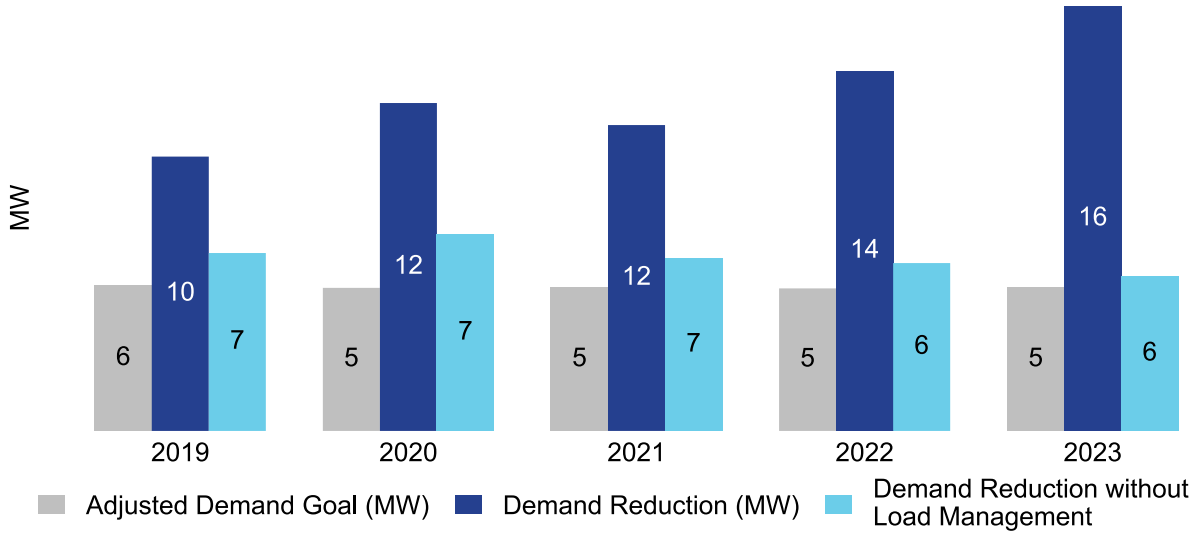


Figure 30 depicts TNMP's performance against their legislated demand reduction goal, with and without load management, from PY2019 to PY2023. TNMP differentiates itself from the other eight utilities by consistently meeting legislated goals through energy efficiency alone.

- **Recommendation:** The PUCT and EM&V should discuss with TNMP how they have employed strategies in their program design to fully achieve the legislated goals for energy efficiency without load management programs.

[35] Demand reductions are reported in megawatts (MW) and energy reductions are reported in gigawatt-hours (GWh).

Figure 30. TNMP's Legislated Goals and Demand Reduction, PY2019-PY2023



5.1.1.1 Commercial Savings

The PY2023 gross savings from TNMP's commercial sector programs were:

- 2.22W MW of demand reduction and
- 9.16 GWh of energy savings.

Figure 31 depicts the achievement of TNMP's commercial programs, excluding load management, from PY2019-PY2023. In PY2023, TNMP's commercial programs saw a decrease in demand reductions from PY2022, resulting in similar achievements to PY2021.

Figure 31. TNMP's Demand Reduction and Energy Savings by Program Year—Commercial Programs, Excluding Load Management, PY2019–PY2023

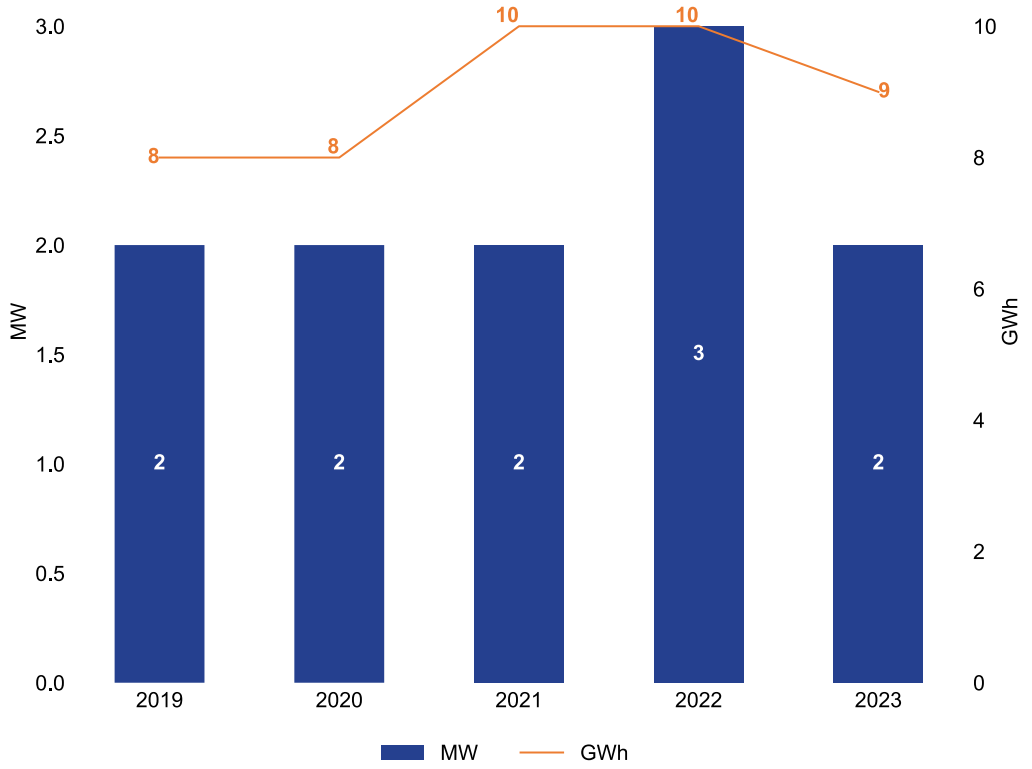


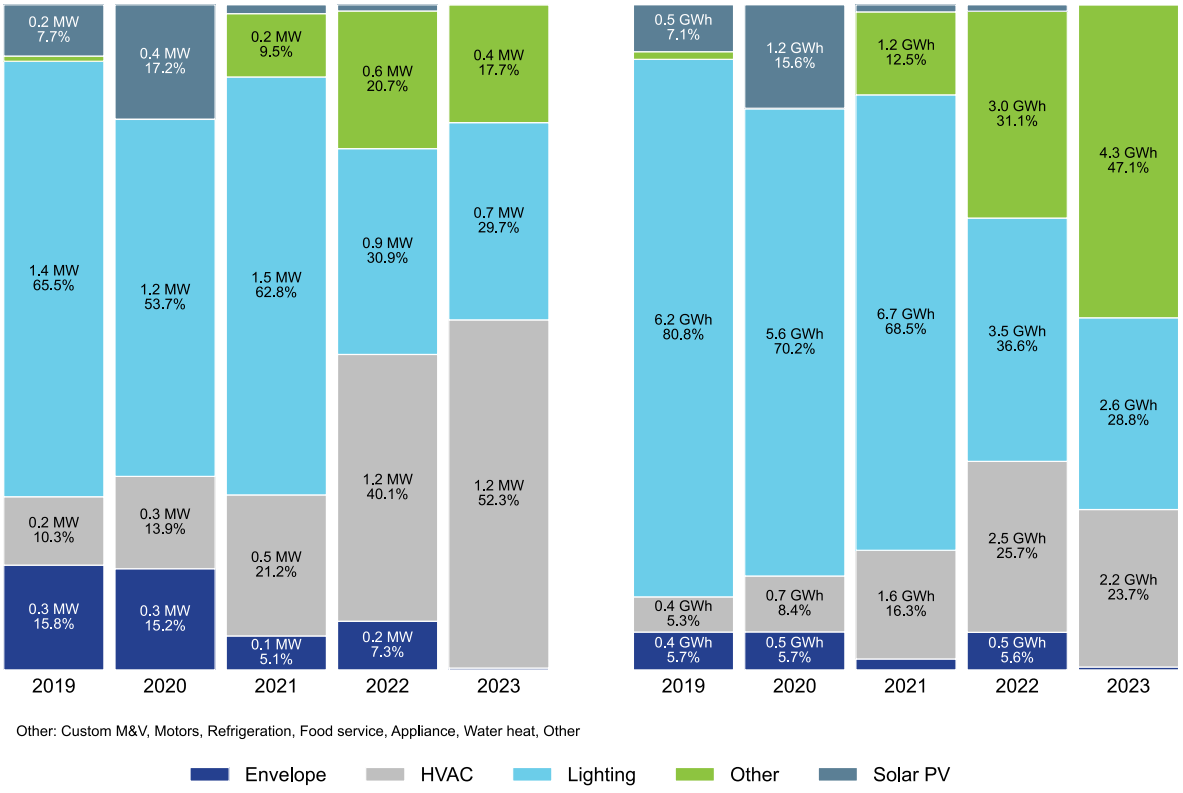
Figure 32 represents the breakdown of demand reductions and energy savings by measure category for TNMP's commercial programs, excluding load management.

HVAC measures accounted for over one-half of the demand reductions and about one-quarter of the energy savings—52 percent and 24 percent, respectively. About three-quarters of the reductions and savings from the *HVAC* measure are from the *AC/HP tune-up* measure. *Lighting* measures continued to decrease in size from PY2022 to PY2023 to below 30 percent for both demand reductions and energy savings.

The *other* measure category was primarily the result of one large custom project to control a very large pump motor. This custom project accounted for 47 percent of TNMP's commercial program energy savings and 17 percent of TNMP's commercial program demand reductions.

- **Recommendation:** The PUCT and EM&V team should discuss TNMP's successful strategies used to diversify the commercial measure mix beyond *lighting*.

Figure 32. TNMP's Demand Reduction and Energy Savings by Measure Category—Commercial Programs, Excluding Load Management, PY2019–PY2023



5.1.1.2 Residential Savings

The PY2023 gross savings from TNMP's residential sector programs (excluding load management) were:

- 3.65 MW of demand reduction and
- 7.402 GWh of energy savings.

Figure 33 depicts the achievement of TNMP's residential programs, excluding load management, from PY2019-PY2023.

In PY2023, the demand reductions achieved by TNMP's residential programs were the second lowest in the last five years, with energy savings at the lowest in the last five years. Some of the decreases in demand reductions and energy savings for TNMP were due to changes in the residential lighting changes to the EISA backstop in PY2022, new federal standards for HVAC in 2023, and updates to the TRM in PY2021.

Figure 33. TNMP's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023

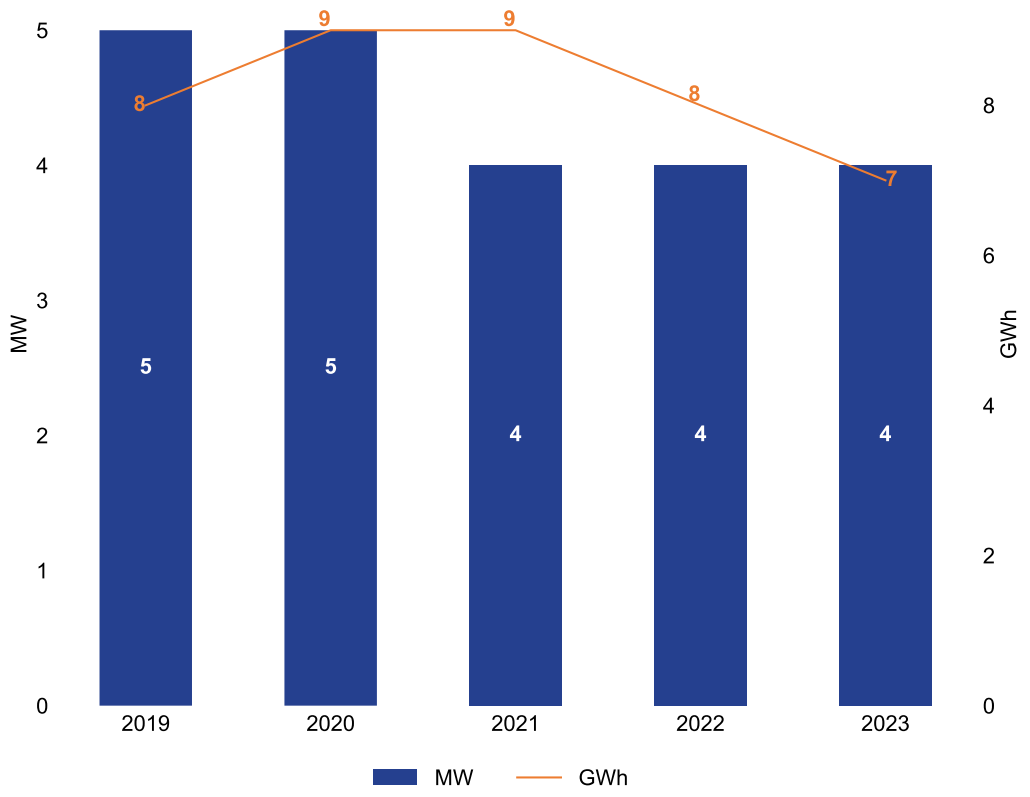
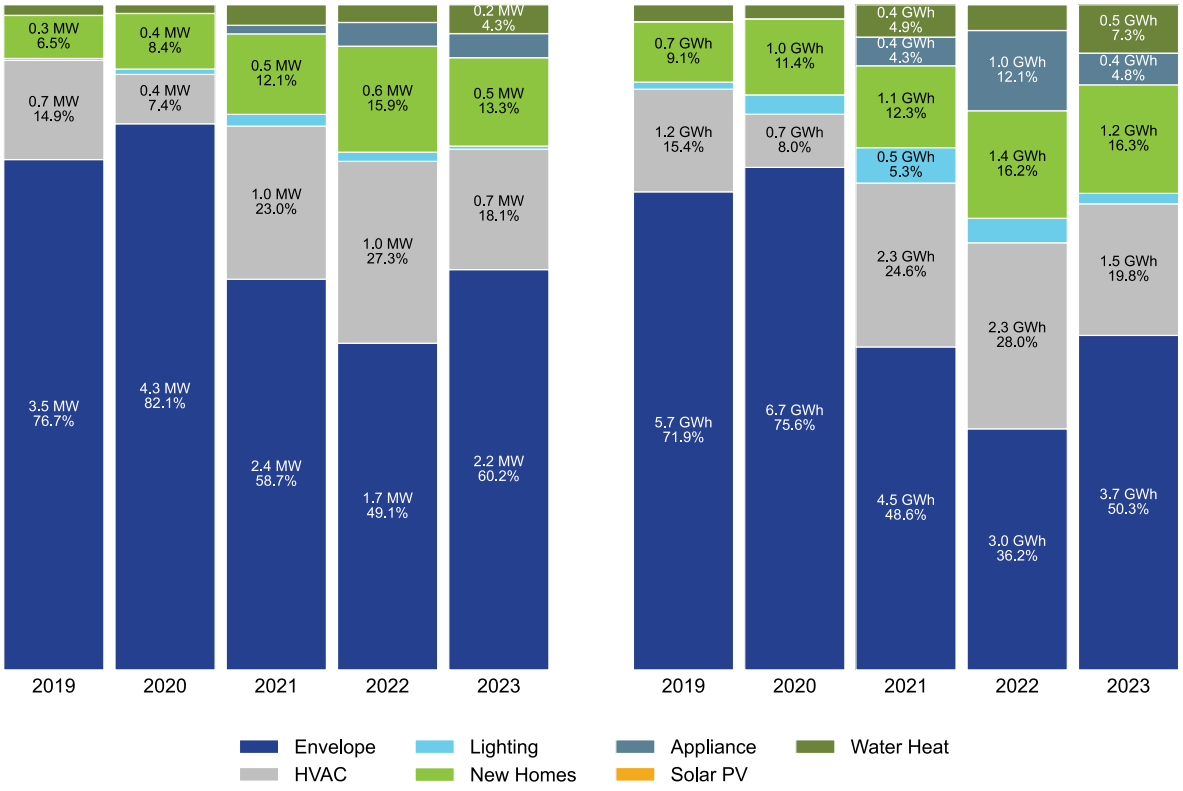


Figure 34 represents the breakdown of demand reductions and energy savings by measure category for TNMP's residential programs, excluding load management.

In PY2023, the demand reductions and energy savings from TNMP's residential programs were primarily derived from *envelope* measures, representing nearly two-thirds of kilowatts and one-half of kilowatt-hours—60.2 percent and 50.3 percent, respectively. From PY2022 to PY2023, demand reductions from *envelope* measures increased by 11.1 percent. *HVAC* measures were the second highest contributor to demand reductions and energy savings in both PY2022 and PY2023, while *new homes* measures were a close third for both demand reductions and energy savings in PY2023.

Figure 34. TNMP's Demand Reduction and Energy Savings by Measure Category—Residential Programs, Excluding Load Management, PY2019–PY2023



5.1.1.3 Load Management Savings

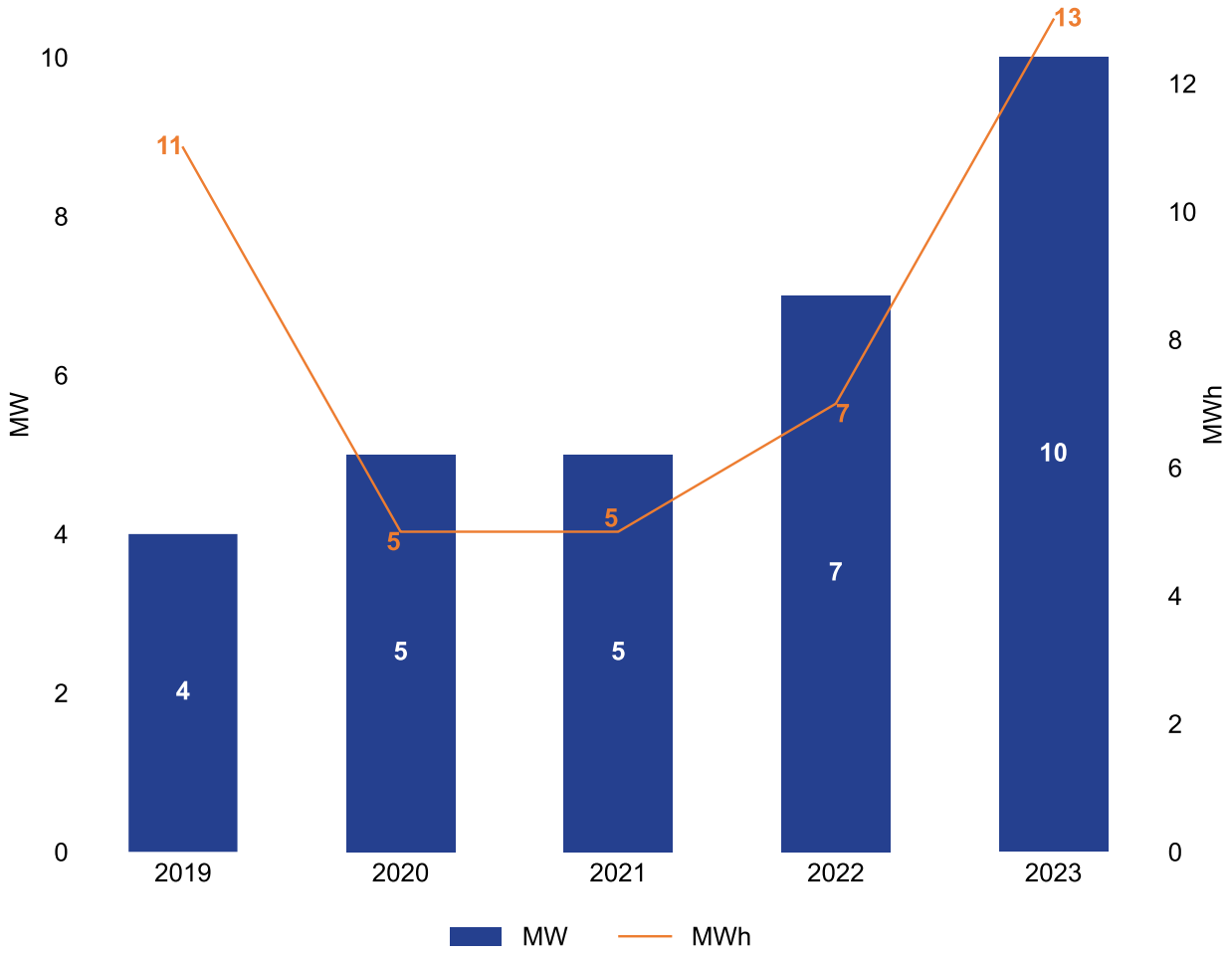
The PY2023 gross savings from TNMP's load management programs were:

- 10.278 MW of demand reduction and
- 0.013 GWh of energy savings.

Figure 35 depicts the demand reductions and energy savings achieved by TNMP's load management programs from PY2019-PY2023. In PY2023, demand reductions increased from 7 MW to 10 MW, continuing a trend of consistent growth since PY2021. In PY2023, participation in the summer load management program decreased but did not impact demand reductions. TNMP introduced a winter load management program into their portfolio in PY2023, which served as a driver for the relatively higher percentage increase in demand reduction.

Energy savings are dependent upon the number of curtailment events called each year and their duration. Overall, energy savings from TNMP's load management programs have followed the demand reduction pattern over the past few years—with the exception of PY2019, in which the increased number of events and their duration resulted in higher energy savings than demand reductions.

Figure 35. TNMP's Demand Reduction and Energy Savings by Program Year—Load Management Programs, PY2019–PY2023

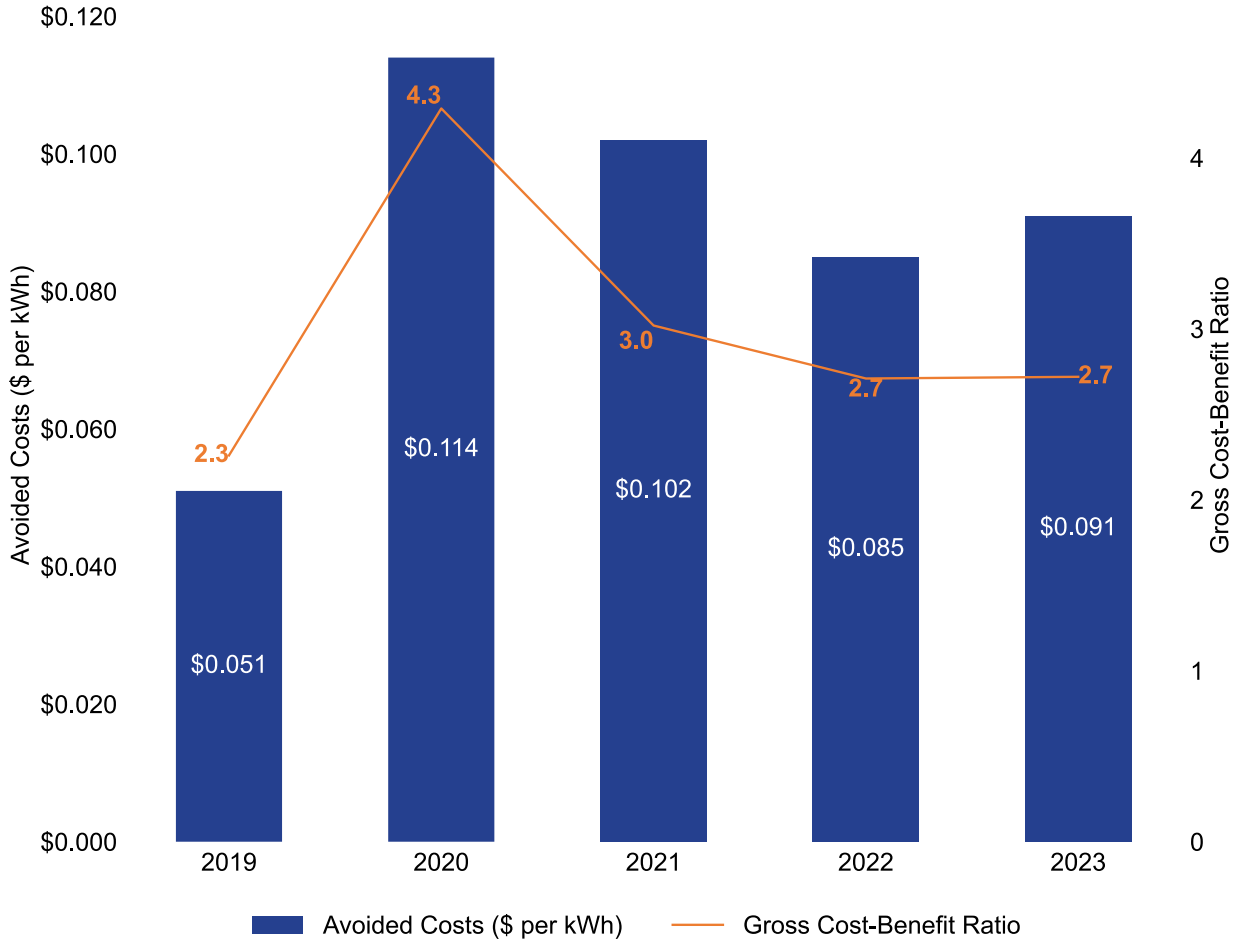


5.1.2 Cost-Effectiveness

Figure 36 overviews the avoided costs and cost-effectiveness ratios for TNMP from PY2019-PY2023.[36] While PY2020 saw a high of 4.3, the cumulative cost-effectiveness of TNMP's programs remains healthy at 2.7 in PY2023. The overall cost-effectiveness ratio has consistently remained above 2.0 for TNMP, with the cost-effectiveness ratios over the last four years being high largely due to the higher avoided costs of energy.

[36] IOU program cost-effectiveness tests compare the benefits of the programs to the costs – a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

Figure 36. TNMP's Gross Cost-Benefit Ratio and Avoided Cost by Program Year, PY2019-PY2023



5.2 KEY FINDINGS

This section presents the evaluated savings and cost-effectiveness results for TNMP's energy efficiency portfolio. The key findings are summarized first, followed by details for each program's portfolio with a *high* or *medium* evaluation priority.

5.2.1 Evaluated Savings

TNMP's evaluated savings for PY2023 were 16,153 in demand reductions (kilowatt, kW) and 16,579,845 in energy savings (kilowatt-hour, kWh). The overall kilowatt and kilowatt-hour portfolio realization rates are approximately 100 percent. TNMP was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (see Table 19), supporting healthy realization rates.

Table 16 shows the claimed and evaluated demand reductions for TNMP's portfolio and broad customer sector and program categories. Residential and load management results are based on census reviews, and therefore, precision calculations are not applicable (N/A).

Table 16. TNMP PY2023 Claimed and Evaluated Demand Reductions

Level of analysis	Percentage portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Precision at 90% confidence
Total portfolio	**100.0%**	**16,152**	**16,153**	**100.0%**	**N/A**
Commercial	13.8%	2,221	2,221	100.0%	N/A
Residential	19.2%	3,109	3,109	100.0%	N/A
Low-income	3.4%	544	544	100.0%	N/A
Load management*	63.6%	10,278	10,279	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Table 17 shows the claimed and evaluated energy savings for TNMP's portfolio and broad customer sector and program categories for PY2023.

Table 17. TNMP PY2023 Claimed and Evaluated Energy Savings

Level of analysis	Percentage portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Precision at 90% confidence
Total portfolio	**100.0%**	**16,579,844**	**16,579,845**	**100.0%**	N/A
Commercial	55.3%	9,164,407	9,164,407	100.0%	N/A
Residential	38.0%	6,299,001	6,299,001	100.0%	N/A
Low-income	6.7%	1,103,469	1,103,469	100.0%	N/A
Load management*	0.1%	12,966	12,967	100.0%	N/A

* The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

Program-level realization rates are discussed in the detailed findings subsections. However, it is important to note that these results should only be viewed qualitatively due to the small sample sizes at the utility program level.

In program-level realization rates, we have also included a qualitative rating of *good*, *fair*, and *limited*, associated with the level of program documentation received from the utility. TNMP received *good* documentation scores for all evaluated programs.

5.2.2 Program Funding and Cost-Effectiveness Results

TNMP's total portfolio funding for PY2023 was $5,016,950 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 2.7 (or 2.9, excluding low-income programs).

The more cost-effective programs were the Commercial Solutions MTP and the Low-Income Weatherization program; the less cost-effective programs were the Open for Small Business MTP and the Summer Load Management SOP. All of TNMP's programs were cost-effective in 2023.

Table 18. TNMP Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**2.72**	**2.72**	**2.42**
Total portfolio excluding low-income programs	**2.85**	**2.85**	**2.52**
Commercial	**3.29**	**3.29**	**2.91**
Open for Small Business MTP	1.78	1.78	1.69
SCORE/CitySmart MTP	1.98	1.98	1.76
Commercial Solutions MTP	4.77	4.77	4.18
Residential	**2.69**	**2.69**	**2.39**
High-Performance Homes MTP**	3.52	3.52	2.47
Residential SOP	2.59	2.59	2.34
Hard-to-Reach SOP	2.28	2.28	2.28
Low-income*	**4.09**	**4.09**	**4.09**
Low-Income Weatherization*	4.09	4.09	4.09
Load management	**1.68**	**1.68**	**1.68**
Summer Load Management SOP	1.53	1.53	1.53
Winter Load Management SOP	2.29	2.29	2.29

* The low-income program is evaluated using the Savings-to-Investment ratio (SIR).
**Net savings for the High-Performance New Homes program will be updated in the final version of this report based on net-to-gross research conducted as part of the PY2023 EM&V scope.

5.3 SAVINGS DIFFERENCES

As discussed above, utilities are provided the opportunity to adjust savings at the project level based on interim EM&V findings.

Table 19 summarizes savings differences identified by the EM&V team, which TNMP also used to adjust their claimed savings. The EM&V team requests that utilities adjust projects when evaluated and claimed savings differ by more than five percent. TNMP adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in their June 1st EECRF filing.

Table 19. TNMP Claimed Savings Adjustments by Program

Program	EM&V demand claimed reductions adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Small Business MTP	-0.76	-21,321.00
SCORE/CitySmart MTP	-23.43	-50,381.00
Commercial Solutions MTP	-5.81	-22,168.00
High-Performance Homes MTP	-3.00	-3.00
Total	**-30.00**	**-93,873.00**

5.4 DETAILED FINDINGS—COMMERCIAL

5.4.1 Commercial Solutions Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
5.80%	937	937	100.0%	38.0%	6,293,766	6,293,766	100.0%	Good

Completed desk reviews*	On-site M&V visit
5	2

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Commercial Solutions MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for two projects. One project had an adjustment of greater than five percent compared to the originally claimed savings, while the other project had an adjustment of less than five percent compared to the originally claimed savings. TNMP accepted the evaluated results and adjusted savings for all measures to match the claimed kilowatt-hour and kilowatt savings. The final program realization rate rounds to 100 percent. Further details of the EM&V findings are provided below.

Participant ID 5-1-1-2-78923: A hotel installed solar panels on the roof. During the desk review, the EM&V team adjusted the tilt angle based on communications in the documentation. These adjustments decreased demand reduction and resulted in a realization rate of 91 percent. However, the adjustments slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 5-1-1-3-136879: A retail facility installed new direct-expansion (DX) air conditioners (AC) in place of old units. During the desk review, the EM&V team identified one of the new units without seasonal energy efficiency ratio 2/energy efficiency ratio 2 (SEER2/EER2) ratings in the Air Conditioning, Heating, and Refrigeration Institute (AHRI) certificate, so the savings for that unit were calculated within the SEER1/EER1 calculator. The adjustment slightly decreased demand reductions and resulted in a realization rate of 99 percent. The adjustment also slightly decreased energy savings and resulted in a realization rate that rounded to 100 percent.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, qualified products list (QPL) qualifications, and AHRI certifications) for the five projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation included invoices, QPL qualifications or AHRI certifications, pre-inspection and post-inspection notes, project savings calculators, and photographic documentation of existing and new equipment, which are significant efforts by the utility to verify equipment conditions and quantities. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

5.4.2 SCORE/CitySmart Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
3.4%	546	546	100.0%	8.8%	1,460,002	1,460,002	100.0%	Good

Completed desk reviews*	On-site M&V visit
4	2

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 SCORE/CitySmart MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for two projects. One project had an adjustment of greater than five percent compared to the originally claimed savings, while the other project had minor adjustments of less than five percent compared to the originally claimed savings. TNMP accepted the evaluated results and adjusted savings to match the claimed kilowatt-hour and kilowatt savings for all projects. The final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 5-1-1-2-62595: A new construction junior high school installed an air-cooled chiller, DX AC units, and interior and exterior LED lighting. During the desk review and on-site M&V visit, the EM&V team adjusted the tradeable exterior lighting wattage allowance to qualify the exterior lighting fixtures in the energy savings. This adjustment slightly increased demand reductions and resulted in a realization rate of 101 percent. The adjustments also slightly increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 5-1-1-2-69945: A new construction junior high school installed an air-cooled chiller, DX AC units, and interior LED lighting. During the desk review, the EM&V team adjusted the building type from a *secondary school* to a *primary school* because it included middle school grades. Also, the EM&V team identified one DX AC unit that only had SEER1/EER1 ratings, so savings were calculated using the SEER1/EER1 calculator. These adjustments decreased demand reductions and resulted in a realization rate of 82 percent. The adjustments also decreased energy savings and resulted in a realization rate of 87 percent.

Documentation Score

The EM&V team verified key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the four projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included invoices, QPL qualifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment. However, several sites were found to be missing invoices. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

5.4.3 Open for Small Business Market Transformation Program (MTP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
4.6%	738	738	100.0%	8.5%	1,410,639	1,410,639	100.0%	Good

Completed desk reviews*	On-site M&V visit
5	3

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 Open for Small Business MTP evaluation efforts focused on desk reviews and on-site M&V visits. The sample of completed desk reviews and on-site M&V visits for this program is listed above.

The EM&V team adjusted the claimed savings for four projects. Two projects had an adjustment of greater than five percent compared to the originally claimed savings, while two projects had minor adjustments of less than five percent compared to the originally claimed savings. TNMP accepted the evaluated results and adjusted savings to match the claimed kilowatt-hour and kilowatt savings for all projects. The final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 5-1-1-2-62585: A pharmacy completed an LED lighting retrofit. During the desk review, the EM&V team verified the assumptions in the ex-ante calculation, although the calculation found a different energy savings value. It appeared that the ex-ante calculator was augmented in the calculation engine. The ex-post calculated adjustment increased demand reductions and resulted in a realization rate of 118 percent. The adjustment also saw increased energy savings and resulted in a realization rate of 118 percent.

Participant ID 5-1-1-2-62966: A manufacturing facility completed an LED lighting retrofit. During the desk review, the EM&V team removed the demand and energy impacts of the AC equipment since no AC equipment was identified. This adjustment slightly decreased demand reductions and resulted in a realization rate of 96 percent. However, the adjustment slightly increased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 5-1-1-2-65067: A cattle facility with a showroom completed an exterior, barn, and interior LED retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the building type of some of the claimed exterior fixtures to an *interior* building type of *other* since they were located in the barn. The interior lighting fixtures in the showroom were adjusted to be in air conditioning (AC). These adjustments decreased demand reductions and resulted in a realization rate of 93 percent. The adjustments also decreased energy savings and resulted in a realization rate of 74 percent.

Participant ID 5-1-1-2-62966: A gas station completed an interior and exterior LED lighting retrofit. During the desk review and on-site M&V visit, the EM&V team removed the demand and energy impacts of the AC equipment since no AC equipment was identified. This adjustment slightly decreased demand reductions and resulted in a realization rate of 96 percent. However, the adjustment slightly increased energy savings and resulted in a realization rate that rounded to 100 percent.

Documentation Score

The EM&V team verified key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the five projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included invoices, QPL qualifications, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment. However, several sites were found to be missing QPL qualifications and specification sheets. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

5.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. Therefore, the scope and related findings in the following sections are limited. All residential programs and subprograms included in the consumption analysis received a tracking system review for program impacts, which included verification of claimed savings against the final PY2023 tracking data provided to the EM&V team for the EM&V database.

5.5.1 High-Performance Homes Market Transformation Program (MTP)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energysavings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
3.7%	598	598	100.0%	8.8%	1,455,438	1,455,438	100.0%	Good

Completed desk reviews*
5

*Confidence intervals are not reported at the utility program level as these results should only be viewed qualitatively due to the small sample sizes.

The PY2023 High-Performance New Homes MTP evaluation efforts focused on desk reviews. The number of completed desk reviews for this program is listed above. Five desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system, and savings were calculated in accordance with the TRM.

The EM&V team adjusted the total claimed savings for all five projects. All five projects had an adjustment of less than five percent compared to the overall claimed savings. TNMP accepted the evaluated results and matched the claimed savings to those of the evaluation. Therefore, the final program realization rate is 100 percent for kilowatt and kilowatt-hour. Further details of the EM&V findings are provided below.

Participant ID 5-4-1-2-59441: A new construction home installed energy efficient measures; the savings were determined using modeling software. During the desk review, the EM&V team identified a slight deviation between the ex-ante savings and the fuel summary report, which was likely due to rounding. This adjustment slightly decreased demand reductions and resulted in a realization rate that rounded to 100 percent. The adjustment also slightly decreased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 5-4-1-2-66511: A new construction home installed energy efficient measures; the savings were determined using modeling software. During the desk review, the EM&V team identified a slight deviation between the ex-ante savings and the fuel summary report, which was likely due to rounding. This adjustment slightly decreased demand reductions and resulted in a realization rate that rounded to 100 percent. The adjustment also slightly decreased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 5-1-1-2-66577: A new construction home installed energy efficient measures; the savings were determined using modeling software. During the desk review, the EM&V team identified a slight deviation between the ex-ante savings and the fuel summary report, which was likely due to rounding. This adjustment slightly increased demand reductions and resulted in a realization rate that rounded to 100 percent. However, the adjustment slightly decreased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 5-1-1-2-66590: A new construction home installed energy efficient measures; the savings were determined using modeling software. During the desk review, the EM&V team identified a slight deviation between the ex-ante savings and the fuel summary report, which was likely due to rounding. This adjustment slightly decreased demand reductions and resulted in a realization rate of 99 percent. The adjustment also slightly decreased energy savings and resulted in a realization rate that rounded to 100 percent.

Participant ID 5-1-1-2-74707: A new construction home installed energy efficient measures; the savings were determined using modeling software and rightsizing savings based on a baseline study conducted by the implementer if Manual J was provided. During the desk review, the EM&V team found that Manual J was not included in the documentation and adjusted the savings accordingly. The EM&V team also identified a slight deviation between the ex-ante savings and the fuel summary report, which was likely due to rounding. These adjustments decreased demand reductions and increased energy savings and resulted in realization rates of 104.1 percent and 82.1 percent for energy savings and demand reductions, respectively. However, additional documentation, including Manual J, was provided by the utility based on the discussion of the preliminary results, and the EM&V team adjusted the savings, resulting in near 100 percent realization rates for both energy savings and demand reductions.

Documentation Score

The EM&V team verified key inputs and assumptions (e.g., equipment capacity, modeling savings) for the five projects that had desk reviews completed because sufficient documentation was provided for the sites. Project documentation at these sites included the fuel summary report, Manual J, and ENERGY STAR® qualifications. Complete documentation enhances the accuracy and transparency of project savings and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

5.6 DETAILED FINDINGS—LOAD MANAGEMENT

5.6.1 Summer Load Management Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
47.0%	7,590	7,591	100.0%	0.1%	7,590	7,591	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the TNMP Summer Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 30-minute increments. In PY2023, load management events occurred on the following dates and times:

- June 5, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled)[37],
- June 7, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled), and
- June 12, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled).

There were no unscheduled events in PY2023. The EM&V team received interval meter data and a spreadsheet that summarized the event-level savings for the seven sponsors across 69 sites. Sixteen sites did not participate in any of the scheduled events. All sponsors had at least one site that curtailed during each event[38].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings provided for all sites. The kilowatt savings for each participating site corresponded to the kilowatt reductions that occurred at the scheduled event (no averaging was necessary because each participating site participated in only one event). The kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team's (evaluated) and TNMP's (claimed) calculated kilowatt and kilowatt-hour savings. No adjustments were made to the program savings; however, a negligible difference in kilowatt and kilowatt-hour savings resulted from different rounding practices during calculations. The realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

[37] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for ERCOT Energy Emergency Alert Level 2 (EEA2) or system reliability.

[38] See the Report Volume 1 recommendation to monitor load management cooperation rates.

5.6.2 Winter Load Management (Pilot) Standard Offer Program (SOP) (Medium Evaluation Priority)

Program contribution to portfolio savings (kW)	Claimed demand reductions (kW)	Evaluated demand reductions (kW)	Realization rate (kW)	Program contribution to portfolio savings (kWh)	Claimed energy savings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
16.6%	2,688	2,688	100.0%	0.0%	5,376	5,376	100.0%	Good

Completed desk reviews*
N/A

*The review for the load management program included a census review of equations and interval meter data to estimate the baseline usage and the resulting level of load curtailment achieved for each event for all participants.

The EM&V team evaluated the TNMP Winter Load Management (Pilot) SOP by applying the TRM calculation methodology to interval meter data. In PY2023, the meter data were supplied in 30-minute increments. Load management events occurred on the following dates and times:

- December 16, 2022, from 8:00 a.m. to 10:00 a.m. (scheduled) and
- December 20, 2022, from 8:00 a.m. to 10:00 a.m. (scheduled).

There were no unscheduled events in PY2023. The EM&V team received interval meter data and a spreadsheet that summarized the event-level savings for the three sponsors across 35 sites. Four sites did not participate in any of the scheduled events. All sponsors had at least one site that curtailed during each event.

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings provided for all sites. The kilowatt savings for each participating site corresponded to the kilowatt reductions that occurred at the scheduled event (no averaging was necessary because each participating site participated in only one event). The kilowatt-hour savings for each participating site were calculated by multiplying the kilowatt reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

The table above shows the EM&V team's (evaluated) and TNMP's (claimed) calculated kilowatt and kilowatt-hour savings. No adjustments were made to the program savings. The realization rate for kilowatt and kilowatt-hour is 100 percent, with a documentation score of *good*.

APPENDIX A: EVALUATION, MEASUREMENT, AND VERIFICATION APPROACH

This appendix describes the PY2023 EM&V methodology. The foundation of the evaluation process was to create a statewide EM&V database with a streamlined data request process and a secure retrieval system. Complete PY2023 program data were requested from utilities and integrated into the database. A visual representation of the EM&V database import, review, and validation process can be found in Appendix B.

The EM&V database allowed the EM&V team to complete:

- due diligence reviews of claimed savings,
- program tracking system reviews, and
- efficient sampling across utilities and programs.

A.1 IMPLEMENTING IMPACT EVALUATIONS

The impact evaluations are used to calculate realization rates. The realization rate is determined by dividing the evaluated savings by the utility-claimed savings. Utility-claimed savings are verified in the EM&V database from the tracking systems.

The EM&V team performed a tracking system review and a series of desk reviews for an initial assessment of the reasonableness of the claimed savings. Primary data were then collected for sampled projects to assess the accuracy of the claimed savings further.

Demand-side management (DSM) program evaluations routinely employ 90 percent confidence intervals with ±10 percent precision as the industry standard (“90/10”). A confidence interval is a range of values believed to contain the true population quantity with some stated level of confidence. The confidence level is the probability that the interval includes the target value. Precision provides a convenient shorthand for expressing the interval believed to contain the estimator; for example, if the estimate is 530 kWh, and the relative precision level is ten percent, then the interval is 530 ±53 kWh.

It is essential to provide both the precision and corresponding confidence levels in reporting estimates from a sample. In general, high confidence levels can be achieved with wider intervals, while narrower, more precise intervals permit less confidence. In other words, when all else is held constant, there is a trade-off between precision and confidence.

As a result, any precision statement without a corresponding confidence level is incomplete and impossible to interpret. For example, assume the average savings among participants in an appliance program is estimated as 1,000 kWh per year. It is determined this estimate has 16 percent relative precision at the 9 percent confidence level. The same dataset and the same formulas may be used to estimate 10 percent relative precision at the 70 percent confidence level. If the confidence level is not reported, the second formulation would appear less uncertain when the two are identical.

The estimators commonly used in DSM evaluations generally have sampling errors that are approximately normal in distribution. In Texas, EM&V activities were designed to achieve 90/10 confidence and relative precision for gross evaluated savings estimates at the utility portfolio level. This level was achieved via the sampling process used to select a random sample of commercial participants that received desk reviews and census reviews of residential deemed savings and load management savings.

A.2 TRACKING SYSTEM AND DESK REVIEWS

The EM&V team reviewed the program tracking system and its linkage to any deemed savings tools or methods used to estimate savings at the measure and site level for each residential program. Then, for each *medium-* or *high-priority* program, the EM&V team reviewed a sample of applications entered into the utilities' tracking systems for accuracy and completeness.

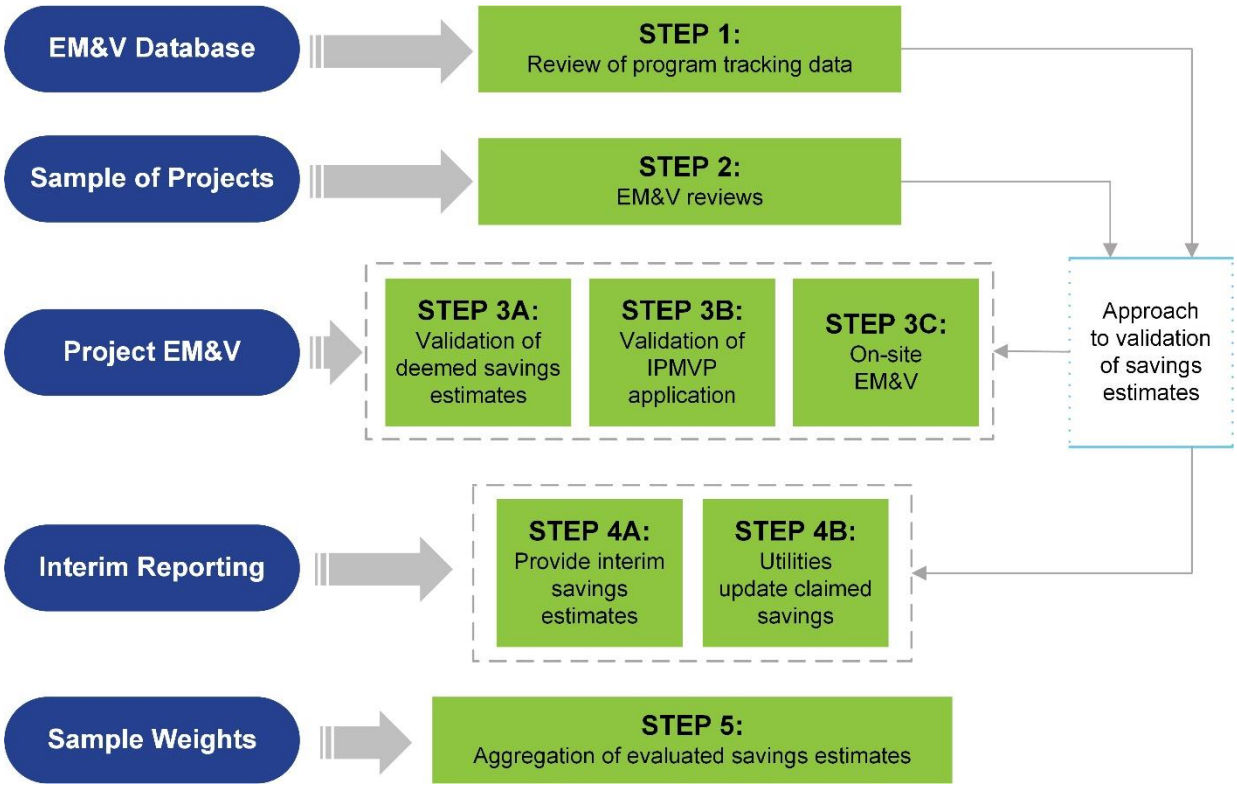
Our review accomplished two primary objectives. First, it ensured that the measures installed were consistent with those listed in the tracking system. Second, the desk reviews verified that the savings estimates in the tracking system were consistent with the savings calculated in the deemed calculation tools, tables, or M&V methods used to estimate project savings.

The desk reviews included a review of the assumptions used for the savings assumptions and, when available, utility M&V reports gathered through the supplemental data request for sampled projects.

A.3 REALIZATION RATES

The evaluated savings are based on project-level realization rate calculations that are then weighted to represent program-, sector-, and portfolio-level realization rates. These realization rates incorporate any adjustments for incorrect application of deemed savings values, any equipment details determined through the tracking system, desk reviews, and primary data collected by the EM&V team. For example, baseline assumptions or hours of use may be corrected through the evaluation review and thus affect the realization rates. Utilities have the opportunity to adjust claimed savings based on interim findings on their evaluation savings, thereby providing an opportunity for realization rates to be close to 100 percent. A flow chart of the realization rate calculations is provided in Figure 37.

Figure 37. Realization Rate Flowchart



A.4 PROGRAM DOCUMENTATION SCORE

The EM&V team assigned a program documentation score of *good*, *fair*, or *limited* based on the level of program documentation provided to complete a third-party due diligence review of claimed savings.

Program documentation scores were assigned as follows:

- **Good:** at least 90 percent of sampled projects have sufficient documentation.
- **Fair:** 70–89 percent of sampled projects have sufficient documentation; the remaining sampled projects had limited or no documentation.
- **Limited:** less than 70 percent of the sampled projects have sufficient documentation.

Sufficient documentation is defined as the necessary information required to verify savings. The documentation included completed savings calculators, customer invoices, pre- and post-inspection reports, and equipment cut sheets for nonresidential programs. The documentation provided all inputs needed to replicate the savings calculations based on the deemed savings manual, the approved calculation method, and supporting materials for programs.

Limited documentation is defined as the documentation provided to verify some, but not all, key inputs to savings calculations.

No documentation is defined as only the savings calculator or measure attributes were provided, with no supporting materials.

A.5 COST-EFFECTIVENESS TESTING

The EM&V team conducted cost-effectiveness testing using the PACT method using PY2023 actual results, except for low-income programs, as discussed below. Cost-effectiveness tests were run using a uniform model for all utilities. The EM&V team collected required inputs for the model from several sources, including program tracking data, deemed savings, the PUCT, and utilities. Table 20 lists the required inputs to the cost-effectiveness model and the sources of information.

Table 20. Cost-Effectiveness Model Inputs and Sources

Model input	Measurement level	Source
Reported energy savings and demand reductions	Measure type	EM&V database
Summer and winter peak coincidence factors (CF)	Measure type	Deemed savings
Effective useful life	Measure type	Deemed savings
Incentive payments	Program	IOU Energy Efficiency Plan and Reports (EEPRs)
Administrative and research and development (R&D) costs	Program/portfolio	IOU EEPRs
EM&V costs	Program/portfolio	EM&V team budgets
Performance bonus earned in the program year[39]	Portfolio	IOU Energy Efficiency Cost Recovery Factor (EECRF)
Avoided costs	Statewide	PUCT (utilities)
Weighted average cost of capital (WACC)	Utility	Utilities
Line loss factor (Outside-of-ERCOT[40] utilities only)	Utility	Utilities
Realization rates	Program	IOU evaluation results

The EM&V team conducted PY2023 cost-effectiveness tests separately using claimed gross savings and evaluated gross savings. The model produces results at the portfolio-, program category-[41], and program-level.

All benefits and costs are expressed in program year dollars. Benefits resulting from demand reductions or energy savings occurring in future years are net-to-program-year dollars using the utility's WACC as the discount rate.

[39] Performance bonuses as an input into cost-effectiveness testing came into effect in 2012.
[40] Electric Reliability Council of Texas.
[41] Program categories are currently defined as nonresidential, residential, low-income, load management, and pilot.

When running program-level tests, if only portfolio or other grouped information was available, the EM&V team allocated data proportionate to costs (16 Tex. Administrative Code § 25.182 (e)(6)). For example, the performance bonus was calculated for the overall portfolio and allocated to individual programs proportionate to the programs' costs associated with meeting the IOU's demand reduction and energy savings goals. These program-level costs include program administrative and incentive costs, while portfolio-level costs include the performance bonus, EM&V, administrative, and R&D costs.

Low-income programs were evaluated using the savings-to-investment ratio (SIR). This model only includes net incentive payments under program costs. The SIR methodology is only used when testing low-income programs.

Portfolio-level cost-effectiveness analyses are based on the PACT and are shown both with and without low-income and hard-to-reach customers factored in.

The calculations used for the PACT cost-effectiveness methodology are in Appendix C.

Also, the EM&V team reported the cost-per-lifetime kilowatt-hour and kilowatt. Cost per lifetime is calculated by attributing costs to energy savings and demand reductions based on their portion of total benefits and applying that proportion to the total program costs.

A.6 REPORTING

There are two EM&V report deliverables per PY: (1) impact evaluation reports and (2) the Annual IOU Energy Efficiency Report. There are also a number of status reports, ad hoc reports, data collection and sampling deliverables, and interim evaluation results.

The impact evaluation reports are delivered separately for each utility and discussed with the PUCT and each utility before drafting the Annual IOU Energy Efficiency Report. The impact reports allow the EM&V team to discuss the impact results with the PUCT and utilities, receive their input, and conduct supplemental analysis (if needed) prior to publishing the Annual IOU Energy Efficiency Report—a comprehensive report across all utility energy efficiency portfolios.

For PY2023, the metrics used as the basis for recommendations in the reports were:

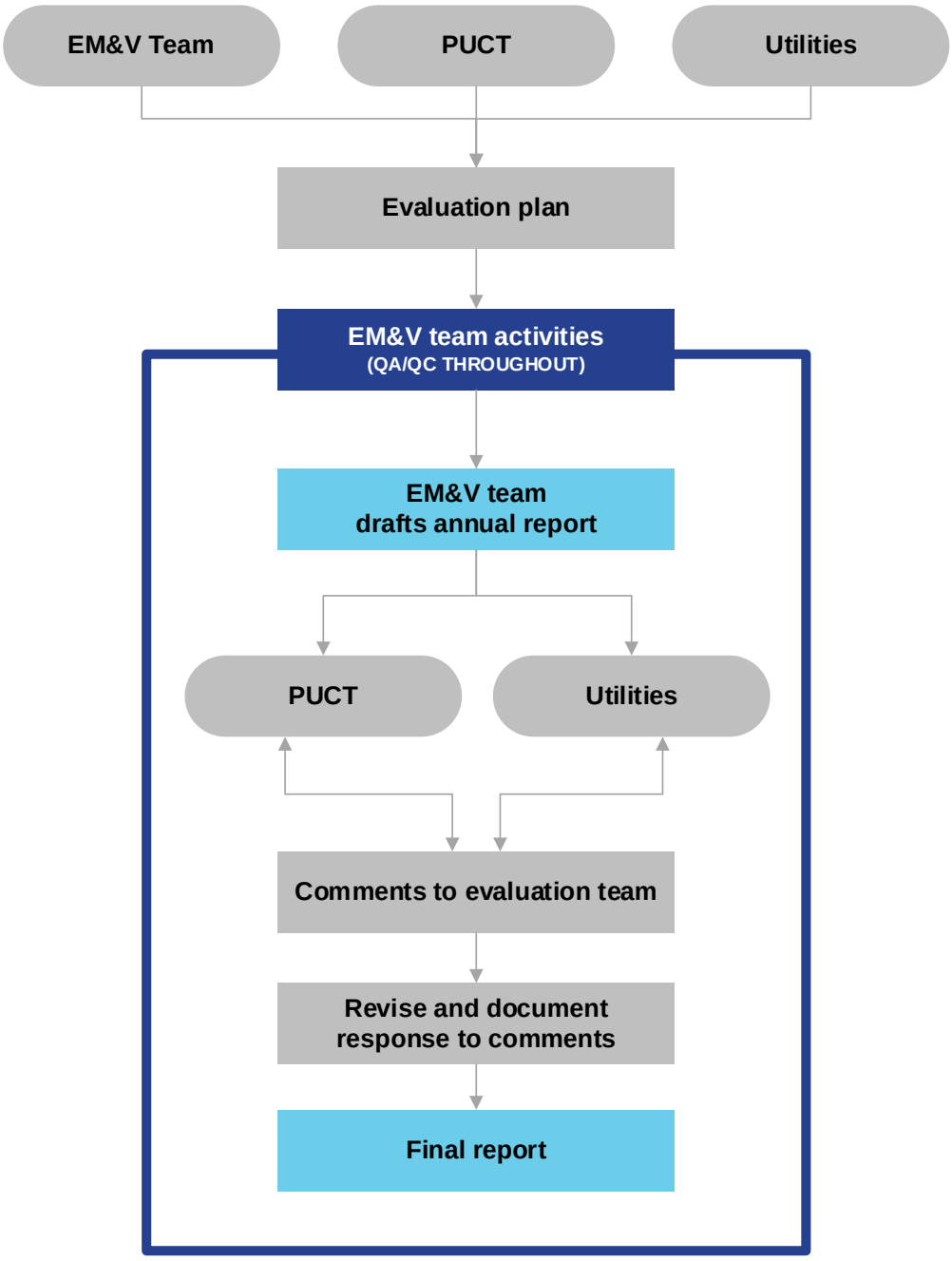
- the programs' gross savings realization rate and associated program documentation scores;
- tracking system and interval meter data reviews;
- desk reviews;
- on-site M&V findings, including site-specific realization rates; and
- the programs' cost-effectiveness results.

The EM&V database is at the core of reporting results as it houses the claimed and evaluated savings. The database allows structured queries to provide results by utility, program categories and types, measure types, or sectors. QA and QC are conducted to ensure that results entered into and extracted from the database are accurate. The EM&V team's QA/QC plan for the reported evaluated savings is in Appendix D.

The EM&V team encourages feedback and comments on EM&V reports as the EM&V team reviews feedback and documents how it was taken into consideration in finalizing deliverables. While the interim impact reports are distributed and reviewed separately for each utility, the EM&V team seeks input from a larger group of stakeholders on the Annual IOU Energy Efficiency Report. These are presented and discussed at Energy Efficiency Implementation Project (EEIP) meetings between draft and final versions.

The flow chart in Figure 38 describes the general reporting process flow.

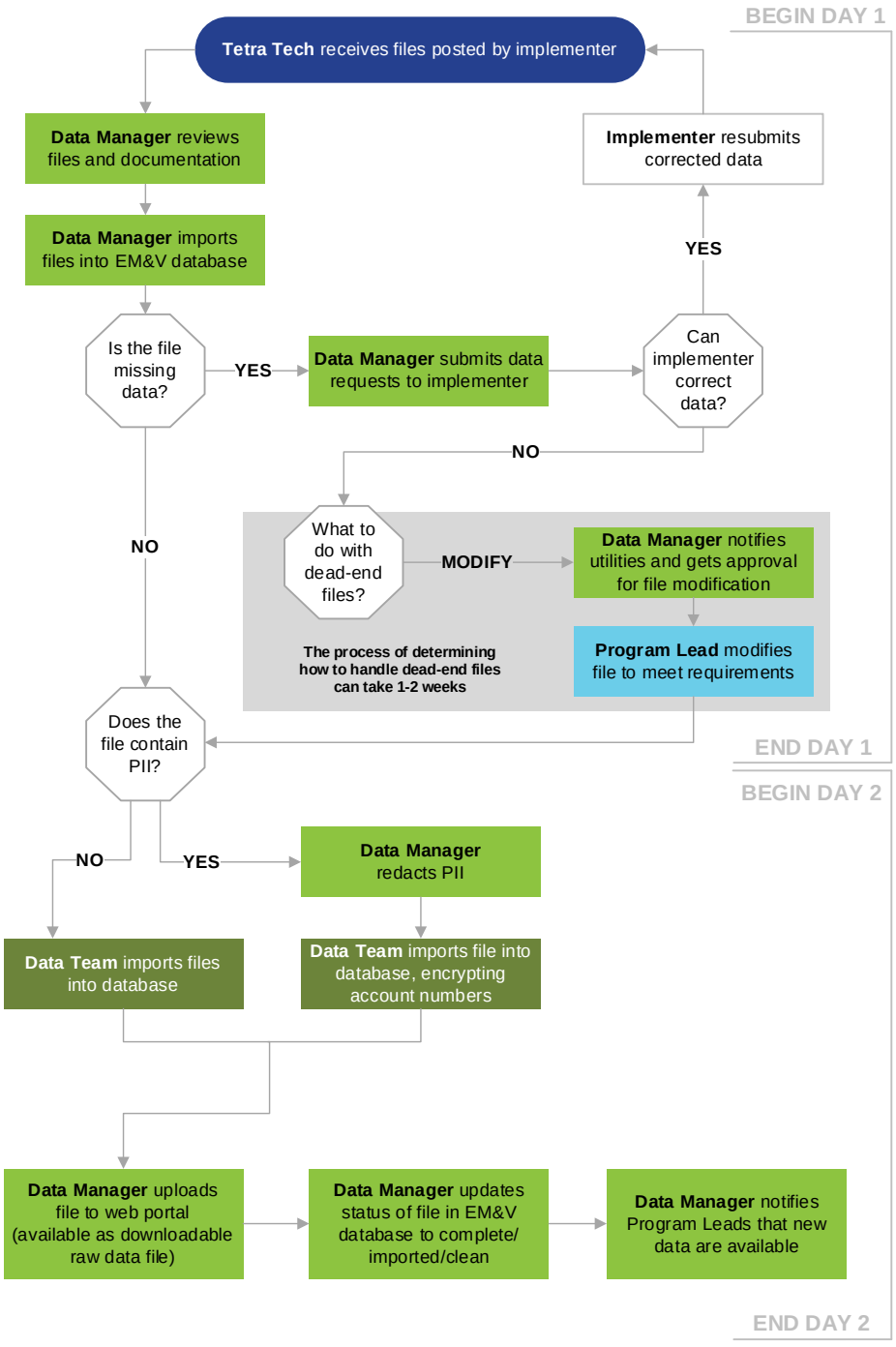
Figure 38. Reporting Flowchart



APPENDIX B: DATA MANAGEMENT PROCESS

Figure 39 details the data management process.

Figure 39. Data Management Process



APPENDIX C: COST-EFFECTIVENESS CALCULATIONS

This appendix describes the calculations used for modeling cost-effectiveness. This approach provides the PUCT with a consistent methodology for evaluating cost-effectiveness across the utilities.

C.1 APPROACH

The approach to the EM&V team's benefit-cost testing is based on 16 Tex. Admin. Code § 25.181, where costs and benefits are defined in section (d):

> *"The cost of a program includes the cost of incentives, measurement and verification, any shareholder bonus awarded to the utility, and actual or allocated research and development and administrative costs. The benefits of the program consist of the value of the demand reductions and energy savings, measured in accordance with the avoided costs prescribed in this subsection. The present value of the program benefits shall be calculated over the projected life of the measures installed or implemented under the program."*

This description is consistent with the PACT. Based on this definition, we collected the costs reported in the utilities' 2024 Energy Efficiency Plan and Reports, filed on April 1, 2024.[42] The program benefits must be calculated at a measure level in order to apply individual effective useful lives. Therefore, the savings were derived from the EM&V database, which is a comprehensive, centralized source of the utilities' program tracking data.

The present value of the benefits is calculated separately for energy savings and demand reductions, as follows:

$$PV = \frac{AC}{WACC - E}\left[1 - \left(\frac{1+E}{1+WACC}\right)^{n}\right]$$

Where:

AC is the avoided cost of the benefit (energy savings or demand reductions).

The discount rate, *WACC*, is the utility's weighted average cost of capital.

E is the escalation rate.

n is the effective useful life of the measure.

This calculation was modified from the original evaluation plan in order to allow for including an escalation rate. The EM&V team has provided results for benefit-cost calculation using an escalation rate of two percent and without an escalation rate.

[42] PUCT filing number 50666.

The benefit-cost ratio is calculated as:

$$BC = \frac{PV_e + PV_d}{C}$$

Where:

PV_e is the present value of the avoided energy costs.

PV_d is the present value of the avoided demand costs.

C is the total program cost, including incentives, administrative, EM&V, shareholder bonus, and research and development (R&D) costs.

Some costs are reported by the utilities at the portfolio level, such as R&D and shareholder bonus costs. These costs are attributed to individual programs based on each program's incentive costs as a percentage of the portfolio. EM&V costs were previously distributed among utility programs by the EM&V team based on the programs' share of energy savings and evaluation priority.

C.2 SAVINGS-TO-INVESTMENT RATIO

Targeted low-income energy efficiency programs are run by all unbundled transmission and distribution utilities—specifically, the ERCOT utilities. These programs are evaluated using the savings-to-investment ratio (SIR) rather than the PACT described above.

The SIR is significantly different in both the benefits and costs included. The benefits are comprised of the customer's avoided energy costs, which means that the retail electric rate is used rather than the utility's avoided cost, and there is no cost associated with avoided demand. Rather than the WACC, the SIR uses a societal discount rate of three percent. The only costs included are the incentives paid to the weatherization agencies.

Table 21 lists the average retail rates paid by customers. These rates are based on data collected by Frontier Energy through weatherization agencies. The rates are updated annually based on data from the Energy Information Administration, the Bureau of Labor Statistics, and the PUCT.

Table 21. Average Energy Cost by Utility

Utility	Average kWh rate
AEP Texas	$0.16
CenterPoint	$0.17
Oncor	$0.17
TNMP	$0.17
Xcel SPS	$0.13

C.3 NET-TO-GROSS RATIOS

The following net-to-gross (NTG) ratios were used to calculate cost-effectiveness based on net savings. The EM&V team determines the NTG ratios through primary research periodically (approximately every four to five years), as indicated in the table below. NTG ratios were updated for the Residential SOP, Commercial SOP, and Commercial MTP programs in 2022.

Table 22. Net-to-Gross Ratios Used to Calculate Cost-Effectiveness by Program

Program	kWh NTG	kW NTG	Research year
Commercial			
Commercial SOP	1.00	0.99	2022
Commercial MTP (including SCORE/CitySmart MTP)	1.00	1.00	2022
Solar PV SOP	1.01	1.01	2019
Small Business	0.95	0.95	2019
Upstream Lighting	0.90	0.90	2020
Retro-Commissioning	0.90	0.90	2019
Residential			
Residential SOP, non-HVAC measures	0.90	0.90	2022
Residential SOP, HVAC measures	0.94	0.95	2022
Residential SOP, overall	0.91	0.93	2022
Solar PV SOP	0.96	0.95	2018
New Homes	0.60	0.60	2024
Upstream Lighting	0.90	0.90	2020
A/C Tune-Up/Residential MTP	0.80	0.80	2019
Hard-to-Reach SOP	1.00	1.00	N/A—industry standard is to set at 1.0
Midstream MTP	0.84	0.84	2019
Appliance Recycling	0.79	0.79	2018
Low-income			
Targeted Low-Income	1.00	1.00	N/A—industry standard is to set at 1.0
Load management			
Commercial Load Management SOP	1.00	1.00	N/A—industry standard is to set at 1.0
Residential Load Management SOP	1.00	1.00	N/A—industry standard is to set at 1.0

APPENDIX D: QUALITY ASSURANCE/QUALITY CONTROL PROTOCOLS

This appendix documents the quality assurance/quality control (QA/QC) protocols established for the PUCT Evaluation, Measurement, and Verification (EM&V) team for reporting claimed and evaluated impacts. Although quality control is a function of all evaluation stages (e.g., populating the EM&V database, sampling, and analysis), this appendix focuses on the QA/QC processes within the reporting stage. A QA/QC team, led by the Tetra Tech reporting lead, is developed and accountable for ensuring all QA/QC protocols are being followed.

Below, we summarize the specific activities that are subject to QA/QC processes. Note that these QA/QC processes focus on the accuracy of data; this section does not address methodological issues.

Accuracy of ex-ante program data. The EM&V team is housing data, analysis, and reporting functions within the EM&V database. Data is provided by program implementers, read into the database in raw form, and organized for analysis. The database centrally stores the claimed (ex-ante) savings, which are used for sampling and reporting those claimed savings. Data is provided to the EM&V team quarterly. The EM&V team characterizes the data received in terms of energy savings, demand reductions, and participants served, and reports the information within the detailed research plans; these detailed research plans are delivered to the utilities for review and confirmation that the population data is accurate. Inaccurate population data may indicate missing data, errors in the data importation process, or misunderstanding of the data fields.

- Responsibility: program leads
- Accountability: QA/QC team
- Consulted: utility staff, implementation contractors, and EM&V project manager

Application of verification rates and net-to-gross (NTG) ratios. The impacts are generated in the EM&V database. The database categorizes measure-level information in the format it was provided to the EM&V team per the data acquisition process. Although projects may be sampled and verified at the measure level, the EM&V team conducts impact evaluations to obtain and report verification and NTG estimates at the utility and program-type level, which is then aggregated and reported at the program-group level.

These impact estimates are provided by the program leads and stored in two locations. First, the program leads enter the impact results within an Excel tracking sheet stored on the SharePoint site. The Excel tracking sheet includes the following fields: program year (PY), utility, program group, program type, measure group, program lead, verification rate, NTG ratio, report source of verification rate, report source of NTG ratio, and modification date. Only one sheet maintains current impact information. If data is updated throughout the process, the outdated records are moved to a separate worksheet within that file. Doing so ensures that one sheet maintains the correct rates and any modifications are documented, including the reason for the modification.

Second, the EM&V database includes an interface where program leads directly enter their impact results. These results are then stored and applied against the claimed savings to calculate the evaluated gross and evaluated net results for the annual reporting.

By creating a two-stage impact reporting process, the EM&V team has built a point of verification of the data into the process. The evaluated and net savings results are directly calculated out of the EM&V database using the rates supplied within the web interface. The EM&V team then verifies that the results are as expected using the values documented within the Excel impact reporting file. Should the results differ, the QA/QC team may refer to the original source to verify the results.

- Responsibility: program leads
- Accountability: QA/QC team
- Consulted: impact leads, EM&V data lead, and project manager

Accuracy of reported savings. As documented in the report outline, program impacts are aggregated and reported in various ways. At the most aggregate level, the data is reported by program group overall and then by utility. At the most granular level, the data is reported by program group for each utility. The annual report, therefore, represents impacts in over 100 tables. It is critical to spend considerable time conducting QA/QC against those reported values.

The EM&V database calculates the full-year claimed savings by utility, program type, and program group. Although claimed savings are documented in quarterly detailed research plans, adjustments made in claimed savings often occur throughout the year. Therefore, it is necessary to calculate the full PY claimed savings and verify our results against the utility-claimed data, which is reported to the PUCT. The EM&V team requests that the utilities provide their draft claimed savings to verify against the reported claimed savings within the EM&V database. Any differences in the evaluation and utility claimed savings are clearly documented within the report.

All results tables are cross-referenced to ensure the results true up and are consistent with each other. For example, the sum of all residential MTPs evaluated net savings documented within the utility-specific sections should equal the residential MTP results captured in Technical Reference Manual (TRM) Volume 1. The QA/QC team develops a checklist of tables that are cross-checked against which sources (i.e., EM&V database, EEPRs, etc.) and systematically goes through this checklist throughout the report-proofing process.

Although not a specific QA/QC function, the team's development of these reporting functions with the overarching goal of ensuring transparency inherently allows for ad hoc QA/QC checks by the PUCT, utilities, implementation contractors, or other interested parties. For example, the EM&V database can export results and resulting calculations within easy-to-use Excel files. In addition, impact-related reports tie back to results clearly for a secondary review.

- Responsibility: utilities (for providing claimed savings) and program leads (for verifying claimed impacts provided)
- Accountability: QA/QC team (for final review and cross-checks of impact tables)
- Consulted: impact leads, EM&V data lead, utilities, and EM&V project manager