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Volume 3. Outside-of-ERCOT Utility-Specific Energy Efficiency Report Program Year 2023

TETRA TECH

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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
HPwES	Home Performance with ENERGY STAR®
HTR	Hard-to-reach

Acronym	Description
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
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 outside-of-ERCOT utilities – specifically, the impact evaluation results for energy efficiency portfolios implemented in program year (PY) 2023 (PY2023). Each section begins with a trend analysis for the utility energy efficiency portfolios from PY2019 to PY2023 in order to provide additional context for PY2023 results. Volume 3 is a companion document to Volume 1 of the Investor-Owned Utilities (IOUs) PY2023 Energy Efficiency Portfolio Report, and Volume 2 presents similar data for the ERCOT utilities.

PY2023 is the twelfth year evaluating the EM&V effort for the Public Utility Commission of Texas (PUCT). The PY2023 scope includes targeted impact evaluations on the projects where savings had the highest uncertainties identified by the prior EM&V results or changes in programs or technologies. The targeted impact evaluation focuses 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 provide due diligence of claimed savings on the portfolio of each utility.

The reviews also provide an independent assessment of claimed savings and verify 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]I 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 a program's contribution to the portfolio's impact (e.g., more than ten percent of portfolio savings are from a measure or program),
- 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 component of the program (e.g., pilot, early implementation, mature),
- importance to future portfolio performance (may be a significant contributor to savings in the future),
- priorities for PUCT and utilities, prior EM&V results, and upcoming changes in the markets in which the programs operate.

Section 2.0 through Section 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 EL PASO ELECTRIC COMPANY IMPACT EVALUATION RESULTS

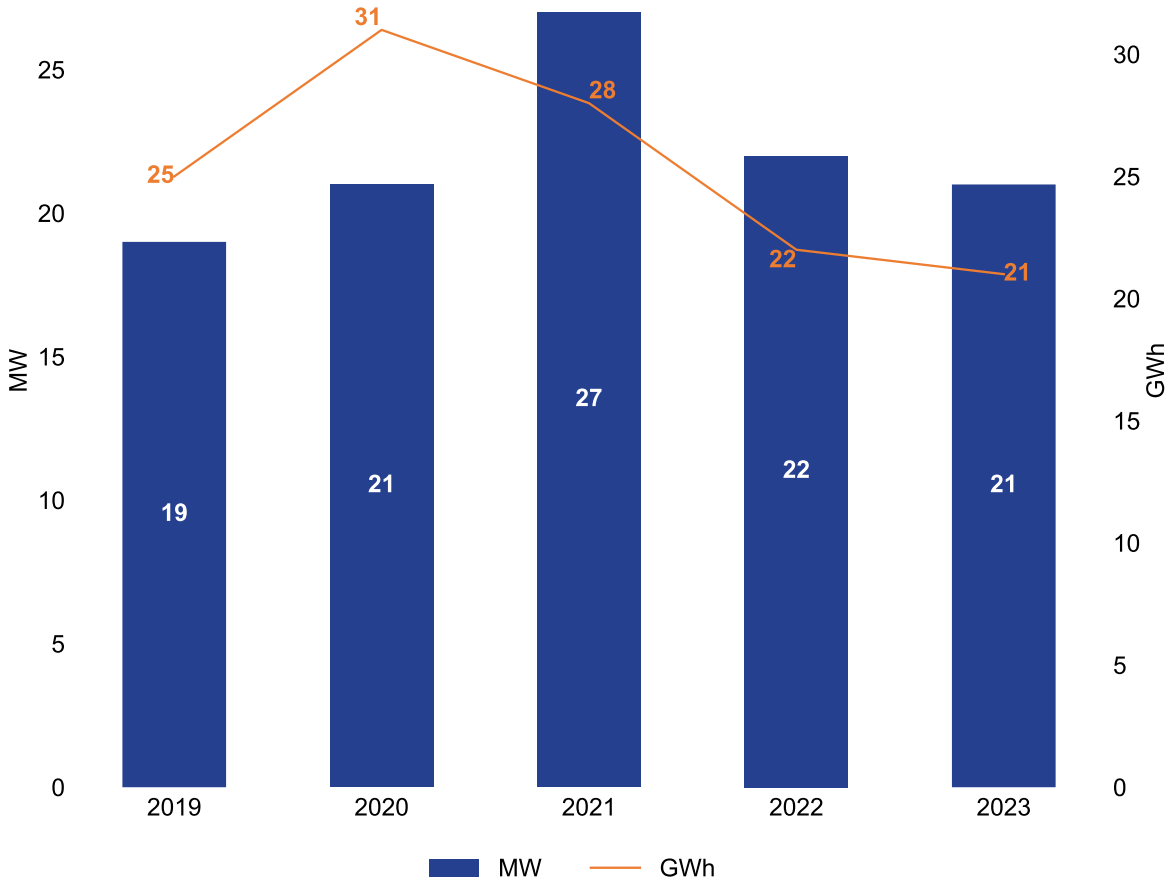
2.1 YEAR-OVER-YEAR COMPARISONS

This section provides a trend analysis for El Paso Electric Company's (El Paso Electric) program performance from PY2019 to PY2023. This trend analysis provides insight into the PY2023 results included in Sections 2.2 through 2.7.

2.1.1 PY2019–PY2023

PY2023 saw a slight decrease in both demand reductions and energy savings across El Paso Electric's portfolio, with demand reductions being consistent with those of PY2020 and energy savings being fairly consistent with PY2022. The slight decrease in energy savings is connected to new federal standards in lighting and air conditioners that came into effect in PY2023—a change that impacted all utilities.

Figure 1. El Paso Electric Demand Reduction and Energy Savings by Program Year, PY2019–PY2023



Load management programs achieved 71.5 percent of El Paso Electric's demand reduction goal for PY2023. Compared to the other outside-of-ERCOT utilities, El Paso Electric had the highest percentage of demand reductions derived from load management of the outside-of-ERCOT utilities—and the second-highest percentage across all eight IOUs (Figure 2, left). Over 70 percent of El Paso Electric's demand reduction goal has been achieved through its load management programs since PY2021.

- **Recommendation:** The PUCT and EM&V team should discuss with El Paso Electric the reasons for the large percentage of their demand reduction goal being achieved by load management programs and their future plans to increase the percentage of their demand reduction goal being met by energy efficiency programs.

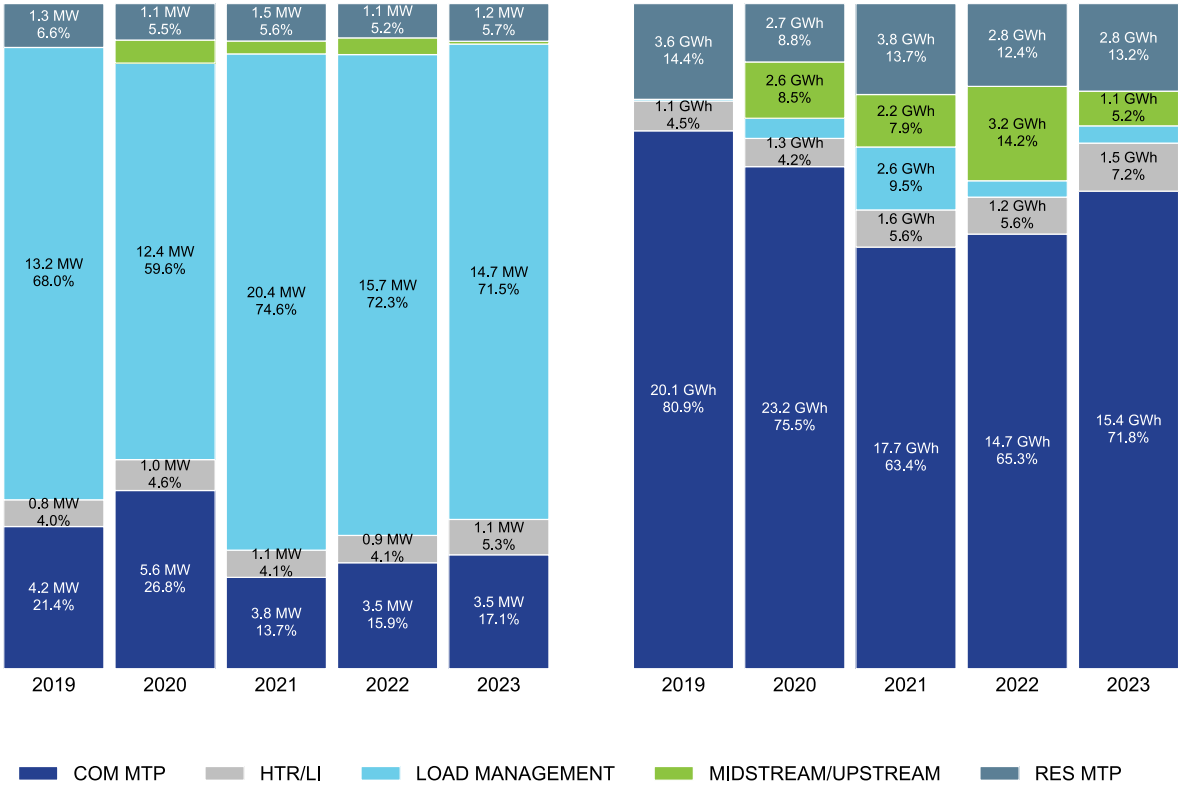
In PY2023, most of the energy savings (Figure 2, right) achieved by El Paso Electric's programs were attributable to the Commercial MTP. While El Paso Electric does not offer a Commercial SOP, this is fairly typical for the outside-of-ERCOT utilities. However, El Paso Electric is the only utility that does not offer a Residential SOP.

- **Recommendation:** The PUCT and EM&V team should discuss with El Paso Electric their reasons for not offering a Commercial SOP and Residential SOP and their future plans to balance the program design of MTP and SOP offerings to serve both commercial and residential customers.

In PY2023, demand reductions and energy savings from HTR programs have slightly increased from prior years.

- **Recommendation:** The PUCT and EM&V team should discuss El Paso Electric's successful strategies used to increase savings to HTR customers and their future plans to continue doing so.

Figure 2. El Paso Electric Demand Reduction and Energy Savings by Program Type, PY2019–PY2023[3]

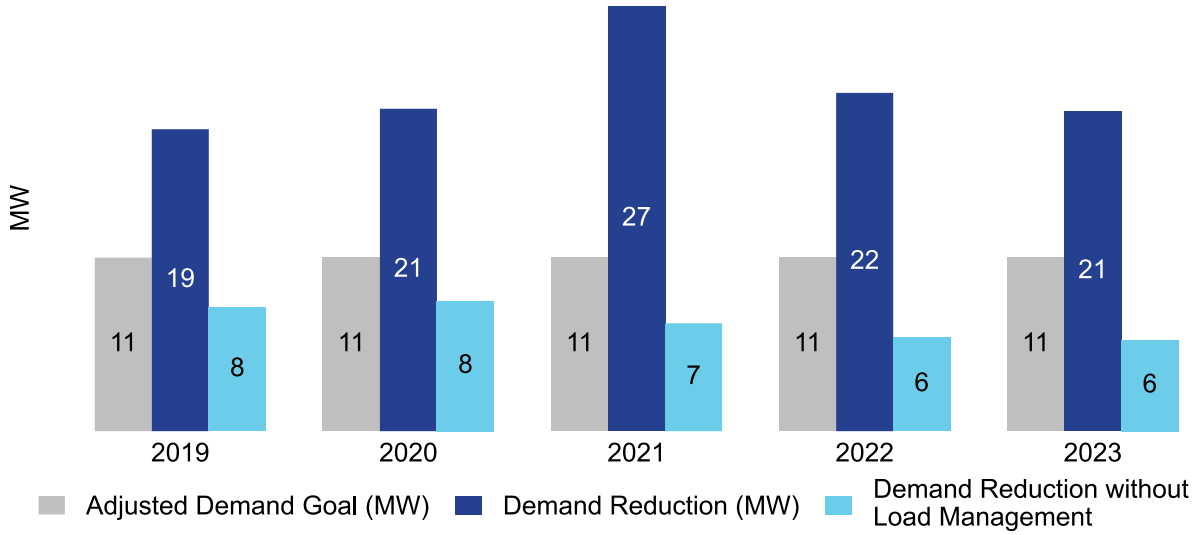


El Paso Electric has consistently not met its demand reduction goal with energy efficiency alone.

- **Recommendation:** The PUCT and EM&V team should discuss with El Paso Electric the strategies they have considered to fully achieve their demand reduction goal without load management programs and the challenges they see to doing so, if any.

[3] Demand reductions are reported in megawatts (MW) and energy reductions 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. El Paso Electric's Legislated Goal and Demand Reduction, PY2019–PY2023



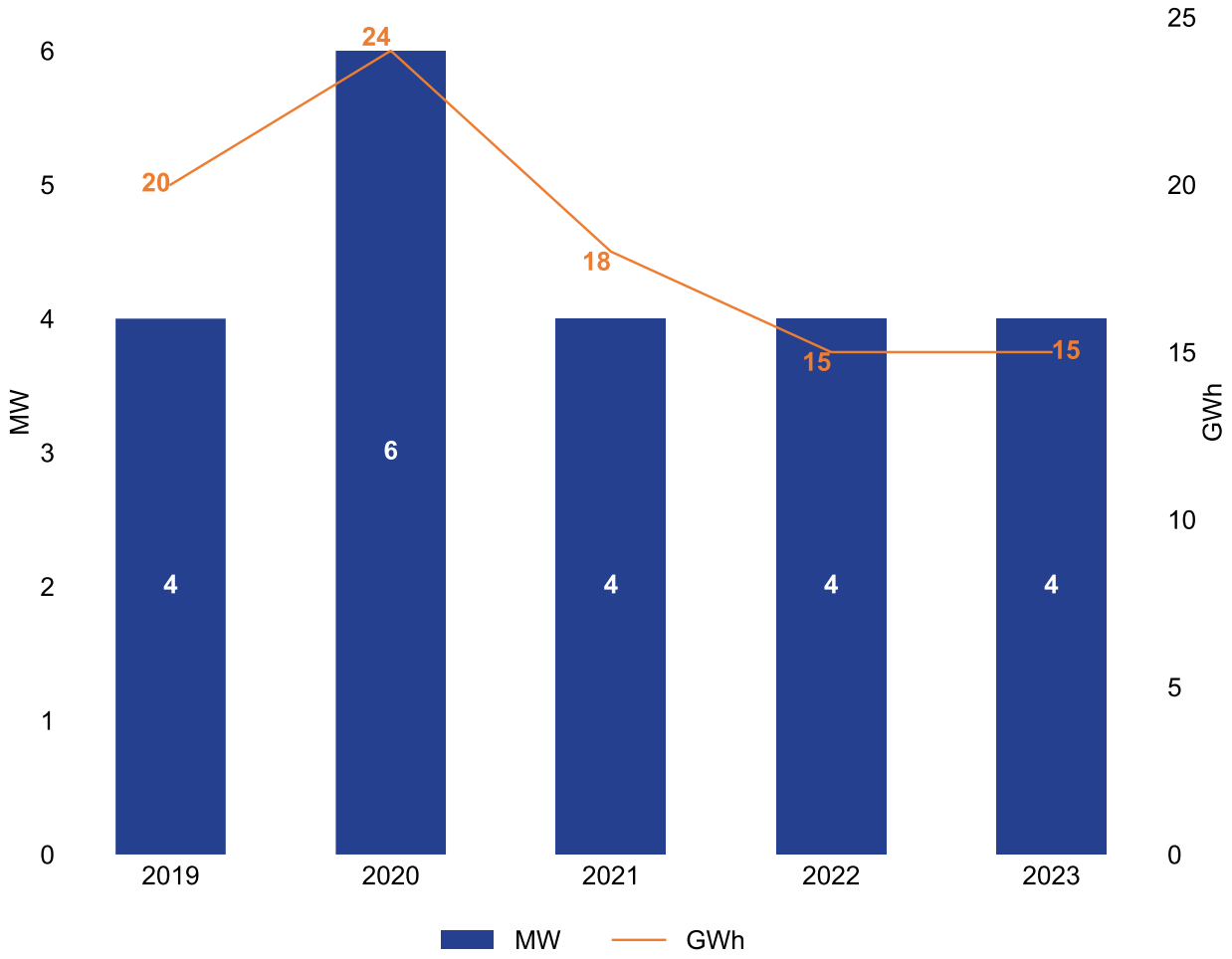
2.1.1.1 Commercial Savings

The PY2023 gross savings from El Paso Electric's commercial sector program, excluding load management, were:

- 3.53 megawatts (MW) of demand reduction and
- 15.39 gigawatt-hours (GWh) of energy savings.

In PY2023, demand reductions from El Paso Electric's commercial program, excluding load management, remained steady at 4 MW from PY2021 to PY2023, after a peak of 6 MW in PY2020. Energy savings also remained relatively stable at 15 GWh from PY2022 to PY2023, after a peak of 24 GWh in PY2020 and a decrease to 18 GWh in PY2021.

Figure 4. El Paso Electric's Demand Reduction and Energy Savings by Program Year—Commercial Program, Excluding Load Management, PY2019–PY2023



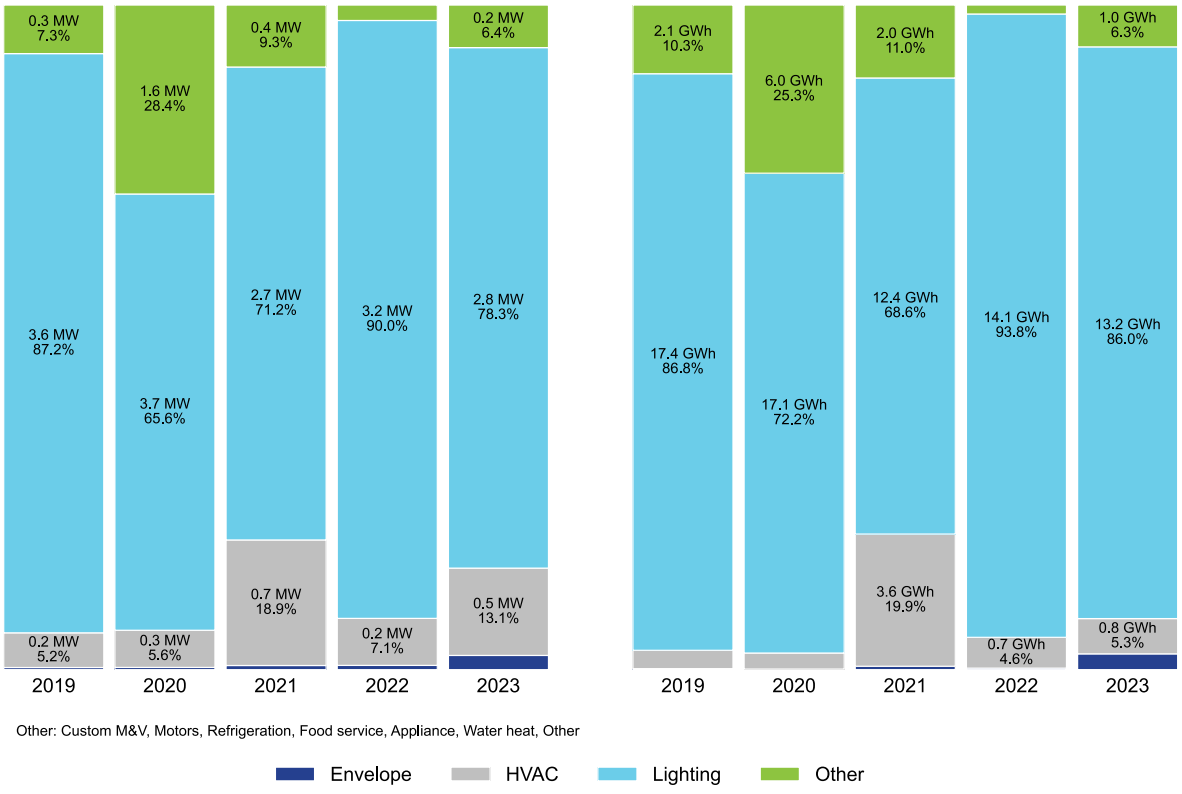
In PY2023, *lighting* measures continue to account for nearly all the demand reductions and energy savings in El Paso Electric's commercial program, excluding load management—78 percent and 86 percent, respectively.

In PY2023, the remaining percentage of demand reductions and energy savings are derived mainly from *HVAC* measures, which increased sharply in PY2021 and then decreased to a lower percentage in PY2022 and PY2023. Two measures account for half of the *HVAC*-related reductions and savings—*evaporative cooling* in the small business program, and HVAC equipment *variable speed* drives; another two measures account for the remaining *HVAC*-related reductions and savings in PY2023—the *efficient air conditioner* and *heat pump* measures.

Additionally, the demand reductions and energy savings from both *envelope* and *other* measures increased from PY2022 to PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with El Paso Electric their strategies and plans to diversify their portfolio's commercial measure mix beyond *lighting* and any challenges seen recently in completing commercial *HVAC* projects.

Figure 5. El Paso Electric's Demand Reduction and Energy Savings by Measure Category—Commercial Programs, Excluding Load Management, PY2019–PY2023



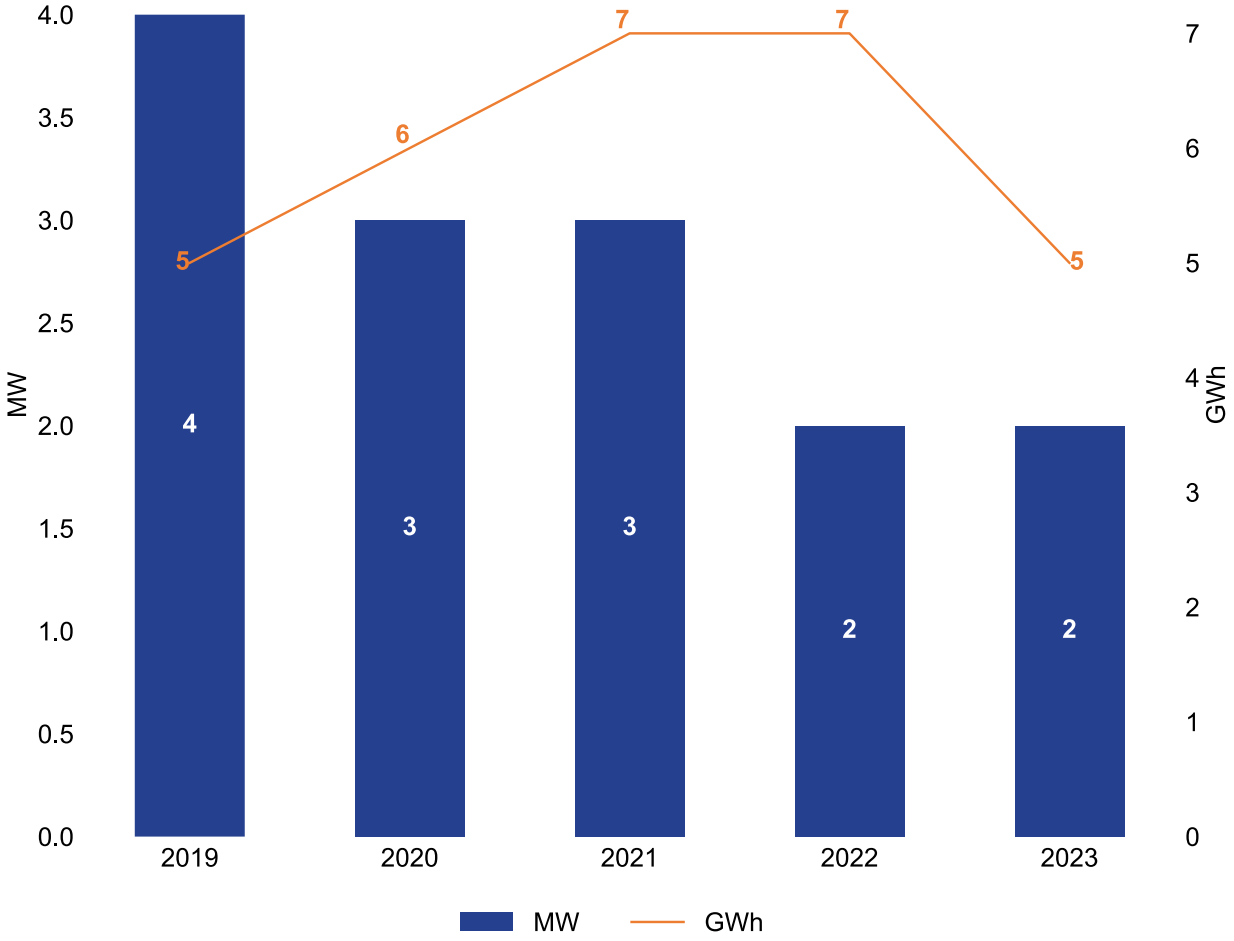
2.1.1.2 Residential Savings

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

- 2.26 MW of demand reduction and
- 4.94 GWh of energy savings.

In PY2023, demand reductions achieved by El Paso Electric's residential programs, excluding load management, were the lowest in the last five years, with energy savings at the second lowest. Some of the decreases in demand reductions and energy savings in PY2023 were due to the continuing impacts of 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.

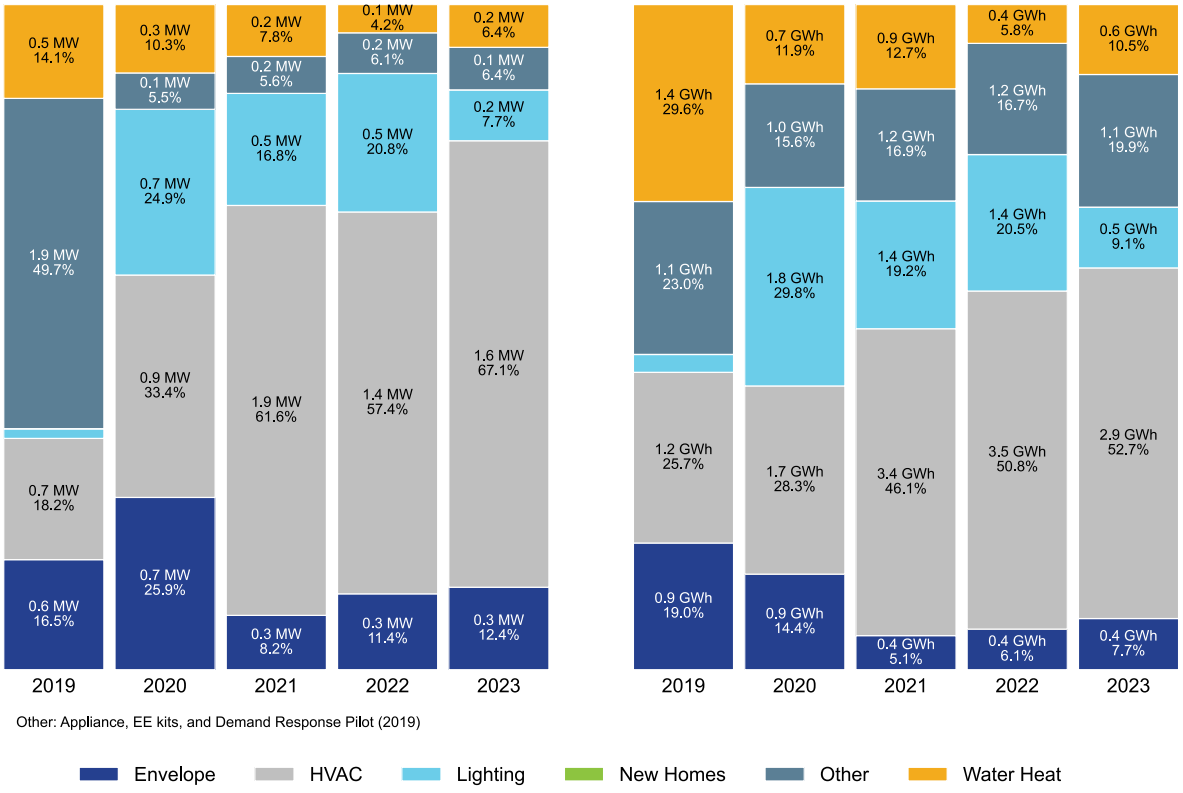
Figure 6. El Paso Electric's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023



In PY2023, demand reductions and energy savings from El Paso Electric's residential programs, excluding load management, were primarily derived from *HVAC* measures—at over two-thirds of kilowatts and over one-half of kilowatt-hours. Second and third in reductions and savings to *HVAC* measures were *envelope* and *lighting* measures, respectively, with *water heating* measures following closely behind.

- **Recommendation:** The PUCT and EM&V team should discuss with El Paso Electric their successful strategies in increasing *HVAC* residential projects and how they plan to continue building on that success.

Figure 7. El Paso Electric's Demand Reduction and Energy Savings by Measure Category—Residential Programs, Excluding Load Management, PY2019–PY2023



2.1.1.3 Load Management Savings

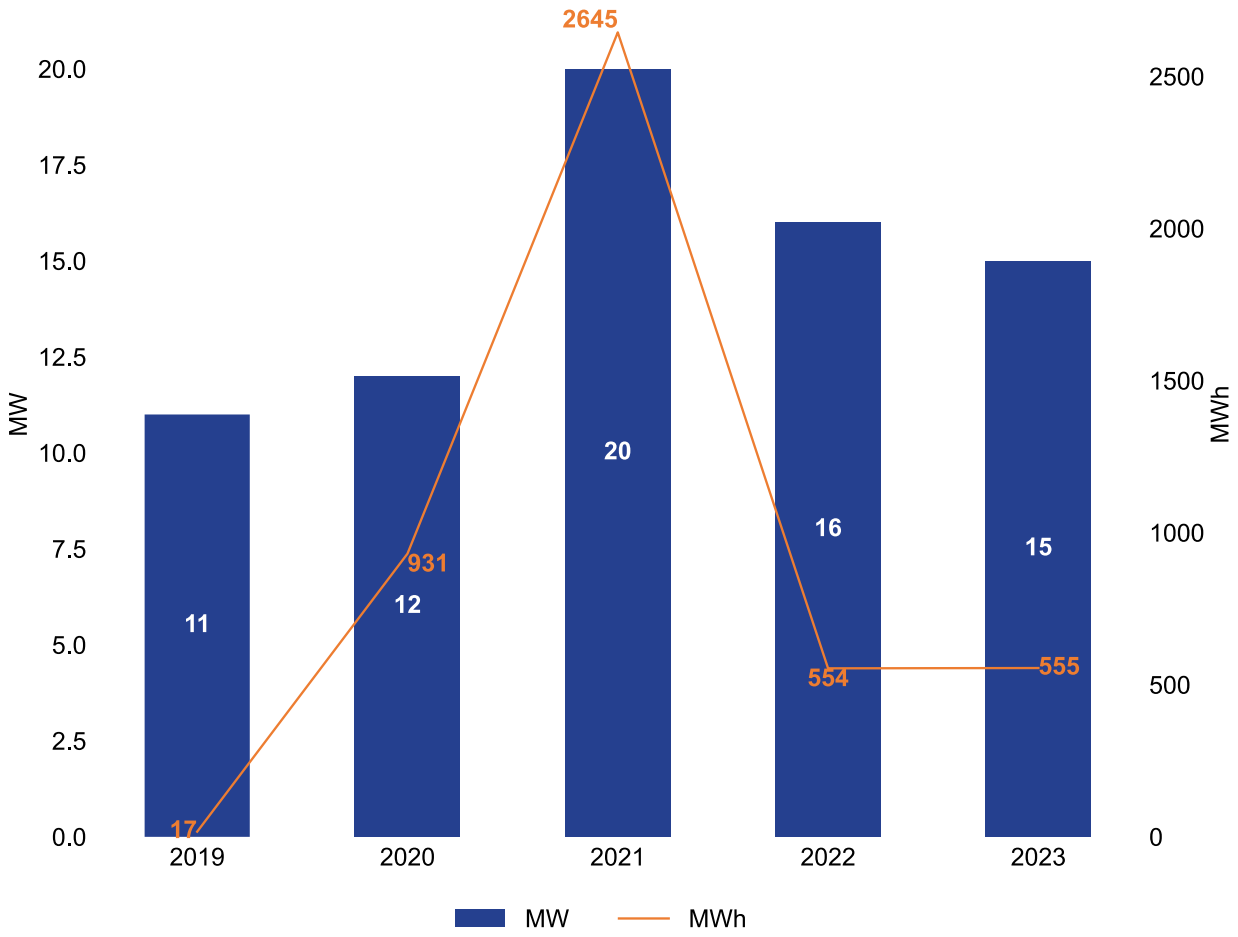
The PY2023 gross savings from El Paso Electric's load management programs were:

- 14.69 MW of demand reduction and
- 0.555 GWh of energy savings.

Demand reductions achieved by El Paso Electric's load management programs saw steady growth from PY2019 to PY2020, with a sharp increase in PY2021. This sharp increase in demand reductions in PY2021 was due to considerable growth in El Paso Electric's residential load management program. While their residential load management program continued to achieve heightened demand reductions in PY2022 and PY2023, lower participation in their commercial load management program was the main driver of a decrease in demand reductions in PY2022 and PY2023.

Energy savings depend upon the number of curtailment events called each year and their duration. Overall, energy savings achieved by El Paso Electric's load management programs have followed the demand reduction pattern over the past few years. The increased energy savings in PY2021 is due to new thermostat devices that were purchased through El Paso Electric's Marketplace website and enrolled in the load management program at the time of purchase.

Figure 8. El Paso Electric's Demand Reduction and Energy Savings by Program Year—Load Management Programs, PY2019–PY2023

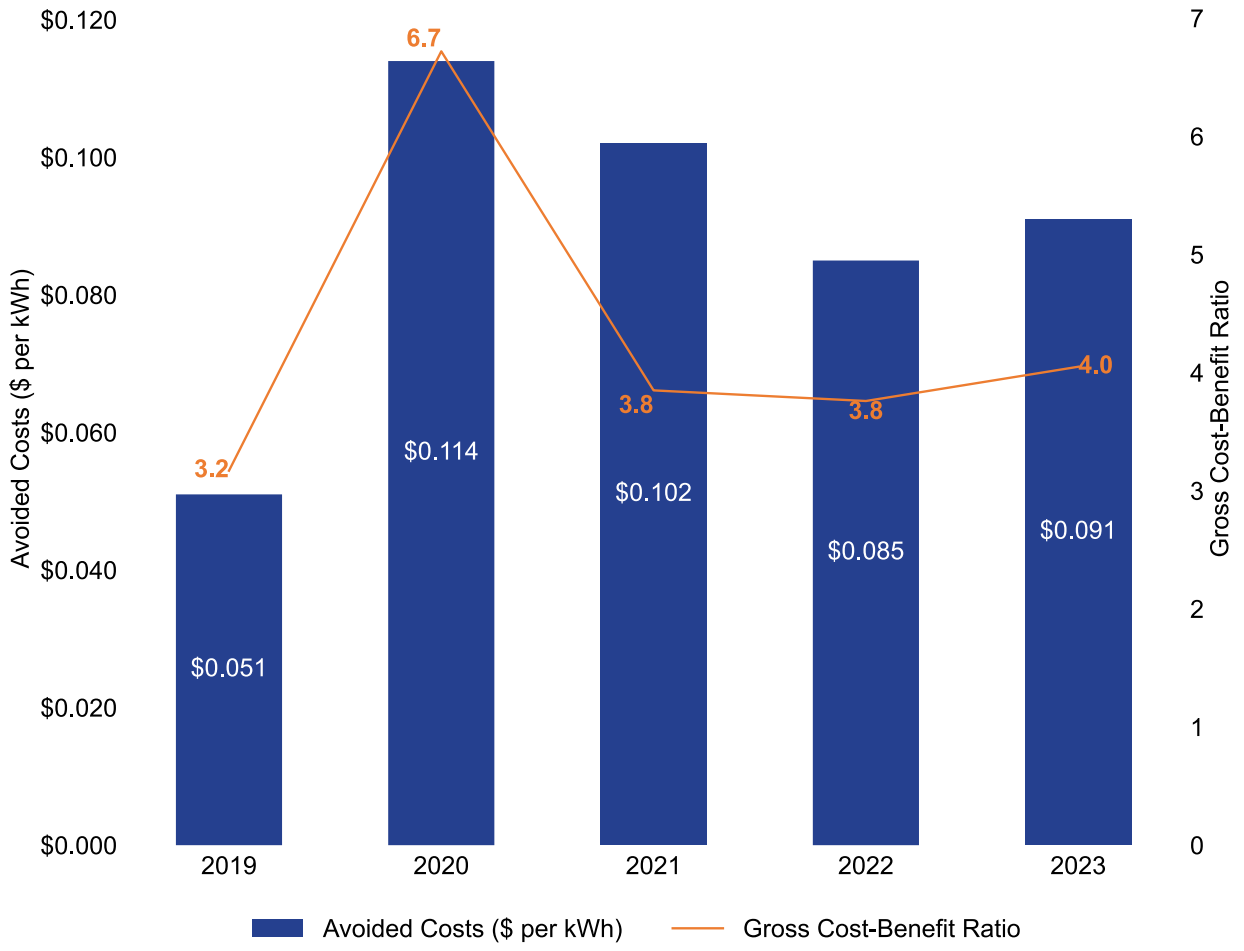


2.1.2 Cost-Effectiveness

Figure 9 overviews the avoided costs and cost-effectiveness ratios for El Paso Electric over the last five years.[4] The overall cost-effectiveness ratio has consistently remained above 2.0 for El Paso Electric. While PY2020 saw a high of 6.7, the cumulative cost-effectiveness of El Paso Electric's programs remains healthy at 4.0 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy in the ERCOT market.

[4] The IOU program cost-effectiveness test compares the benefits of a program to the costs, with a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

Figure 9. El Paso Electric's Gross Cost-Benefit Ratio and Avoided Cost by Program Year, PY2019–PY2023



2.2 KEY FINDINGS

This section presents the evaluated demand reductions and energy savings and cost-effectiveness results for El Paso Electric'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. *Low* evaluation priority programs where claimed savings were only verified through the EM&V database are listed at the end.

2.2.1 Evaluated Savings

El Paso Electric's evaluated savings for PY2023 were 20.5 MW in demand reductions and 21.3 GWh in energy savings. The overall portfolio realization rates were approximately 100 percent. El Paso Electric 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 El Paso Electric's portfolio and broad customer sector and program categories.

Table 1. El Paso Electric 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%**	**20,553**	**20,543**	**100.0%**	**N/A**
Commercial	17.2%	3,528	3,518	99.7%	N/A
Residential	11.0%	2,257	2,257	100.0%	N/A
Load management*	71.5%	14,690	14,690	100.0%	N/A
Pilot	0.4%	78	78	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 2 shows the claimed and evaluated energy savings for El Paso Electric's portfolio and broad customer sector and program categories for PY2023.

Table 2. El Paso Electric 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%**	**21,383,085**	**21,348,063**	**99.8%**	**N/A**
Commercial	72.0%	15,391,673	15,356,651	99.8%	N/A
Residential	23.1%	4,942,475	4,942,475	100.0%	N/A
Load management*	2.6%	555,456	555,456	100.0%	N/A
Pilot	2.3%	493,481	493,481	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. El Paso Electric received *good* documentation scores for all evaluated programs except the Residential Solutions MTP, which received a *fair* documentation score. Recommendations to improve this documentation score may be found in the program-level results.

2.2.2 Program Funding and Cost-Effectiveness Results

El Paso Electric's total portfolio funding for PY2023 was $4,669,164 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 3.3.

Table 1 depicts El Paso Electric's cost-effectiveness results at both the portfolio- and program-levels.

The more cost-effective programs were the Texas SCORE MTP and the Large C&I Solutions MTP; the less cost-effective programs were the FutureWise Pilot MTP and the Residential Load Management MTP. The FutureWise MTP Pilot[5] and the Residential Load Management MTP were the only programs that were not cost-effective in 2023. The Residential Load Management MTP also did not pass cost-effectiveness in PY2022 with a .91 cost-benefit ratio. The cost-benefit ratio decreased further in PY2023 due to higher program costs despite PY2023 savings being higher than PY2022 (PY2022 savings were 8,056 kW and 492,696 kWh compared to PY2023 savings of 10,118 and 510,588 kWh).

- **Recommendation:** El Paso Electric should identify and implement any program design changes necessary for the FutureWise MTP Pilot and Residential Load Management MTP to pass cost-effectiveness.

Table 3. El Paso Electric Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**3.31**	**3.30**	**2.93**
Commercial	**5.25**	**5.24**	**4.62**
Small Commercial Solutions MTP	3.53	3.53	3.13
Large C&I Solutions MTP	5.46	5.43	4.80
Texas SCORE MTP	6.06	6.06	5.31
Commercial Marketplace MTP	2.60	2.60	2.18
Residential	**2.59**	**2.59**	**2.28**
Residential Solutions MTP	3.33	3.33	2.66
LivingWise MTP	1.61	1.61	1.29
Texas Appliance Recycling MTP	1.46	1.46	1.15
Residential Marketplace MTP	4.22	4.22	3.54
Hard-to-Reach Solutions MTP	2.34	2.34	2.34
Load management	**0.89**	**0.89**	**0.89**
Commercial Load Management SOP	1.07	1.07	1.07
Residential Load Management MTP	0.83	0.83	0.83
Pilot			
FutureWise MTP Pilot	0.71	0.71	0.57

[5] Pilots are expected to pass cost-effectiveness starting in year two of implementation.

2.3 SAVINGS DIFFERENCES

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 El Paso Electric 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. El Paso Electric adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in its May 1st EECRF filing.

Table 4. Evaluated and Claimed Savings Adjustments by Program

Program	EM&V demand claimed reductions adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Commercial Load Management SOP	156.12	-600.00
Residential Load Management MTP	-48.21	-1,070.70
Large Commercial Solutions MTP	0.00	86,848.00
Texas SCORE MTP	1.66	2,766.00
Total	**109.57**	**87,943.30**

2.4 DETAILED FINDINGS—COMMERCIAL

2.4.1 Large Commercial and Industrial (C&I) 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
9.9%	2,032	2,032	99.5%	37.9%	8,104,287	8,069,265	99.6%	Good

Completed desk reviews*	Completed On-site M&V
6	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 Large C&I 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 four projects. Three projects had adjustments of less than five percent compared to the originally claimed savings, and one was larger than five percent. El Paso Electric accepted the evaluated results and matched the claimed savings to the evaluated savings for the projects with adjustments greater than five percent, resulting in a final program realization rate slightly below 100 percent. Further details of the EM&V findings are provided below.

Participant ID 2-1-0-2-74179: A commercial public order and safety building installed LED tubes and screw-in lamps for a lighting retrofit. A second project at this site was completed in October, but that project was not sampled or evaluated. During the desk review and on-site M&V visit, the EM&V team adjusted quantities of equipment installed for LED fixtures and tubes. The adjustment decreased demand reductions and energy savings, resulting in a realization rate of 96 percent for both.

Participant ID 2-1-0-2-74183: A commercial public order and safety building installed LED tubes and screw-in lamps for a lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the wattage rating of one fixture that was missing a model number. The adjustment decreased demand reduction and energy savings, resulting in a realization rate of 96 percent for both.

Participant ID 2-1-0-2-79574: A new construction distribution warehouse installed packaged rooftop units. Efficient LED lighting installation was completed at a different time, but that project was not sampled or evaluated. During the desk review, the EM&V team adjusted the unit efficiency based on the Air Conditioning, Heating, and Refrigeration Institute (AHRI) certification. The adjustment did not affect the demand reductions, maintaining a realization rate of 100 percent. The adjustment increased energy savings and resulted in a realization rate of 279 percent.

Participant ID 2-1-0-2-79703: A retail building installed LED lighting for a lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted fixture quantities to match on-site findings. The adjustments increased demand reductions and energy savings and resulted in a realization of 101 percent for both.

Documentation Score

The EM&V team could verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, DesignLights Consortium® qualified products list (QPL), AHRI certifications) for all six 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*.

2.4.2 Texas SCORE 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 energysavings (kWh)	Evaluated energy savings (kWh)	Realization rate (kWh)	Program documentation score
4.4%	895	895	100.0%	24.8%	5,296,019	5,296,019	100.0%	Good

Completed desk reviews*	Completed On-site M&V
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 Texas SCORE 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 of greater than five percent compared to the originally claimed. El Paso Electric accepted the evaluated results and matched the claimed savings to those of the evaluations for the projects with significant adjustments, resulting in a final program realization rate of 100 percent. Further details of the EM&V findings are provided below.

Participant ID 2-1-0-2-72946: A middle school installed efficient HVAC equipment for a retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the version of the calculator to 2023 and added three removed fixtures to match the on-site evaluation. The adjustments increased demand reductions and energy savings and resulted in a realization of 110 percent for both.

Documentation Score

The EM&V team could verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for 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. 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*.

2.4.3 Small 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 energysavings (kWh)	Evaluated energy savings(kWh)	Realization rate (kWh)	Program documentation score
2.9%	593	593	100.0%	9.1%	1,952,362	1,952,362	100.0%	Good

Completed desk reviews*	Completed On-site M&V
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 Small 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 did not adjust the claimed savings for any of the projects. Therefore, the final program realization rate is 100 percent.

Documentation Score

The EM&V team could mostly verify key inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for four projects that had desk reviews completed. Project documentation at these sites included invoices, pre-installation and post-installation inspection notes, project savings calculators, and photographic documentation of existing and new equipment. However, two projects were missing certifications and specifications for fixtures listed in the invoices. Providing those documents would enhance the transparency of project savings and ease of evaluation, but a small business program may also streamline the documents. Overall, the EM&V team assigned a program documentation score of *good*.

2.4.4 Commercial Marketplace 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
0.0%	8	8	100.0%	0.2%	39,005	39,005	100.0%	Good

The PY2023 Commercial Marketplace MTP evaluation efforts focused on a desk review of the tracked equipment. Documentation was not requested for a sample because the information was all contained within the tracking system calculator.

Overall, the EM&V team assessed ex-ante claimed demand reductions and energy savings for each item in the tracking system after March 31. The evaluation verified the assumptions used matched the TRM for midstream programs. The project identified that one LED lamp was classified as a *standard lamp* rather than a *directional lamp*. This change did not impact the significant digits in the savings; therefore, the EM&V team did not adjust the claimed savings, and the realization rate is 100 percent.

Documentation Score

The EM&V team verified key inputs and assumptions, including the equipment, assumptions used in calculations, and the savings per unit. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good.*

2.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. El Paso Electric was not part of the analysis because they don't have AMI fully deployed. Full deployment is expected in 2025. 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 Residential Marketplace 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%	78	78	100.0%	5.0%	1,075,805	1,075,805	100.0%	Good

The PY2023 Residential Marketplace MTP evaluation efforts focused on a desk review of the tracked equipment. Documentation was not requested for a sample because the information was all contained within the tracking system calculator.

Overall, the EM&V team assessed ex-ante claimed demand reductions and energy savings for each item in the tracking system after March 31. The evaluation verified the assumptions used matched the TRM for midstream programs. The EM&V team did not identify any savings adjustments; therefore, the realization rate is 100 percent.

Documentation Score

The EM&V team verified key inputs and assumptions, including the equipment, assumptions used in calculations, and the savings per unit. Overall, the EM&V team was satisfied with the project documentation provided and 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
22.3%	4,572	4,572	100.0%	0.2%	44,868	44,868	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 El Paso Electric's Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 30-minute increments at the electric service identifier ID (ESIID) level. In PY2023, load management events occurred on the following dates and times:

- June 9, 2023, from 3:00 p.m. to 5:00 p.m. (scheduled)[6],
- June 19, 2023, from 4:00 p.m. to 7:00 p.m. (unscheduled), and
- July 20, 2023, from 2:00 p.m. to 7:00 p.m. (unscheduled).

The EM&V team received the interval meter data and a spreadsheet that summarized the event-level savings for the nine sponsors across 18 sites. One site in the scheduled event and six sites in the first unscheduled event had negative savings data associated with them. All sponsors had at least one site that curtailed during each event[7].

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 most sites. The difference for three sites was due to calculation errors; six sites had differences due to negative savings. While reviewing individual meter savings for the sites with negative savings, the EM&V team found that El Paso Electric used 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 demand reductions, the energy savings for each participating site were calculated by multiplying the demand reductions by the total number of event hours. Program-level savings were calculated by adding all site-level savings.

[6] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for grid or system reliability.
[7] See the Report Volume 1 recommendation to monitor load management cooperation rates.

The table above shows both the EM&V team (evaluated) and El Paso Electric's (claimed) calculated demand reductions and energy savings. Evaluated savings for the El Paso Electric Commercial Load Management SOP are 4,572 kW and 44,868 kWh, with realization rates of 103.5 percent and 98.7 percent, respectively. El Paso Electric accepted the evaluated results and matched the claimed savings to those of the evaluated savings; therefore, the final program realization rate for both demand reductions and energy savings is 100 percent, with a documentation score of *good*.

2.6.2 Residential 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
49.2%	10,118	10,118	100.0%	2.4%	510,588	510,588	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 El Paso Electric Residential Load Management MTP by applying the deemed savings value from the TRM. As El Paso Electric now has advanced metering infrastructure (AMI) meters installed for residential customers, the EM&V team recommends that the deemed value be discontinued in the PY2025 TRM update, and El Paso Electric instead utilize the M&V approach detailed in Volume 4, which calculates impacts based on AMI data. In PY2023, load management events occurred on the following dates and times:

- June 9, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- June 19, 2023, from 5:00 p.m. to 7:00 p.m. (unscheduled),
- June 26, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled),
- June 27, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled),
- June 28, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- July 6, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- July 7, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- July 12, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- July 13, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled),
- July 19, 2023, from 3:00 p.m. to 5:00 p.m. (unscheduled), and
- July 20, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled).

The EM&V team received a list of participants in the program for each device type and event, the PY2023 list of devices purchased through the Marketplace with incentives received, and a savings summary report. The EM&V team verified the number of participating devices for each curtailment event (devices that were operational and participated in at least 50 percent of the event). The demand reductions for each event were calculated by multiplying the deemed savings value from the TRM by the number of participating devices. The energy savings for each event were calculated by multiplying the demand reductions by the total number of event hours. Program-level savings were calculated by adding all event-level savings. The EM&V team adjusted the number of participating devices, which increased the demand reductions and energy savings.

In addition to savings from the load management events, El Paso Electric claimed savings from new thermostat devices purchased through their Marketplace website that enrolled in the load management program at the time of purchase. Only thermostat devices that enrolled in the program before September 30, 2023, were included in the savings calculation. No adjustment was made to this portion of the program savings.

The table above shows both the EM&V team (evaluated) and El Paso Electric's (claimed) calculated demand reductions and savings. Evaluated savings for the El Paso Electric Residential Load Management MTP are 10,118 kW and 510,588 kWh, with realization rates of 99.5 percent and 99.8 percent, respectively. El Paso Electric accepted the evaluated results and matched the claimed savings to those of the evaluated savings; therefore, the final program realization rate for both demand reductions and energy savings is 100 percent, with a documentation score of *good*.

2.7 SUMMARY OF TRACKING-SYSTEM-ONLY EVALUATED PROGRAMS

Table 5 summarizes claimed savings for El Paso's programs in PY2023 that only received a tracking system verification of 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 5. PY2023 Claimed Savings (Tracking-System-Only Evaluated Programs)

Program	Contributionto 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)
Texas Appliance Recycling MTP	0.5%	99	99	100.0%	3.6%	802,053	802,053	00.0%
LivingWise MTP	0.8%	170	170	100.0%	2.6%	574,910	574,910	100.0%
FutureWise MTP (pilot)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* A tracking system review was conducted for each residential program included in the residential consumption analysis and is not shown in this table

3.0 ENTERGY TEXAS, INC. IMPACT EVALUATION RESULTS

3.1 YEAR-OVER-YEAR COMPARISONS

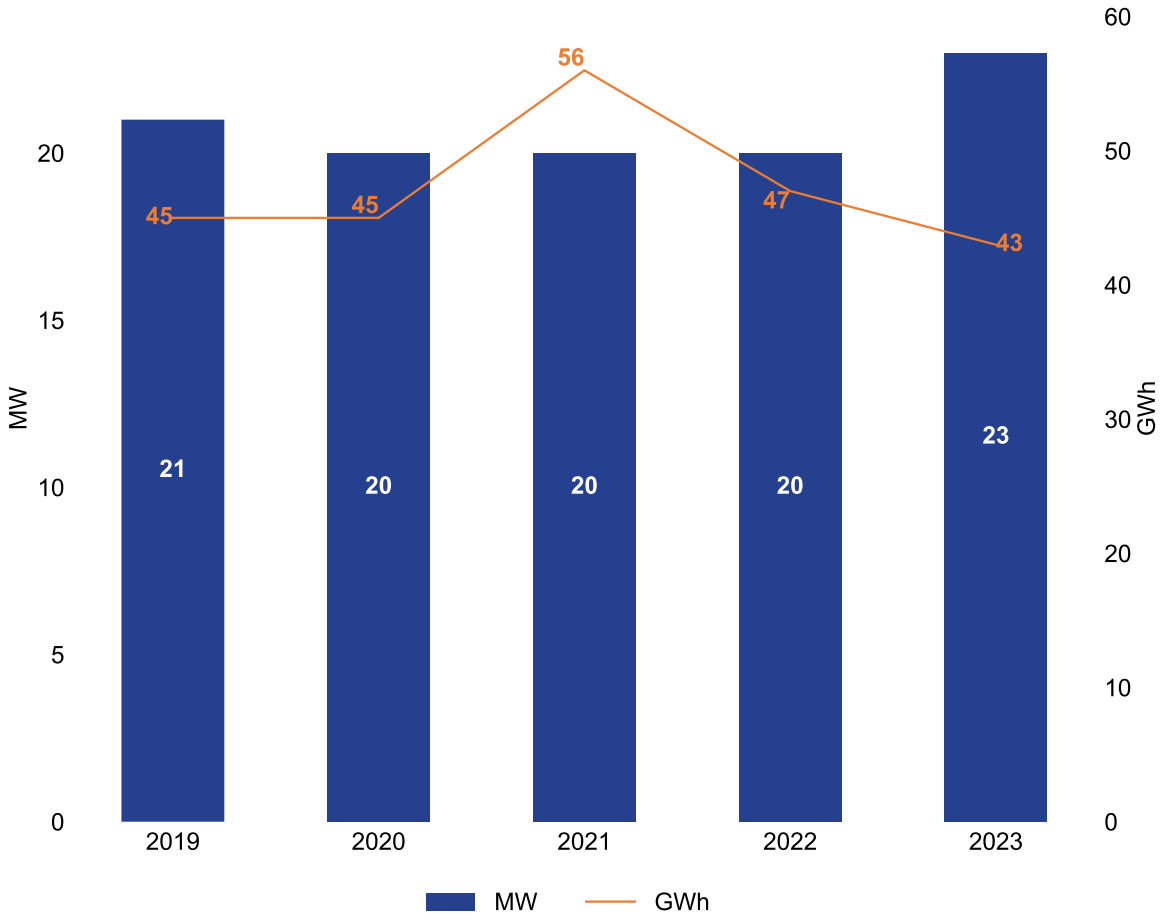
This section provides a trend analysis for the performance of Entergy Texas, Inc.'s (Entergy) programs from PY2019 to PY2023. This trend analysis provides insight into the PY2023 results included in Sections 3.2 through 3.6.

3.1.1 PY2019–PY2023 Trend Analysis

PY2023 saw a slight increase in demand reductions and a slight decrease in energy savings across Entergy's portfolio (

Figure 10). This increase in demand reductions was driven by an increase in load management, including the addition of a Residential Load Management pilot in PY2023. New federal standards in lighting and air conditioners came into effect in PY2023, decreasing energy savings across all utilities.

Figure 10. Entergy Demand Reduction and Energy Savings across Program Years, PY2019–PY2023



In PY2023, Entergy achieved the majority of its demand reduction goal through energy efficiency programs (Figure 12). Compared to the other seven IOUs, Entergy programs achieved the second-highest percentage of demand reductions through energy efficiency programs—58.3 percent compared to an ERCOT IOU average of 29.8 percent and an outside-of-ERCOT IOU average of 47.1 percent.[8] The Commercial MTP, Residential SOP, and HTR programs were all contributors to Entergy's demand reductions beyond load management.

- **Recommendation:** The PUCT and evaluation, measurement, and verification (EM&V) team should discuss with Entergy their successful strategies for achieving over one-half of demand reductions through energy efficiency and any future plans to continue that achievement.

In PY2023, most of Entergy's energy savings (Figure 11, right) were achieved by their Commercial MTP. Entergy does not offer a Commercial SOP, although this is typical for outside-of-ERCOT utilities.

- **Recommendation:** The PUCT and EM&V team should discuss with Entergy their reasons for not offering a Commercial SOP and any future plans to balance the program design of commercial MTP and SOP offerings.

Entergy's demand reductions and energy savings by program type have remained relatively consistent from PY2019 to PY2023, with a small decrease in PY2023 in residential SOP and HTR offerings, coupled with an increase in upstream/midstream offerings.

- **Recommendation:** The PUCT and EM&V team should discuss with Entergy their reasons for decreased residential SOP and HTR offerings in PY2023 and future plans to increase these programs, particularly in light of the effectiveness these programs demonstrated in the consumption analysis.[9]
- **Recommendation:** The PUCT and EM&V team should discuss with Entergy how their upstream/midstream offerings are helping reach new customer segments and technologies and future plans for this delivery model.

[8] ERCOT, Volume 1, Executive Summary, Figure 4 and Outside-of-ERCOT, Figure 5.

[9] The consumption analysis indicated strong performance of Entergy's Residential SOP and HTR programs, (refer to Volume 1, Technical Appendix A).

Figure 11. Entergy Demand Reduction and Energy Savings by Program Type, PY2019–PY2023[10]

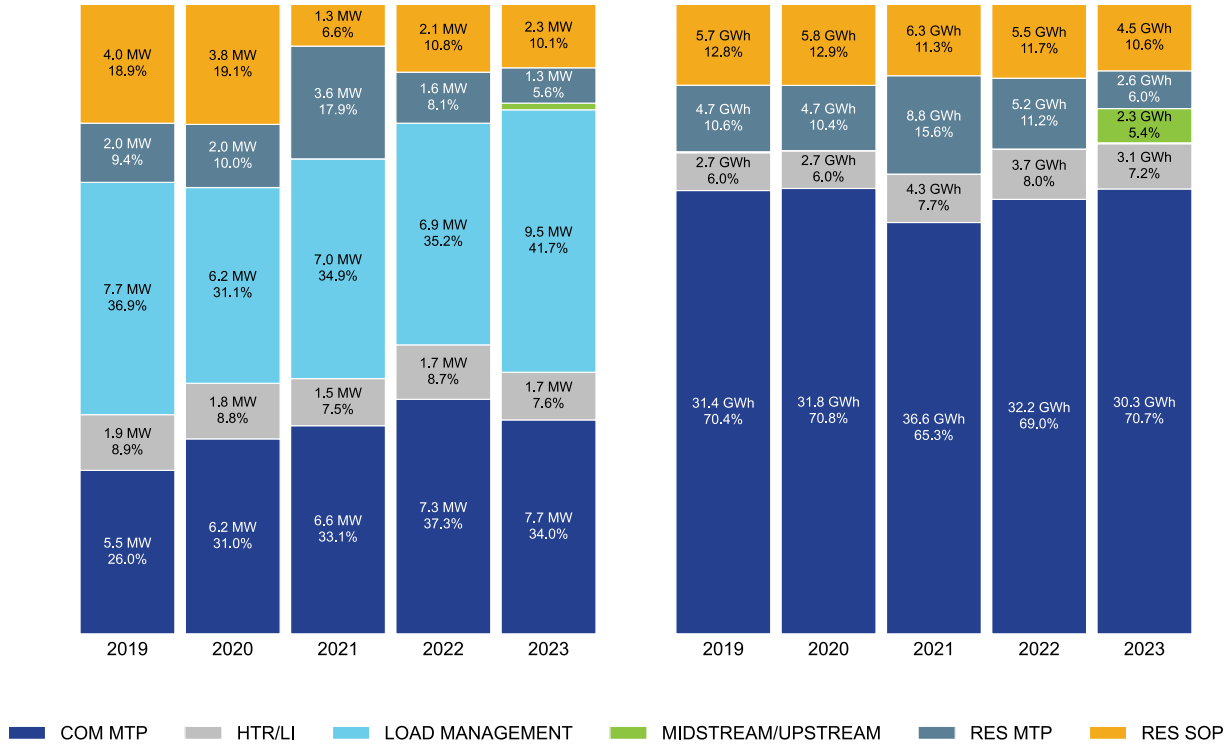
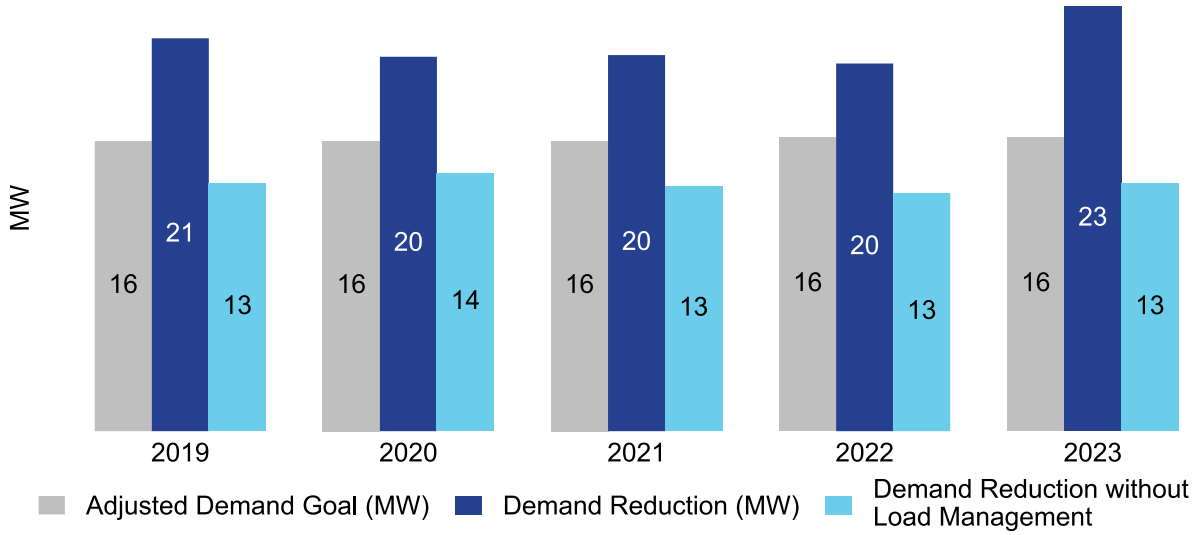


Figure 12 highlights that, even when delivering over one-half of its demand reductions through energy efficiency, Entergy still needed load management to meet its legislated demand reduction goals from PY2019 to PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with Entergy potential strategies to fully meet their legislated demand reduction goal through energy efficiency alone and what challenges they see in being able to do so, if any, considering that Entergy is already delivering a high percentage of demand reductions through energy efficiency.

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

Figure 12. Entergy's Legislated Goals and Demand Reductions, PY2019–PY2023



3.1.1.1 Commercial Savings

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

- Demand reductions of 7.71 MW; and
- Energy savings of 30.29 GWh.

Figure 13 reflects how demand reductions from Entergy's programs have consistently increased by about 0.5 MW each year to achieve just below 8 MW in PY2023. Entergy's energy savings have not seen the same growth pattern from year to year, having peaked at 37 GWh in PY2021. In PY2023, the energy savings decreased to the lowest savings in the past five years, 30 GWh. This variation in pattern between demand reductions and energy savings is a result of the measure mix in the commercial program.

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

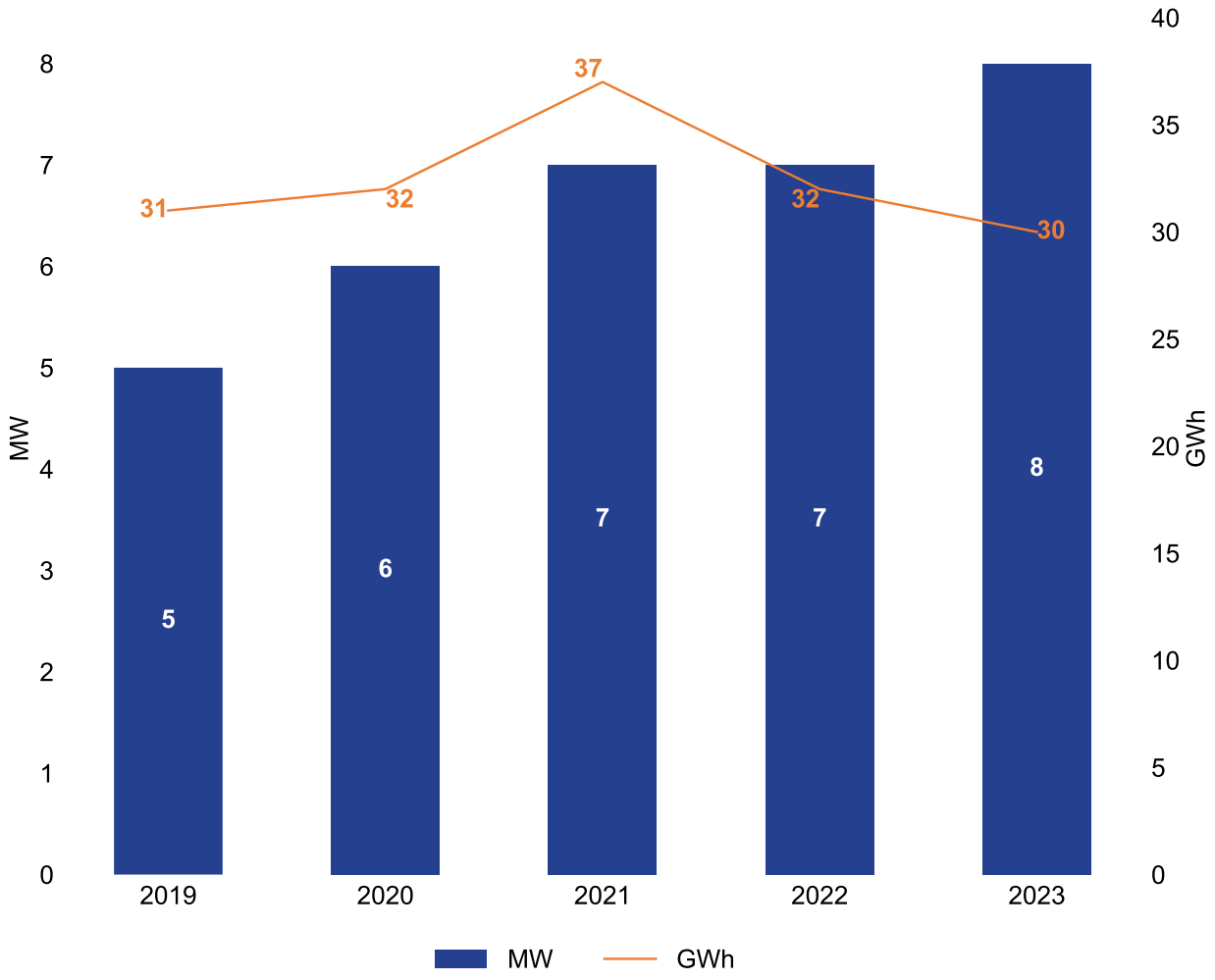
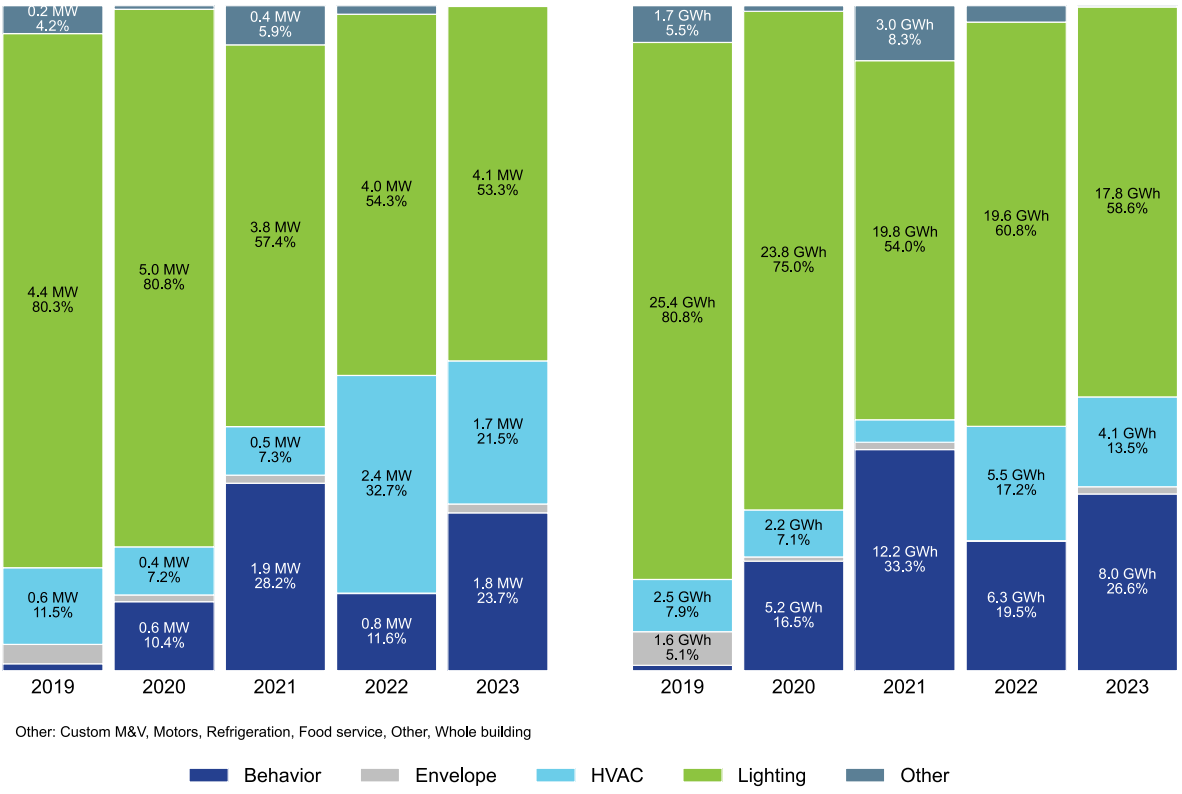


Figure 14 highlights that *lighting* measures still accounted for over one-half of the demand reduction and energy savings in PY2023—53 percent and 59 percent, respectively; however, *lighting* measures have decreased as a percentage of Entergy's commercial savings over the past five years due to the growth of other measure categories such as *HVAC* and *behavior* measures. Figure 14 shows the variation in relative savings of these three measure categories.

- **Recommendation:** The PUCT and EM&V team should discuss with Entergy the plans to continue to diversify the commercial measure mix beyond *lighting*, including the potential of the *HVAC*, *behavior,* and *other* measures to meet customer needs more comprehensively.

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



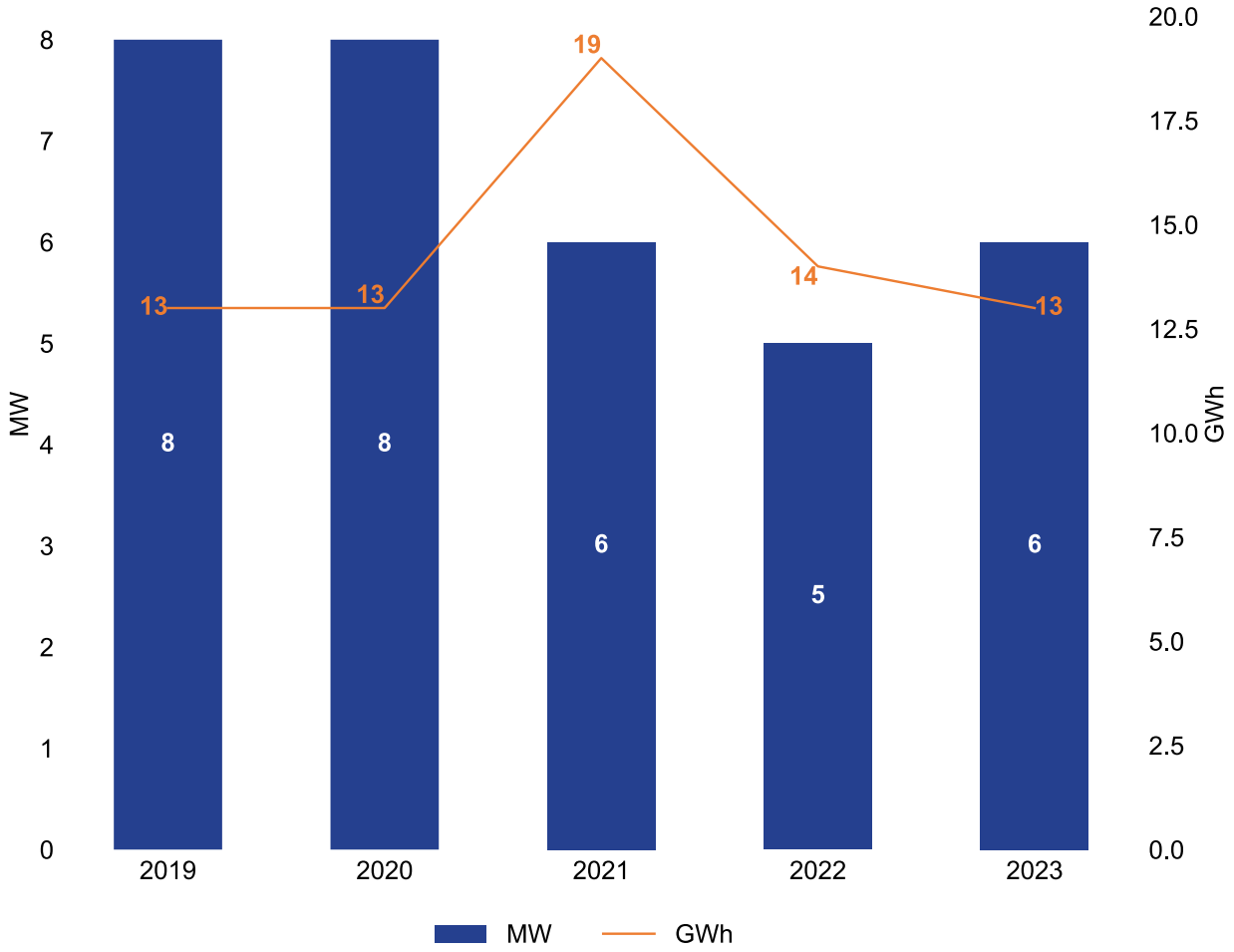
3.1.1.2 Residential Savings

The PY2023 gross savings from Entergy's residential sector programs, excluding load management, were:

- Demand reduction of 5.52 MW; and
- Energy savings of 12.50 GWh.

Figure 15 shows an increase in the demand reductions achieved by Entergy's residential programs in PY2023—bringing them in line with PY2021. Differently, Entergy's residential programs saw a decrease in energy savings in PY2023—bringing them in line with PY2019 and PY2020. Some of the reductions in Entergy's demand reductions and energy savings were due to changes in 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.

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

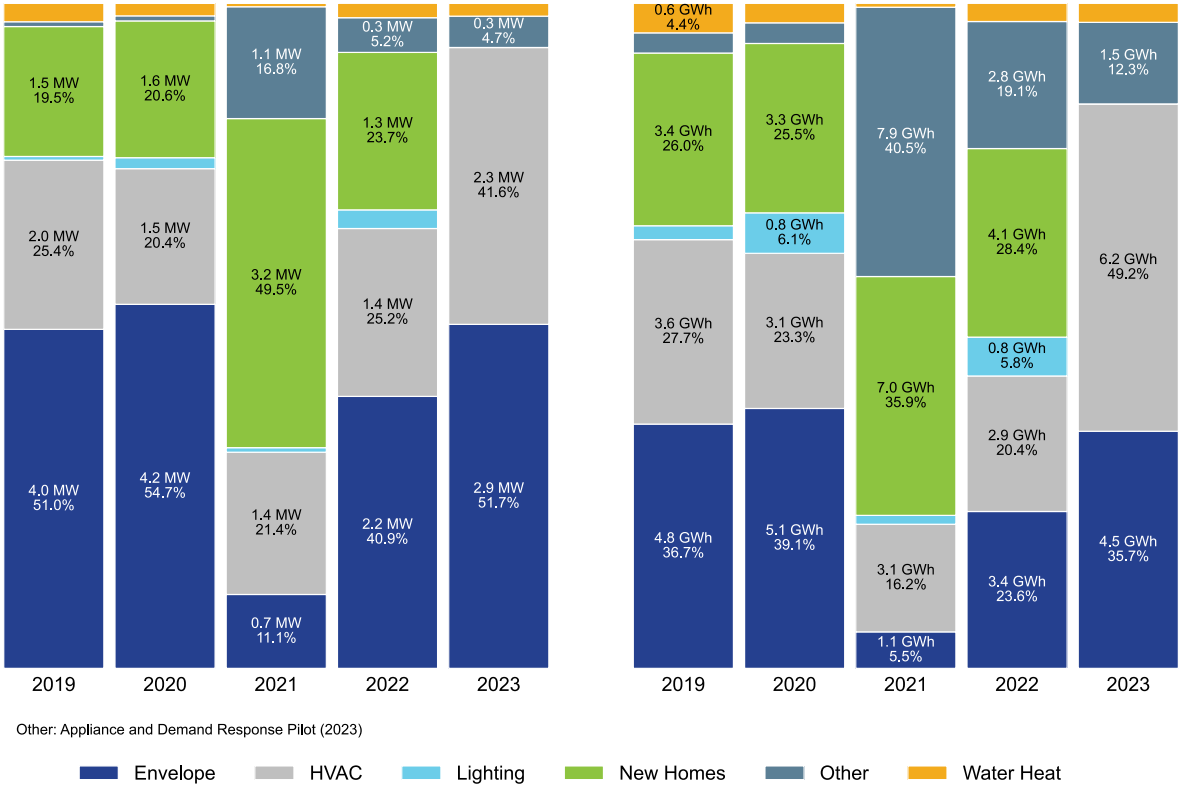


In PY2023, the demand reductions from Entergy's residential programs were primarily derived from *envelope* measures, representing over one-half of kilowatts, with energy savings primarily derived from *HVAC* measures, representing almost one-half of kilowatt-hours. Figure 16 shows the breakdown of demand reductions and energy savings by measure category, demonstrating *HVAC* measures as the highest contributor to energy savings and the second-highest contributor to demand reductions behind *envelope* measures. *Envelope* measures were the second-highest contributor to energy savings, followed by *appliance* measures for both demand reductions and energy savings.

- **Recommendation:** The PUCT and EM&V team should discuss Entergy's successes and challenges in diversifying their residential measure mix, including best practices they have employed in *HVAC* and *envelope* measures—evident in both the percentage of savings achieved by these measures and the favorable consumption analysis results.

The *other* measure category includes a demand reduction of 84 kW and energy savings of 114 kWh from the Demand Solutions (residential load management) pilot, which was one of the subprograms of the Residential Solutions program. See the Program Tracking recommendations included in Table 6, PY2023 EM&V Recommendations and IOU Action Plans, Volume 1 IOUs Energy Efficiency Report Program Year 2023, which recommends that Load Management programs be tracked and reported as separate programs from energy efficiency.

Figure 16. Entergy's Demand Reduction and Energy Savings by Measure Category—Residential Programs, PY2019–PY2023[11]



3.1.1.3 Load Management Savings

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

- Demand reduction of 9.47 MW; and
- Energy savings of 0.065 GWh.

Figure 8 summarizes the demand reductions and energy savings for Entergy's load management programs from PY2019 to PY2023, showing fairly consistent growth in demand reductions since PY2020 and a considerable increase in energy savings from PY2022 to PY2023. The number of participants enrolled in Entergy's load management programs has been consistent from PY2019 to PY2022. In PY2023, participation considerably increased, resulting in higher demand reductions and energy savings.

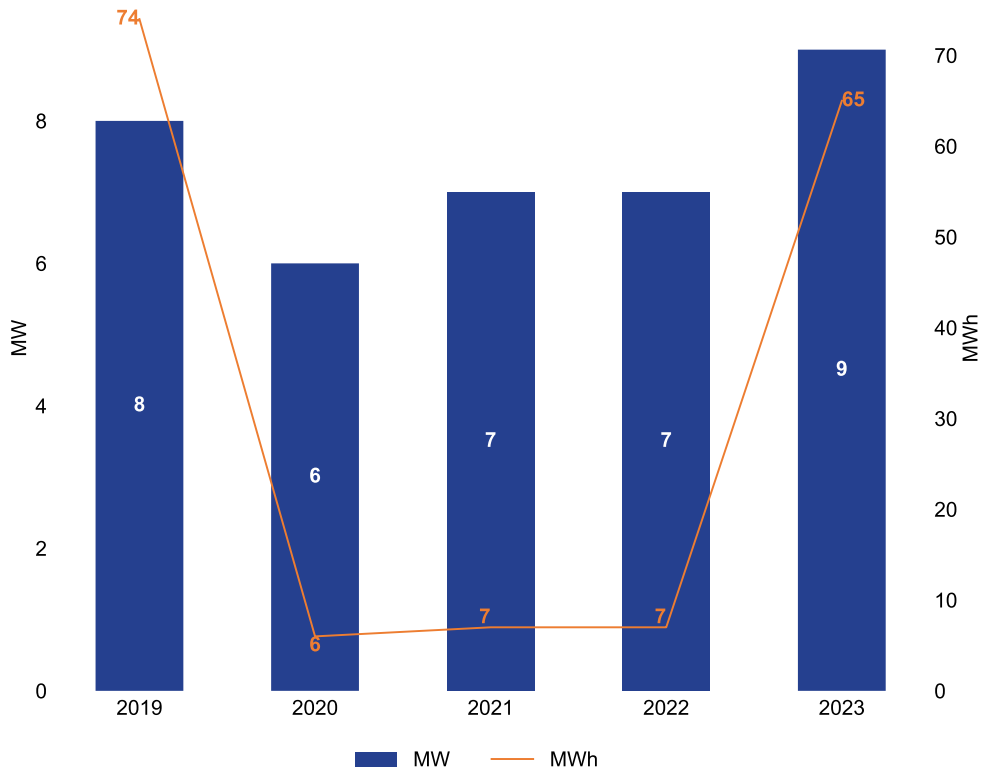
[11] In PY2023, Entergy's New Homes program savings were under measures that fell under other categories. E.g., *new construction air conditioners* were included in the *HVAC* measure category.

Energy savings depend upon the number of curtailment events called each year and their duration. The two years with the highest energy savings relative to demand reduction—PY2019 and PY2023—had the highest number of events due to unscheduled events for grid or system reliability in addition to scheduled test events.

Note that demand reductions and energy savings from Entergy's residential load management pilot program are not included in this section because it was a subprogram of the Residential MTP in PY2023, as discussed above.

- **Recommendation:** The PUCT and EM&V team should discuss with Entergy the importance of tracking and reporting load management and energy efficiency as separate programs, given the different objectives of these offerings.

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

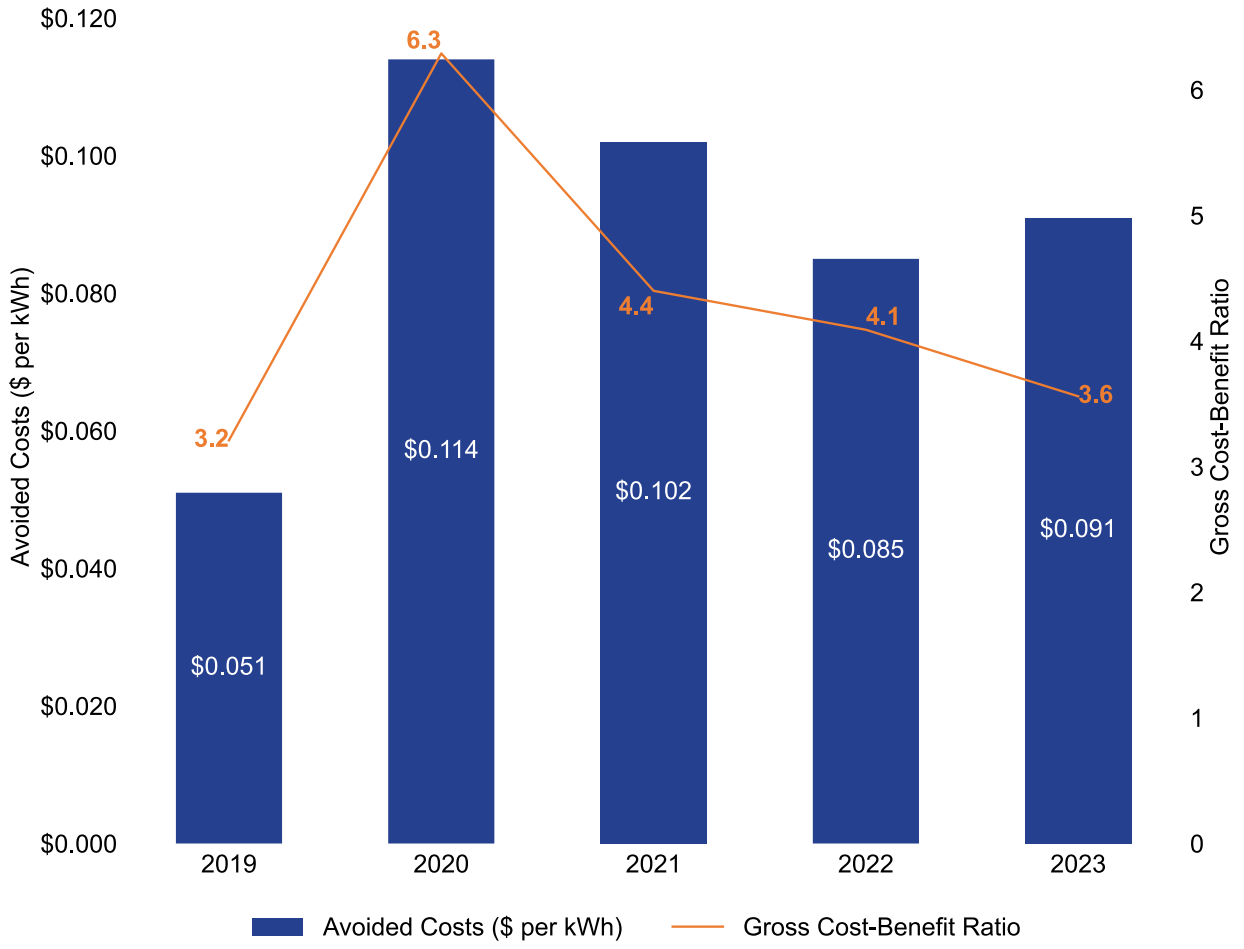


3.1.2 Cost-Effectiveness

Figure 18 overviews the avoided costs and cost-effectiveness ratios for Entergy over the last five years. [12] The overall cost-effectiveness ratio has consistently remained above 2.0 for Entergy. While PY2020 saw a high of 6.3, the cumulative cost-effectiveness of Entergy's programs remains healthy at 3.6 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy in the ERCOT market.

[12] The IOU program cost-effectiveness test compare the benefits of programs to the costs, with a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost-effectiveness evaluation.

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



3.2 KEY FINDINGS

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

3.2.1 Evaluated Savings

Entergy's evaluated savings for PY2023 were 22,704 in demand reductions and 42,850,449 in energy savings. The overall portfolio realization rates are approximately 100 percent. Entergy 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 savings for Entergy'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. Entergy PY2023 Claimed and Evaluated Demand Savings

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%**	**22,699**	**22,704**	**100.0%**	**N/A**
Commercial	34.0%	7,714	7,714	100.0%	N/A
Residential	24.3%	5,520	5,520	100.0%	N/A
Load management*	41.7%	9,465	9,470	100.1%	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 Entergy's portfolio and broad customer sector and program categories for PY2023.

Table 7. Entergy 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%**	**42,850,452**	**42,850,449**	**100.0%**	**N/A**
Commercial	70.7%	30,285,204	30,285,204	100.0%	N/A
Residential	29.2%	12,500,161	12,500,161	100.0%	N/A
Load management*	0.2%	65,087	65,084	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. Entergy received *good* documentation scores for all evaluated programs except the Residential SOP and Hard-to-Reach SOP, which received *fair* documentation scores.

3.2.2 Program Funding and Cost-Effectiveness Results

Entergy's total portfolio funding for PY2023 was $7,283,462 (excluding research and development, EM&V, and their performance bonus); their portfolio had a cost-effectiveness score of 3.6.

The more cost-effective programs were the Commercial Solutions MTP and the Residential Solutions MTP programs; the less cost-effective programs were the Load Management SOP and the Residential SOP programs. All of Entergy's programs were cost-effective in 2023.

Table 8. Entergy Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**3.56**	**3.56**	**3.17**
Commercial	**5.58**	**5.58**	**4.93**
Commercial Solutions MTP	5.58	5.58	4.93
Residential	**2.41**	**2.41**	**2.16**
Residential SOP	2.07	2.07	1.86
Residential Solutions MTP	2.80	2.80	2.24
Hard-to-Reach SOP	2.56	2.56	2.56
Load management	**1.82**	**1.82**	**1.82**
Commercial Load Management SOP	1.82	1.82	1.82

3.3 SAVINGS DIFFERENCES

Utilities are provided the opportunity to adjust savings at the project level based on interim EM&V findings. Table 4 summarizes the savings differences identified by the EM&V team, which Entergy 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. Entergy adjusted claimed savings for all projects with a difference of more than five percent, as found by the EM&V team, prior to their April 1 Energy Efficiency Plan and Report (EEPR) filing.

Table 9. Claimed Savings Differences by Program

Program	EM&V demand claimed reductions adjustments (kW)	EM&V energy claimed savings adjustments (kWh)
Commercial Solutions MTP	-33.43	-14,066
Hard-to-Reach SOP	0.14	1,557
Residential Solutions MTP	0.90	-1,462
Residential SOP	.21	554
Total	**-32.18**	**-13,417**

3.4 DETAILED FINDINGS—COMMERCIAL

3.4.1 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
34.0%	7,714	7,714	100.0%	70.7%	30,285,204	30,285,204	100.0%	Good

Completed desk reviews*	Completed On-site M&V
16	8

*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 with on-site M&V visits competed on a subset of the sample. The sample of completed desk reviews and on-site M&V for this program are listed above.

The EM&V team adjusted the claimed savings for ten projects. Eight projects had adjustments greater than five percent compared to the claimed energy or demand savings; the remaining two projects had adjustments of less than five percent. Entergy accepted the evaluated results and matched the claimed savings to those of the evaluations for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 3-1-0-2-62828: The project was a high school retrofit of lighting throughout the school. During the desk review, the EM&V team updated the baseline for the LED screw-in lamps to meet the current EISA standard. These adjustments slightly increased demand reductions and decreased energy savings, and the resulting realization rate rounded to 100 percent.

Participant ID 3-1-0-2-72743: The project was midstream lighting distribution sales from a single retailer in February to five commercial sites. During the desk review, the EM&V team adjusted the energy savings to match the TRM midstream assumptions from this program's historically claimed midstream assumptions. These adjustments increased demand reductions and resulted in a realization rate of 144 percent. The adjustments also increased energy savings and resulted in a realization rate of 103 percent.

Participant ID 3-1-0-2-72751: The project was a midstream lighting distribution sale from a single retailer in March to three commercial sites. During the desk review, the EM&V team adjusted the energy savings to match the TRM midstream assumptions from this program's historically claimed midstream assumptions. These adjusted demand reductions resulted in a realization rate of 114 percent. The adjustments also decreased energy savings and resulted in a realization rate of 82 percent.

Participant ID 3-1-0-2-72795: The project was a midstream lighting distribution sale from a single retailer in May to five commercial sites. During the desk review, the EM&V team adjusted the energy savings to match the TRM midstream assumptions from this program's historically claimed midstream assumptions. These adjustments decreased demand reductions and resulted in a realization rate of 84 percent. The adjustments also decreased energy savings and resulted in a realization rate of 68 percent.

Participant ID 3-1-0-2-75409: A new construction elementary school installed energy-efficient lighting and HVAC equipment. During the desk review and on-site M&V visit, the EM&V team adjusted the baseline to the EER2/SEER2[13] baseline to match the new equipment. The adjustments decreased demand reductions and resulted in a realization rate of 56 percent. The adjustments also decreased energy savings and resulted in a realization rate of 99 percent.

Participant ID 3-1-0-2-75493: A retail facility installed a lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the building assumption to match an enclosed mall from a strip mall. The demand reductions did not change, but the energy savings increased to a realization rate of 121 percent.

Participant ID 3-1-0-2-79370: A new construction university dormitory installed energy-efficient lighting and HVAC. During the desk review and on-site M&V visit, the EM&V team adjusted the assumptions for lighting and HVAC to match the lodging building type. In addition, there was one lighting fixture for which the EM&V team adjusted the wattage to match the DesignLights Consortium® (DLC) rated wattage. The adjustments 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 167 percent.

Participant ID 3-1-0-2-79443: A healthcare facility completed a lighting retrofit. During the desk review, the EM&V team adjusted the quantity of lighting fixtures and fixture wattages to the DLC-qualified products list (QPL) rated wattage for the sterilizer room. Additionally, the EM&V team adjusted the removed lighting fixtures to match the length of the installed LED tubes and fixtures to match the retrofit, which did not adjust the fixture length. These adjustments decreased demand reductions and energy savings and resulted in a realization rate of 84 percent for each.

Participant ID 3-1-0-2-79726: A retail facility installed new energy-efficient HVAC units. During the desk review and on-site M&V visit, the EM&V team adjusted to the current TRM calculator, which slightly adjusted the savings. These adjustments decreased demand reductions and energy savings and resulted in a realization rate of 96 percent for each.

Participant ID 3-1-0-2-79874: A retail facility installed new energy-efficient HVAC units. During the desk review, the EM&V team adjusted to a new calculator and identified that the submitted calculation had broken links and incorrectly calculated the savings. In addition, the EM&V team identified that the existing HVAC units were manufactured in 2002 and 2009 and adjusted the calculation to match those years. The adjustments decreased demand reductions and resulted in a realization rate of 52 percent. The adjustments also decreased energy savings and resulted in a realization rate of 78 percent.

[13] Energy Efficiency Ratio/Seasonal Energy Efficiency Ratio.

Documentation Score

The EM&V team was able to verify key inputs and assumptions (e.g., equipment quantity, equipment capacity; QPL qualifications; and Air Conditioning, Heating, and Refrigeration Institute (AHRI) certifications) for the 16 projects that had desk reviews because sufficient documentation was provided for the sites. Project documentation included M&V plans, invoices, QPL qualifications or AHRI certifications, equipment specification sheets, 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*.

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 Residential Standard Offer Program (SOP)

The PY2023 Residential SOP evaluation efforts focused on desk reviews and on-site M&V of the Residential HVAC tune-up component. The number of sampled and completed desk reviews and on-site M&V projects for this program are listed below.

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
10.1%	2,286	2,286	100.0%	10.6%	4,521,787	4,521,787	100.0%	Fair

Completed desk reviews*
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 Residential SOP evaluation efforts focused on desk reviews. The number of sampled and completed desk reviews for this program is listed above. The desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system and that savings were calculated in accordance with the TRM.

The EM&V team adjusted the claimed savings for the two projects evaluated. Both projects had an adjustment of greater than five percent compared to the originally claimed savings. Entergy accepted the evaluated results and matched the claimed savings to the evaluation for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID: 3-1-0-2-59591: The energy efficiency project was a tune-up of the existing split air conditioning system. During the desk review, the EM&V team found that the calculation used the incorrect cooling capacity for the unit. The adjustment resulted in a realization rate of 133 percent and 134 percent for demand reductions and energy savings, respectively.

Participant ID: 3-1-0-2-59601: The energy efficiency project was a tune-up of the existing split air conditioning system. During the desk review, the EM&V team found that the calculation used the incorrect cooling capacity for the unit. The adjustment resulted in a realization rate of 105 percent for both demand reductions and energy savings.

Documentation Score

The EM&V team verified most key inputs and assumptions, including the project scope, test results, and equipment specifications for all sampled projects that had desk reviews. Project documentation included the invoice, nameplate photo, and the tracking system of test-out measurements. However, the tracking system made several assumptions that were not documented, including the blower motor type, blower power factor, and fan curve. The nameplate photo documented the equipment type and capacity; however, the capacity was incorrectly entered into the tracking system. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair.*

- **Recommendation:** The EM&V team recommends that Entergy create or update the M&V plan for the tune-up projects and identify the assumptions that should be documented when implementing the measure.

3.5.2 Residential Solutions Market Transformation Program (MTP)

The PY2023 Residential Solutions MTP evaluation efforts focused on desk reviews of the Entergy High-Performance Homes, Distributed Products, and Marketplace components. The number of sampled and completed desk reviews for this program is listed below.

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
6.7%	1,514	1,514	100.0%	11.4%	4,899,812	4,899,812	100.0%	Good

Completed desk reviews*
6

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

The EM&V team adjusted the claimed savings for the two new homes projects evaluated. Both projects sampled were from the same subdivision and had identical equipment; therefore, they had the same energy savings claimed and adjusted. The adjustment was greater than five percent compared to the originally claimed savings. Entergy accepted the evaluated results and matched the claimed savings to the evaluation for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID: 3-4-0-2-67108: The energy efficiency project included the implementation of a central air conditioner at a new construction home. During the desk review, the EM&V team adjusted the calculation to use the SEER2 baseline and certified rating for the 2.4-ton air conditioner installed. Overall, the adjustments resulted in project-level realization rates of 273 percent and 42 percent for demand reductions and energy savings, respectively.

Participant ID: 3-4-0-2-67111: The energy efficiency project included the implementation of a central air conditioner at a new construction home that was similar to the above-sampled project. The air conditioning equipment was identical, and therefore, during the desk review, the EM&V team completed the same adjustment in the calculation. The adjustment was identical and resulted in project-level realization rates of 273 percent and 42 percent for demand reductions and energy savings, respectively.

Documentation Score

The EM&V team verified key inputs and assumptions, including the project scope, baselines, and equipment specifications for all sampled projects with desk reviews. Project documentation included applications, invoices, certification rating identification numbers, and verification reports with photos. The new construction projects included the equipment information, fuel summary report, and certificates for Home Energy Rating System (HERS) and ENERGY STAR®. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good.*

3.5.3 Hard-to-Reach Standard Offer Program (SOP)

The PY2023 Hard-to-Reach SOP evaluation efforts focused on desk reviews; the sample of completed desk reviews and on-site M&V projects for this program are listed below.

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
7.6%	1,720	1,720	100.0%	7.2%	3,078,562	3,078,562	100.0%	Fair

Completed desk reviews*
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 Hard-To-Reach SOP evaluation efforts focused on desk reviews. The number of sampled and completed desk reviews for this program is listed above. The desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system and that savings were calculated in accordance with the TRM.

The EM&V team adjusted the claimed savings for the two projects evaluated. Both projects had an adjustment of greater than five percent compared to the originally claimed savings. Entergy accepted the evaluated results and matched the claimed savings to the evaluation for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID: 3-1-0-2-59352: The energy efficiency project was a tune-up of the existing split air conditioning system. During the desk review, the EM&V team found that the calculation used the incorrect cooling capacity for the unit. The adjustment resulted in a realization rate of 107 percent for both demand reductions and energy savings.

Participant ID: 3-1-0-2-72285: The energy efficiency project was a tune-up of the existing split air conditioning system. During the desk review, the EM&V team found that the unit was a heat pump and adjusted the calculation. The cooling savings calculation adjusted the cooling capacity for the unit based on photo documentation. The heating savings calculation was added to the project by the EM&V team. Overall, the adjustment resulted in the realization rate of 111 percent and 177 percent for demand reductions and energy savings, respectively.

Documentation Score

The EM&V team verified most key inputs and assumptions, including the project scope, test results, and equipment specifications for all sampled projects that had desk reviews. Project documentation included the invoice, nameplate photo, and the tracking system of test-out measurements. However, the tracking system made several assumptions that were not documented, including the blower motor type, blower power factor, and fan curve. The nameplate photo documented the equipment type and capacity; however, the capacity was incorrectly entered into the tracking system. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair.*

- **Recommendation:** The EM&V team recommends that Entergy update the M&V plan for the tune-up projects and identify the assumptions that should be documented when implementing the measure.

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
41.7%	9,465	9,470	100.1%	0.2%	65,087	65,084	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 Entergy Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 5- and 30-minute increments at the electric service identifier ID (ESIID) level. In PY2023, load management events occurred on the following dates and times:

- June 20, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled)[14],
- June 20, 2023, from 6:00 p.m. to 7:00 p.m. (scheduled),
- June 21, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled),
- June 22, 2023, from 1:00 p.m. to 2:00 p.m. (scheduled),
- June 22, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled),
- June 23, 2023, from 1:00 p.m. to 2:00 p.m. (scheduled),
- June 28, 2023, from 3:00 p.m. to 4:00 p.m. (scheduled),
- June 30, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled),
- July 3, 2023, from 3:00 p.m. to 4:00 p.m. (scheduled),
- July 19, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled),
- August 1, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled), and
- August 15, 2023, from 4:00 p.m. to 6:00 p.m. (unscheduled).

The EM&V team received interval meter data and a spreadsheet summarizing the event-level savings for the nine sponsors across 175 sites. All but 12 sites participated in their associated scheduled event (used as a test event). On average, 24 sites did not participate in each of the unscheduled events, with one site not participating in all unscheduled events[15].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings Entergy provided for all sites. The demand reductions for each participating site corresponded to the average across the unscheduled and scheduled events. The energy savings for each participating site were calculated by multiplying the demand 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 Entergy's (claimed) calculated demand reductions and energy savings. No adjustments were made to the program savings; however, a negligible difference in kilowatt and kilowatt-hour resulted from different rounding practices during calculations. Evaluated demand reductions and energy savings for the Entergy Commercial Load Management SOP were 9,470 kW and 65,084 kWh, respectively. Accordingly, the realization rate for demand reductions and energy savings is 100 percent, with a documentation score of *good*.

[14] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for grid or system reliability.
[15] See the Report Volume 1 recommendation to monitor load management cooperation rates.

4.0 SOUTHWESTERN ELECTRIC POWER COMPANY IMPACT EVALUATION RESULTS

4.1 YEAR-OVER-YEAR COMPARISONS

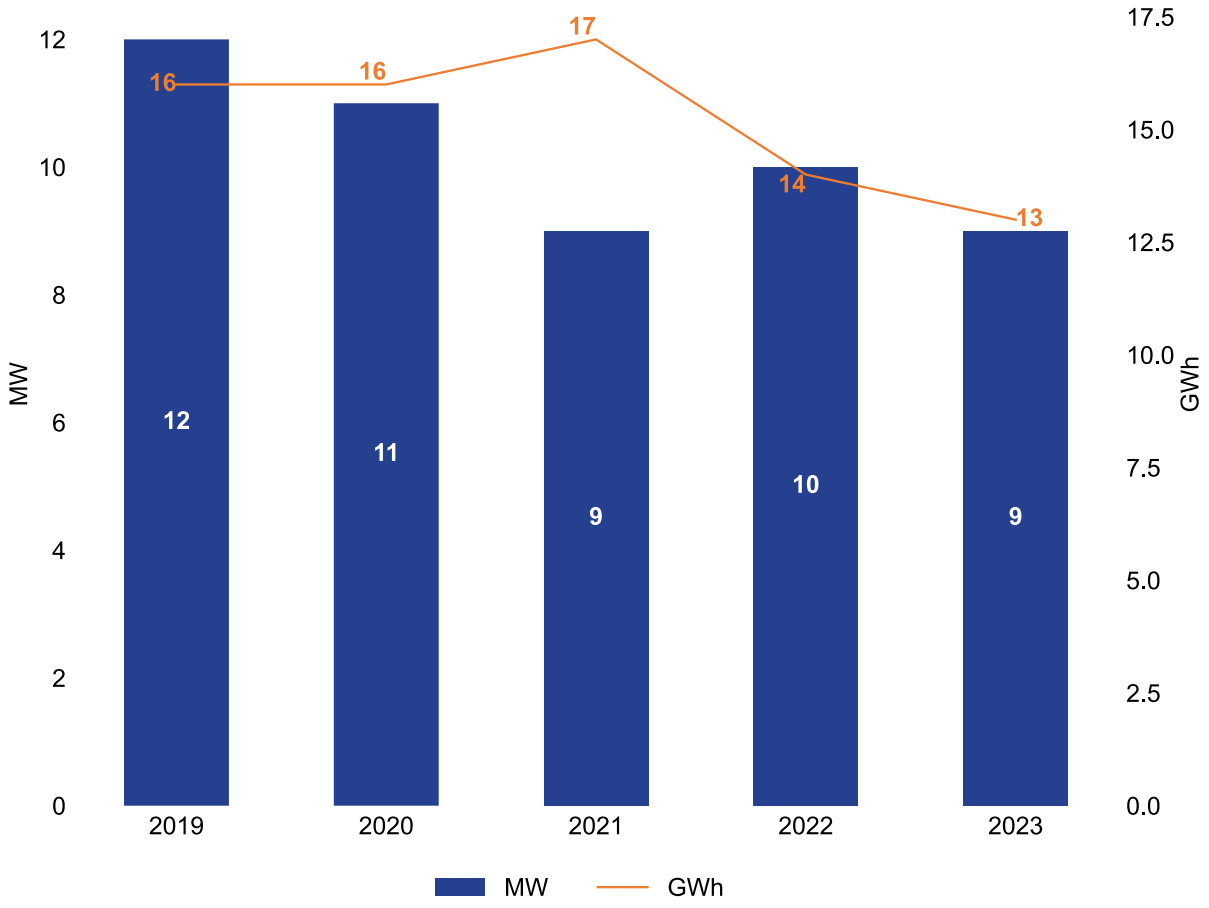
This section provides a trend analysis for Southwestern Electric Power Company's (SWEPCO) program performance during program year (PY) 2019 (PY2019) through PY2023. This trend analysis provides insight into the PY2023 results included in Sections 4.2 through 4.6.

4.1.1 PY2019–PY2023

PY2023 saw a decrease in demand reductions and energy savings across SWEPCO's portfolio (Figure 19). New federal standards in *lighting* and *air conditioners* came into effect in PY2023, decreasing energy savings across all utilities.

- **Recommendation:** The PUCT and evaluation, measurement, and verification (EM&V) team should discuss with SWEPCO the challenges they faced in responding to the federal baseline changes and any strategies to return energy savings and demand reductions to levels achieved in prior years.

Figure 19. SWEPCO Demand Reduction and Energy Savings across Program Years, PY2019–PY2023



In PY2023, SWEPCO delivered just under one-half of its demand reductions through energy efficiency programs (Figure 20). Compared to the other IOUs, SWEPCO's programs achieved more demand reductions through energy efficiency than both the ERCOT IOUs and the outside-of-ERCOT IOUs—47.1 percent compared to 29.8 percent for ERCOT IOUs and 47.1 percent for outside-of-ERCOT IOUs. [16] The Commercial MTP, SOP, and HTR programs were the three largest contributors to demand reductions.

- **Recommendation:** The PUCT and EM&V team should discuss SWEPCO's successful strategies used to deliver close to one-half of portfolio savings through energy efficiency and any future plans to continue to increase the percentage of demand reductions achieved by energy efficiency.

In PY2023, almost one-half of the energy savings (Figure 20, right) were achieved by SWEPCO's Commercial MTPs. In contrast, energy savings from SWEPCO's Commercial Standard Offer Program (SOP) have consistently decreased since PY2021, which may be due to the increase in savings from SWEPCO's Commercial MTPs. However, it is worth noting that SWEPCO differs from the other outside-of-ERCOT IOUs by including a Commercial SOP in its portfolio. Energy savings from other program types have remained relatively stable across SWEPCO's portfolio.

- **Recommendation:** The PUCT and EM&V team should discuss with SWEPCO the reasons for changes in the balance of commercial MTP and SOP offerings and what will be the right balance in future program years.

[16] ERCOT, Volume 1, Executive Summary, Figure 4 and Outside-of-ERCOT, Figure 5.

Figure 20. SWEPCO Demand Reduction and Energy Savings by Program Type, PY2019–PY2023[17]

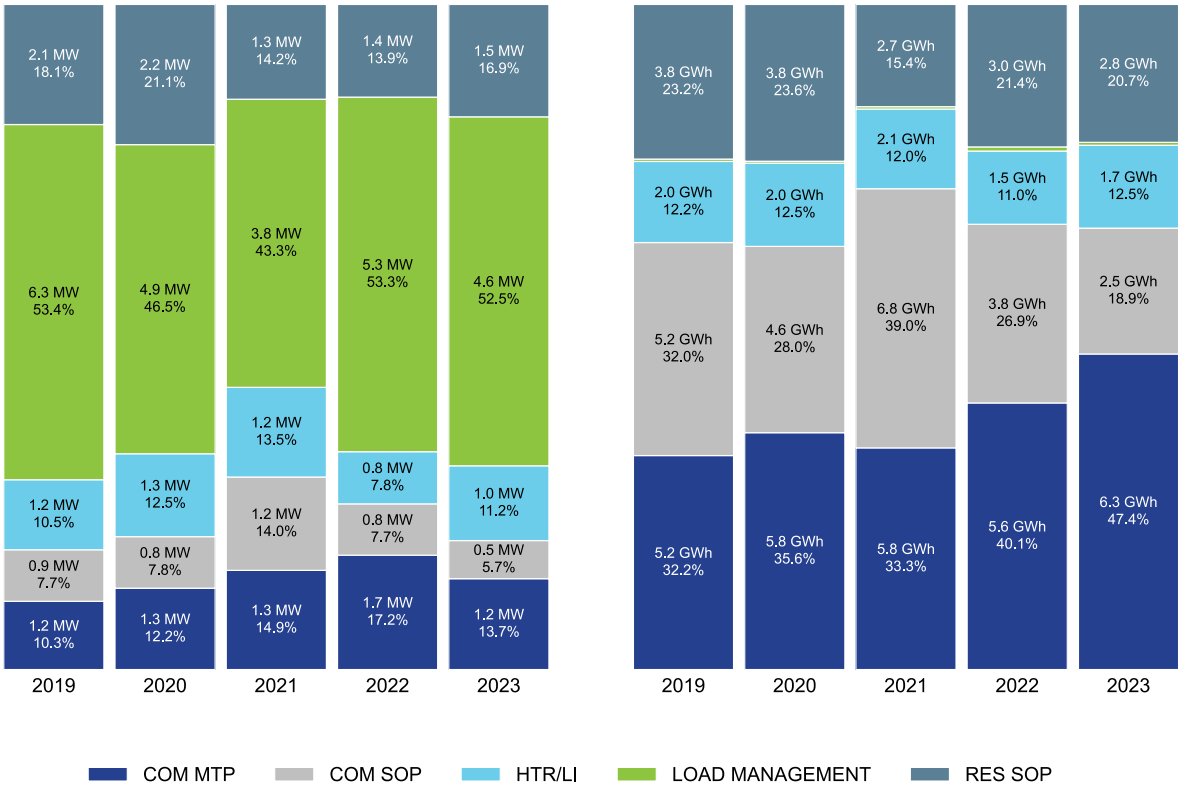
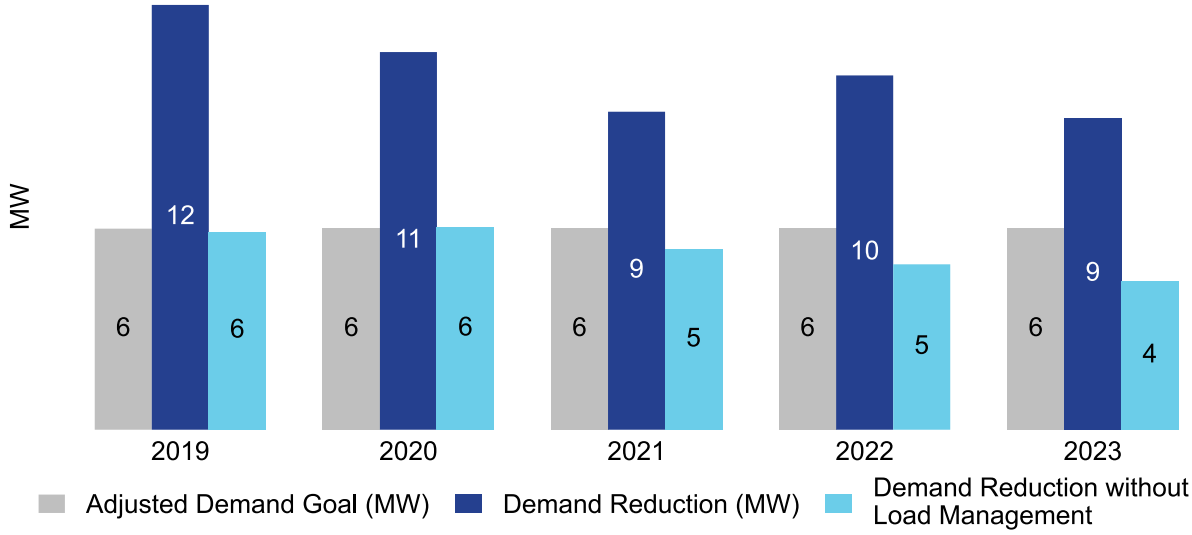


Figure 21 highlights how, prior to PY2021, SWEPCO met its legislated demand reduction goal through energy efficiency alone. Beginning in PY2021, SWEPCO has needed load management to meet their legislated goal.

- **Recommendation:** The PUCT and EM&V team should discuss with SWEPCO their strategies in the past to fully meet the legislated demand reduction goal through energy efficiency and what challenges they see to doing so now, if any.

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

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



4.1.1.1 Commercial Savings

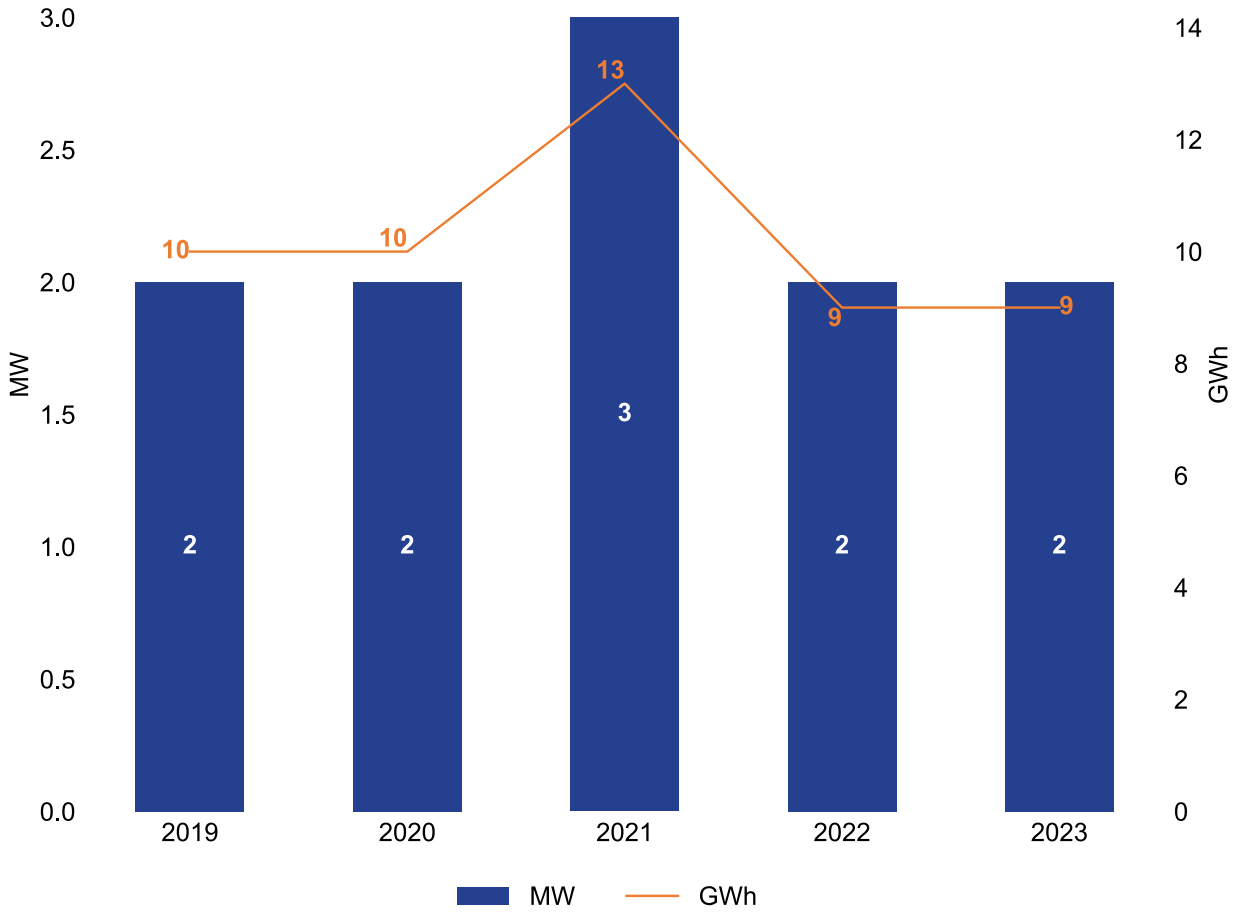
The PY2023 gross savings from SWEPCO's commercial sector programs, excluding load management, were:

- 1.68 megawatts (MW) of demand reduction and
- 8.867 gigawatt-hours (GWh) of energy savings.

Figure 22 highlights that SWEPCO's commercial programs, excluding load management, achieved similar demand reductions in PY2022 and PY2023 as in PY2019 and PY2020. The five-year pattern for energy savings is obscured by rounding; however, the energy savings achieved in PY2023 were the only value below nine GWh from PY2019 to PY2023. This dip in the performance of the commercial programs was the result of SWEPCO switching implementers for most of their commercial programs.

- **Recommendation:** The PUCT and EM&V team should discuss with SWEPCO the effectiveness of transitioning to a new commercial program implementer and whether commercial program savings are expected to return to prior levels.

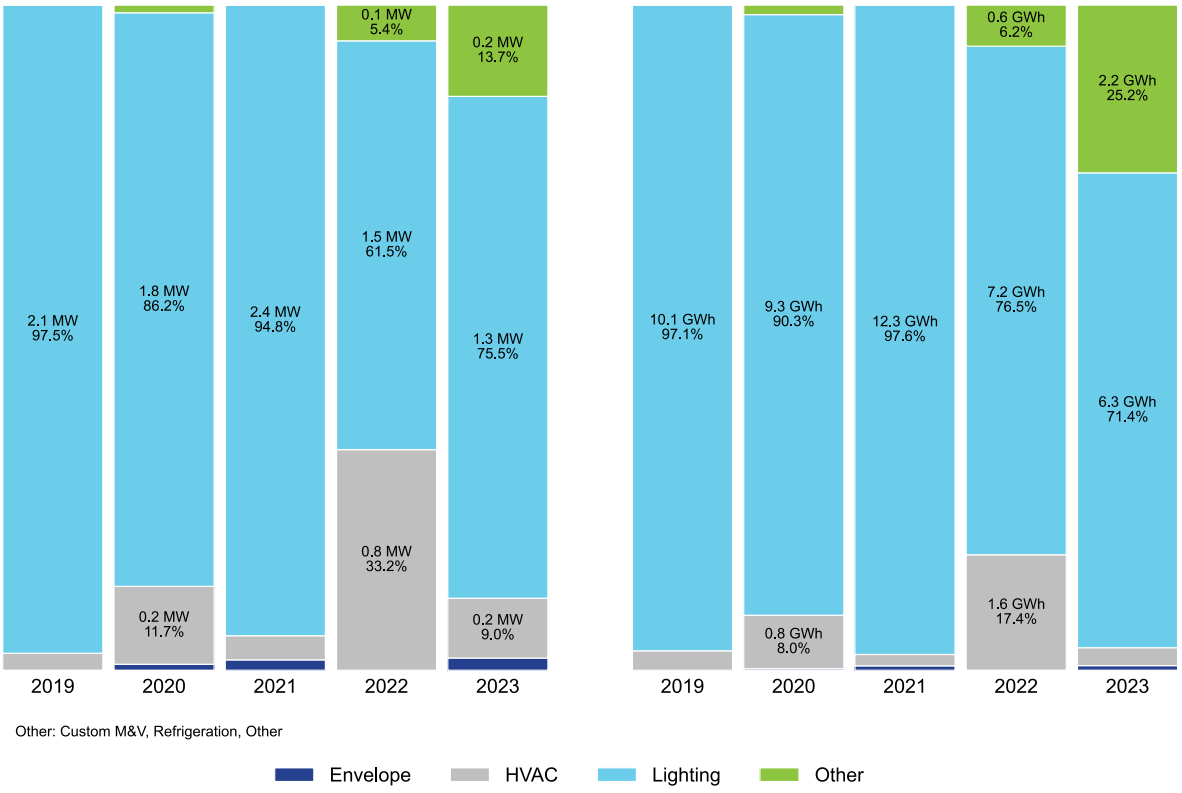
Figure 22. SWEPCO's Demand Reduction and Energy Savings by Program Year—Commercial Programs, Excluding Load Management, PY2019–PY2023



Over the course of PY2022 and PY2023, both demand reductions and energy savings from *lighting* measures have decreased from the PY2019 to PY2021 levels. While *lighting* measures still account for 76 percent of demand reductions and 71 percent of energy savings in PY2023, these values are approximately 40 percent lower than the average from PY2019 to PY2021. Figure 23 highlights that the decrease in reductions and savings from *lighting* measures were offset by a larger amount of demand reduction and energy savings from *HVAC* measures, including several large *HVAC controls system* measures.

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

Figure 23. SWEPCO's Demand Reduction and Energy Savings by Measure Category—Commercial Programs, Excluding Load Management, PY2019–PY2023



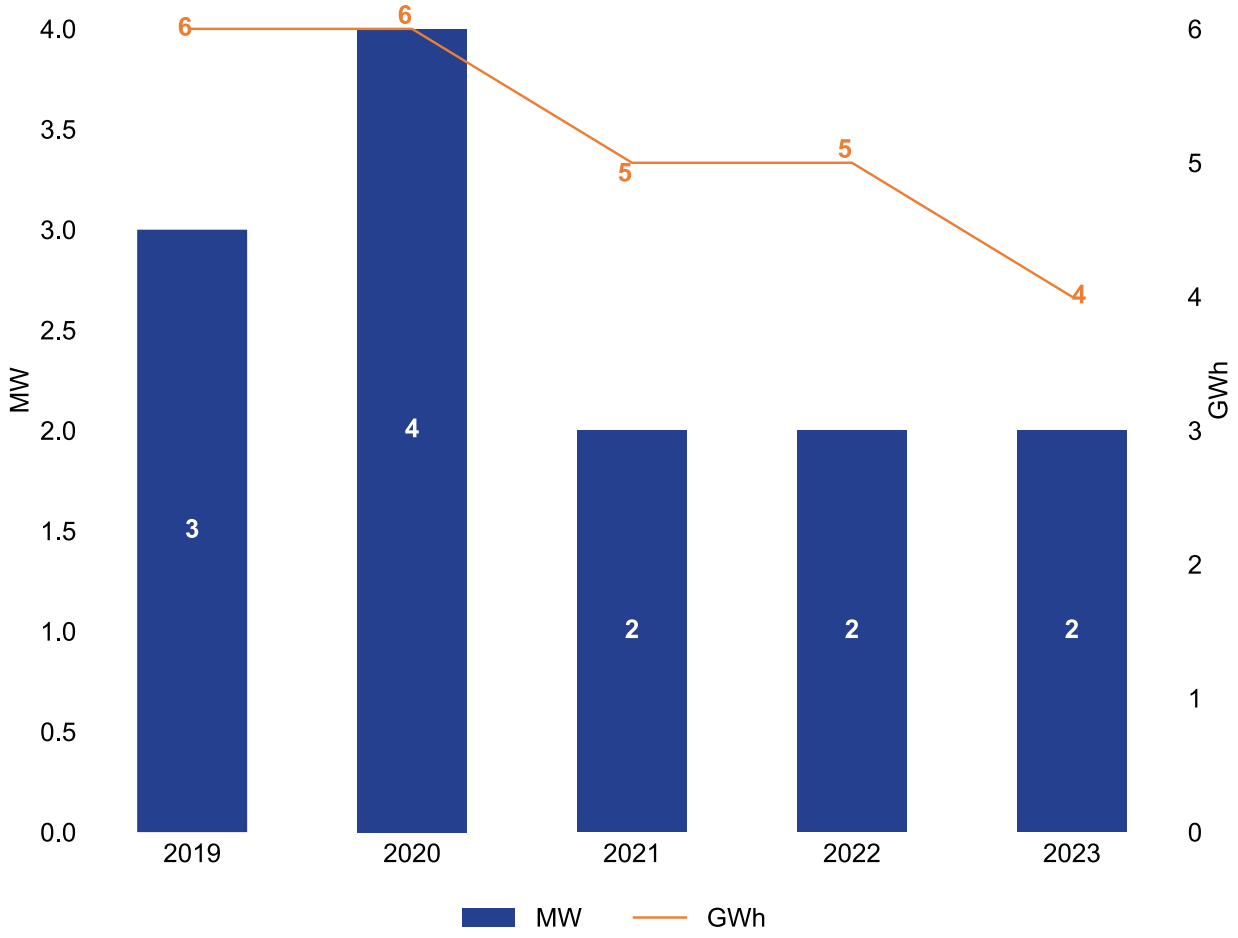
4.1.1.2 Residential Savings

The PY2023 gross savings from SWEPCO's residential sector programs, excluding load management, were:

- 2.44 MW of demand reduction and
- 4.436 GWh of energy savings.

Figure 24 shows that the demand reductions and energy savings achieved in PY2023 by SWEPCO's residential programs, excluding load management, were the second-lowest and lowest, respectively, in the last five years. Some of the decrease in demand reductions and energy savings for SWEPCO's residential programs were due to changes in the residential lighting standards of the EISA backstop in PY2022, new federal standards for HVAC in 2023, and updates to the TRM in PY2021.

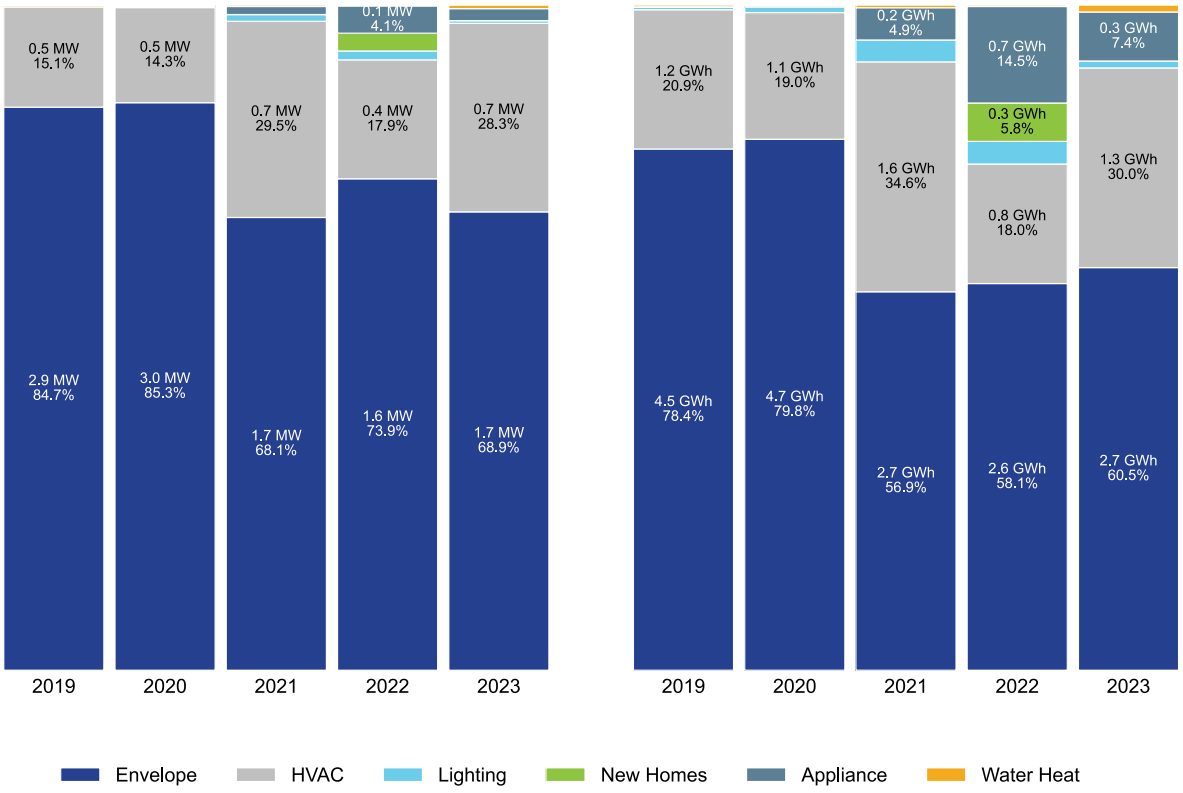
Figure 24. SWEPCO's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023



In PY2023, the demand reductions and energy savings achieved by SWEPCO's residential programs, excluding load management, were primarily derived from *envelope* measures—representing over two-thirds of demand reductions and almost two-thirds of energy savings. Figure 25 shows the breakdown of savings by measure category, demonstrating that SWEPCO has successfully increased *HVAC* measures in its residential portfolio—making *HVAC* measures the second-highest contributor to both demand reductions and energy savings. Additionally, *appliance* measures were the third-highest contributor to both demand reductions and energy savings in PY2023.

- **Recommendation:** The PUCT and EM&V team should discuss with SWEPCO the strategies they have used to successfully increase *HVAC* measures and maintain insulation in their residential programs and their plans to continue doing so.

Figure 25. SWEPCO's Demand Reduction and Energy Savings by Measure Category—Residential Programs, Excluding Load Management, PY2019–PY2023



4.1.1.3 Load Management Savings

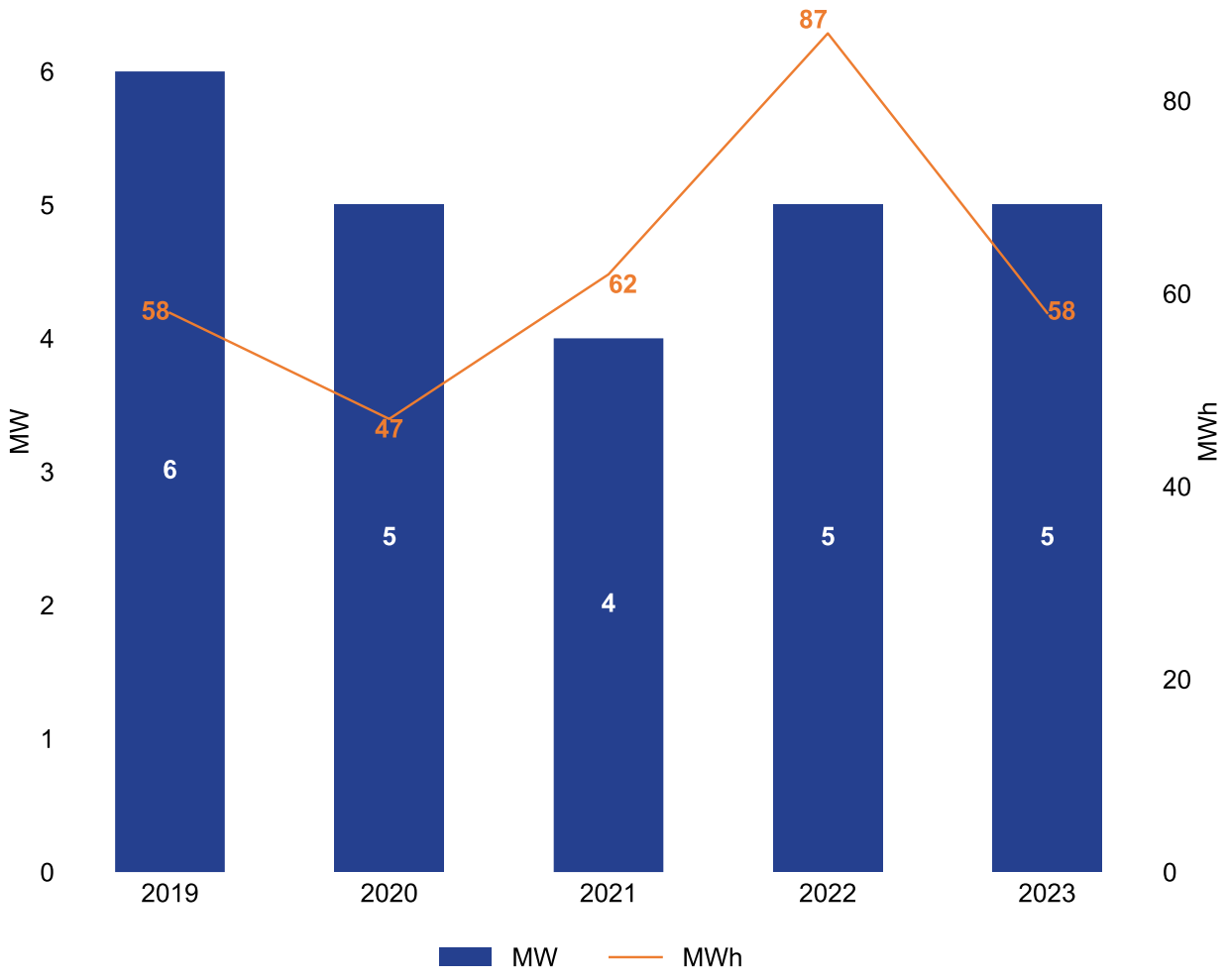
The PY2023 gross savings from SWEPCO's load management programs were:

- 4.56 MW of demand reduction and
- 0.058 GWh of energy savings.

Figure 26 depicts the demand reductions and energy savings achieved by SWEPCO's load management programs over the past five years, showing fairly stable demand reductions and varying levels of energy savings since PY2019. The number of enrolled participants has been about the same since PY2019.

Energy savings depend upon the number of events occurring each year and their duration. The two years with the highest energy savings relative to demand reductions—PY2021 and PY2022—had the highest number of events.

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

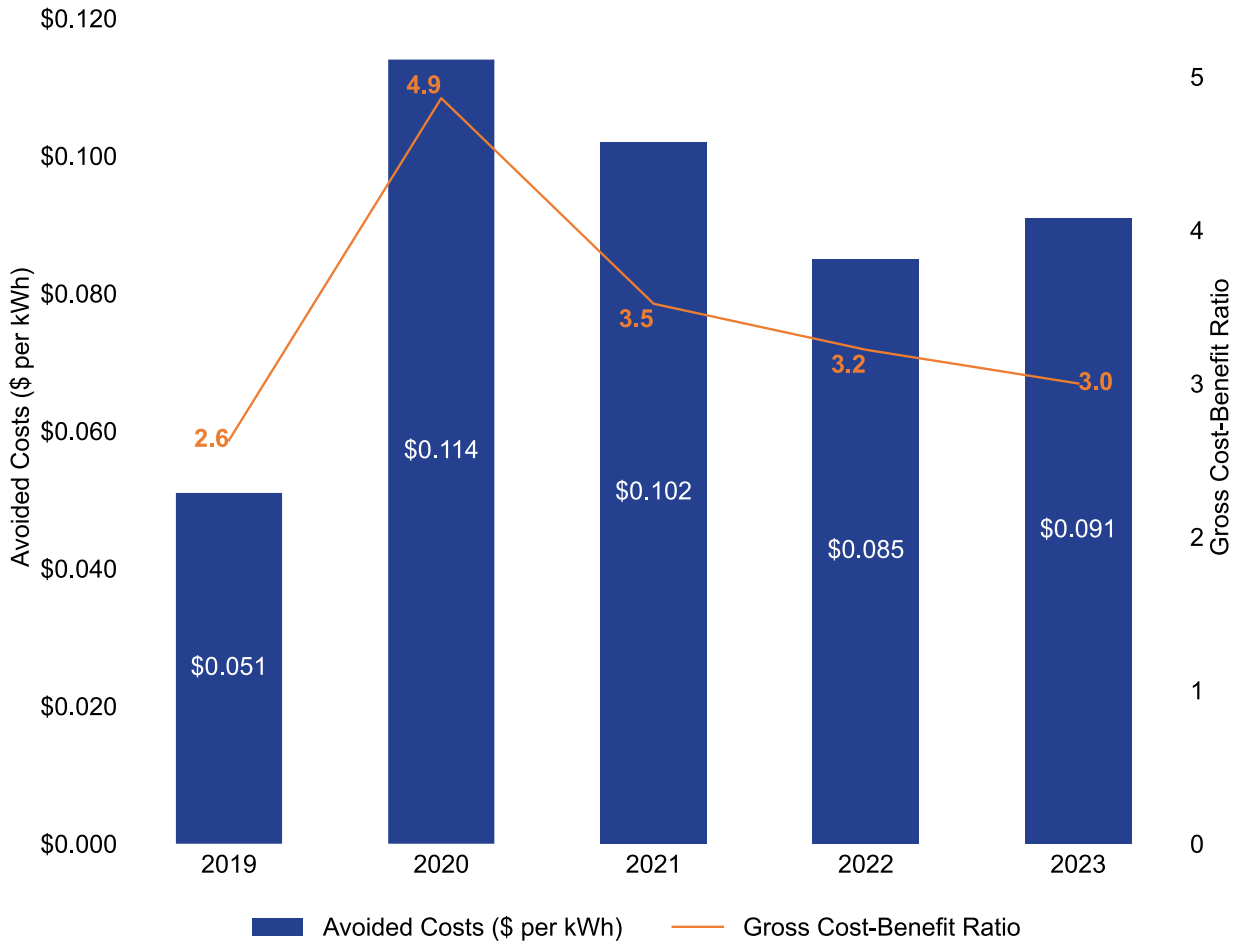


4.1.2 Cost-Effectiveness

Figure 27 overviews the avoided costs and cost-effectiveness ratios for SWEPCO over the last five years. [18] The overall cost-effectiveness ratio has consistently remained above 2.0 for SWEPCO. While PY2020 saw a high of 4.9, the cumulative cost-effectiveness of SWEPCO's programs remains healthy at 3.0 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy.

[18] The IOU program cost-effectiveness test compares the benefits of a program to the costs, with a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

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



4.2 KEY FINDINGS

This section presents SWEPCO's evaluated savings and cost-effectiveness results at the portfolio and program levels. The key findings are summarized first, followed by details for each program that had a *high* or *medium* evaluation priority.

4.2.1 Evaluated Savings

SWEPCO's evaluated savings for PY2023 were 8.7 MW in demand reductions and 13.4 GWh in energy savings, with the overall portfolio realization rates at approximately 100 percent. SWEPCO was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (Table 13), supporting healthy realization rates.

Table 10 shows the claimed and evaluated demand reductions for SWEPCO'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 10. SWEPCO 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%**	**8,681**	**8,681**	**100.0%**	**N/A**
Commercial	19.4%	1,684	1,684	100.0%	N/A
Residential	28.1%	2,443	2,443	100.0%	N/A
Load management*	52.5%	4,555	4,555	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 11 shows the claimed and evaluated energy savings for SWEPCO's portfolio and broad customer sector and program categories for PY2023.

Table 11. SWEPCO 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%**	**13,360,378**	**13,360,378**	**100.0%**	**N/A**
Commercial	66.4%	8,866,889	8,866,889	100.0%	N/A
Residential	33.2%	4,435,645	4,435,645	100.0%	N/A
Load management*	0.4%	57,844	57,844	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. SWEPCO received *good* documentation scores for the residential and load management evaluated program. The three new programs in 2023—the COMPASS MTPs, including Large Commercial, Small Commercial, and Schools—have an opportunity for improvement in documentation; all three programs received a *fair* documentation score.

4.2.2 Program Funding and Cost-Effectiveness Results

SWEPCO's total portfolio funding for PY2023 was $3,968,906 (excluding research and development, EM&V, and their performance bonus), resulting in a cost-effectiveness score of 3.0.

The more cost-effective programs were the COMPASS Large Commercial MTP and the COMPASS Small Business MTP; the less cost-effective programs were the Commercial Load Management SOP and the Residential SOP. All of SWEPCO's programs were cost-effective in 2023.

Table 12. SWEPCO Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**3.00**	**3.00**	**2.74**
Commercial	**3.82**	**3.82**	**3.39**
Commercial SOP	3.93	3.93	3.56
COMPASS Small Business MTP	4.05	4.05	3.58
COMPASS Large Commercial MTP	4.21	4.21	3.70
COMPASS for Schools MTP	3.35	3.35	2.94
Residential	**2.43**	**2.43**	**2.28**
Residential SOP	2.30	2.30	2.07
Hard-to-Reach SOP	2.67	2.67	2.67
Load management	**1.75**	**1.75**	**1.75**
Commercial Load Management SOP	1.75	1.75	1.75

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 13 summarizes savings differences identified by the EM&V team, which SWEPCO 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. SWEPCO adjusted claimed savings for all projects with any differences found by the EM&V team and included these adjustments in their May 1st Energy Efficiency Cost Recovery Factor (EECRF) filing.

Table 13. Claimed Savings Adjustments by Program

Program	Evaluated demand reductions differences (kW)	Evaluated energy savings differences (kWh)
Commercial SOP	-0.14	-1,709
COMPASS Small Business MTP	-17.46	-63,613
COMPASS Large Commercial MTP	-1.76	-16,324
COMPASS for Schools MTP	-4.29	-6,987
Residential SOP	-0.09	-1,138
Total	**-23.74**	**-88,772**

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
5.7%	498	498	100.0%	18.9%	2,527,773	2,527,773	100.0%	Good

Completed desk reviews*	Completed On-site M&V
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 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 three projects. Two projects had an adjustment of less than five percent, and one project had adjustments greater than five percent compared to the originally claimed savings. SWEPCO accepted the evaluated results and matched the claimed savings to those of the evaluations for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 9-4-0-2-78345: A manufacturing facility installed *interior LED high-bay fixtures* for a lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the lighting fixture wattage to *141 W* from *138 W* for one fixture type. The adjustment decreased demand reductions and energy savings, resulting in a realization rate of 93 percent for both.

Participant ID 9-4-0-2-79454: A steel products supply company installed interior and exterior LED lighting for a lighting retrofit. During the desk review, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DesignLights Consortium® (DLC) qualified products list (QPL). The adjustments increased demand reductions and energy savings and resulted in a realization rate of 101 percent for both.

Participant ID 9-4-0-2-79510: An aluminum products manufacturer installed interior and exterior LED lighting for a lighting retrofit. During the desk review and on-site M&V, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. The adjustments increased demand reductions and energy savings, resulting in a realization rate that rounded to 100 percent for both.

Documentation Score

The EM&V team could verify key inputs and assumptions (e.g., lighting quantity, lighting wattage, QPL qualifications) for the four projects that had desk reviews. Project documentation typically included invoices, QPL qualifications, project savings calculators, and photographic documentation of existing and new lighting, which are significant efforts by the utility to verify equipment conditions and quantities. However, the projects did not include any written inspection notes or pre-retrofit photographs, which limited the ability to confirm that the other documentation was complete. Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good*.

4.4.2 COMPASS 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
3.7%	319	319	100.0%	10.3%	1,373,260	1,373,260	100.0%	Fair

Completed desk reviews*	Completed On-site M&V
6	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 COMPASS 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 all six projects reviewed, five of which had an adjustment greater than five percent compared to the originally claimed savings. SWEPCO accepted the evaluated results and matched the claimed savings to those of the evaluations for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 9-4-0-2-62770: A new bank building installed energy-efficient air conditioning units, heat pump units, and interior and exterior LED lighting. During the desk review and on-site M&V, the EM&V team adjusted the building type to *office* to match the bank operations. The EM&V team also adjusted the building area to 3,000 square feet and separated the exterior entry area into six recessed lighting fixtures. These adjustments decreased demand reductions and resulted in a realization rate of 75 percent. The adjustments also decreased energy savings and resulted in a realization rate of 67 percent.

Participant ID 9-4-0-2-62789: A new auto parts store installed interior and exterior LED lighting and efficient air conditioning. During the desk review, the EM&V team adjusted the efficiency of the HVAC unit to match the rated efficiency. The EM&V team also adjusted the building area to 12,626 square feet. These adjustments increased demand reductions and resulted in a realization rate of 125 percent. The adjustments also increased energy savings and resulted in a realization rate of 105 percent.

Participant ID 9-4-0-2-72833: A church installed interior and exterior LED lighting for a lighting retrofit. During the desk review, the EM&V team adjusted the wattage of three fixture types to match the rated watts of the equipment. These adjustments slightly decreased demand reductions and energy savings, but the resulting realization rate rounded to 100 percent.

Participant ID 9-4-0-2-75957: A new tire retail store installed energy-efficient heat pumps and LED lighting. During the desk review, the EM&V team adjusted the HVAC equipment to be a standard air-cooled heat pump. The EM&V team also decreased the interior site area, increased the exterior site area, and adjusted the exterior lighting zone to *Zone 2* to match actual site conditions. These adjustments decreased demand reductions and resulted in a realization rate of 27 percent. The adjustments also decreased energy savings and resulted in a realization rate of 33 percent.

Participant ID 9-4-0-2-79517: An existing bank installed interior and exterior LED lighting and controls for a lighting retrofit. During the desk review and on-site M&V, the EM&V team adjusted the building type to *office* to match the bank operations. These adjustments decreased demand reductions and resulted in a realization rate of 90 percent. The adjustments also increased energy savings and resulted in a realization rate of 102 percent.

Participant ID 9-4-0-2-79655: An existing bank installed interior and exterior LED lighting for a lighting retrofit. During the desk review and on-site M&V, the EM&V team found that the installed exterior lighting equipment was not qualified for the program, and the building type was adjusted to *office* to match the bank operations. The EM&V team also adjusted the quantity of LED tubes installed and the wattage of one LED fixture. These adjustments decreased demand reductions and resulted in a realization rate of 90 percent. The adjustments also decreased energy savings and resulted in a realization rate of 91 percent.

Documentation Score

The EM&V team was partially able to verify key inputs and assumptions (e.g., lighting quantity, lighting wattage, QPL qualifications) for the six projects with desk reviews. The documentation consistently included invoices and project savings calculators. However, the documentation was missing project descriptions, project photos, or written inspection notes. The certifications of equipment were also not consistently provided. The *Program Tracking Data and Evaluation Requirements* section in the TRM details the expected documentation requirements per measure. Without the context of these items, the project documentation included could not always match the project savings calculation. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair.*

- **Recommendation:** The EM&V team recommends that SWEPCO create a documentation organization structure or checklist to verify the documentation meets the requirements of the TRM.

4.4.3 COMPASS Large Commercial 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
4.5%	392	392	100.0%	15.6%	2,090,182	2,090,182	100.0%	Fair

Completed desk reviews*	Completed On-site M&V
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 COMPASS Large Commercial 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 three projects. One project had an adjustment of less than five percent, and two projects had adjustments greater than five percent compared to the originally claimed savings. SWEPCO accepted the evaluated results and matched the claimed savings to those of the evaluations for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 9-4-0-2-65046: A new construction recreation center installed LED screw-in lamps and packaged air conditioning equipment. During the desk review and M&V site visit, the EM&V team adjusted the lighting hours and other calculation assumptions to match the *public assembly* building type. In addition, the exterior lighting zone was adjusted to *Zone 2* to match the surrounding properties. These adjustments decreased demand reductions and resulted in a realization rate of 87 percent. The adjustments also decreased energy savings and resulted in a realization rate of 65 percent.

Participant ID 9-4-0-2-65064: A city installed LED street lighting with photosensor controls. During the desk review, the EM&V team adjusted the wattage of the installed fixture to match the rated wattage. The adjustment increased demand reductions and resulted in a realization rate of 101 percent. The adjustments also increased energy savings and resulted in a realization rate of 101 percent.

Participant ID 9-4-0-2-79627: A shipping warehouse installed interior and exterior LED lighting for a lighting retrofit. During the desk review and M&V site visit, the EM&V team adjusted the lighting hours and other calculation assumptions to match the *warehouse—non-refrigerated* building type. In addition, the quantity of one fixture was slightly reduced, and the air conditioning was removed from the savings calculation for the lighting equipment in the warehouse. This adjustment decreased demand reductions and resulted in a realization rate of 91 percent. The adjustments also increased energy savings and resulted in a realization rate of 102 percent.

Documentation Score

The EM&V team was partially able to verify key inputs and assumptions (e.g., lighting quantity, lighting wattage, QPL qualifications) for the four projects with desk reviews. The documentation consistently included invoices or equivalent product quantities and project savings calculators. However, the documentation was missing project descriptions, project photos, or written inspection notes. The certifications of equipment were also not consistently provided. The *Program Tracking Data and Evaluation Requirements* section in the TRM details the expected documentation requirements per measure. Without the context of these items, the project documentation included could not always match the project savings calculation. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair.*

- **Recommendation:** SWEPCO should create a documentation organization structure or checklist to verify that program documentation meets the requirements of the TRM.

4.4.4 COMPASS for Schools 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
5.5%	475	475	100.0%	21.5%	2,875,674	2,875,674	100.0%	Fair

Completed desk reviews*	Completed On-site M&V
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 COMPASS for Schools 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 an adjustment greater than five percent compared to the originally claimed savings. SWEPCO accepted the evaluated results and matched the claimed savings to those of the evaluations for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID 9-4-0-2-75475: A school district upgraded the LED lighting, air conditioning and heat pump units, and smart thermostats for a school. During the desk review, the EM&V team adjusted the calculation to use the older rating baseline (EER1/SEER1) for the air conditioning and heat pump equipment under 5.4 tons and adjusted the capacity to match the rated capacities in the calculation. These adjustments 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 95 percent.

Documentation Score

The EM&V team was partially able to verify key inputs and assumptions (e.g., equipment quantity, rated qualifications) for the four projects with desk reviews. The documentation consistently included project savings calculators. However, the documentation from new construction projects was missing project descriptions, construction documents, M&V plans, or written inspection notes. The certifications of equipment were also not consistently provided. The *Program Tracking Data and Evaluation Requirements* section in the TRM details the expected documentation requirements per measure. Without the context of these items, the project documentation included could not always match the project savings calculation. Two of the projects were carried over from previous years, and the evaluator had the context to complete the evaluation. Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair.*

- **Recommendation:** SWEPCO should create a documentation organization structure or checklist to verify that program documentation meets the requirements of the TRM.

4.5 DETAILED FINDINGS—RESIDENTIAL

The PY2023 evaluation's primary focus was on a retrofit consumption analysis. SWEPCO was not part of the analysis because they don't have AMI fully deployed. Full deployment is expected in 2025. 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 Standard Offer Program (SOP)

The PY2023 Residential SOP evaluation efforts focused on desk reviews of the New Homes, Efficient Products, and Residential HVAC components. The number of sampled and completed desk reviews for this program is listed below.

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
16.9%	1,466	1,466	100.0%	20.7%	2,769,857	2,769,857	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 Residential SOP evaluation efforts focused on desk reviews. The number of sampled and completed desk reviews for this program is listed above. The desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system and that savings were calculated in accordance with the TRM.

The EM&V team adjusted the claimed savings for the two new homes projects evaluated. One project had an adjustment of less than five percent, and the other project had an adjustment greater than five percent compared to the originally claimed savings. SWEPCO accepted the evaluated results and matched the claimed savings to the evaluation for all projects; therefore, the final program realization rate is 100 percent. Further details of the EM&V findings are provided below.

Participant ID: 9-4-0-2-45934: The energy efficiency project included the implementation of a central heat pump, ceiling fan, dishwasher, heat pump water heater, LEDs, and a smart thermostat. During the desk review, the EM&V team found that LED equipment did not have documentation to claim the savings for that measure. The remaining measures had no adjustment. Overall, the adjustments decreased the energy savings slightly but had no impact on demand reductions. The adjustments resulted in project-level realization rates of 100 percent for demand reductions and energy savings, respectively.

Participant ID: 9-4-0-2-47897: The energy efficiency project included the implementation of a central heat pump, ceiling fan, dishwasher, LEDs, and a smart thermostat. During the desk review, the EM&V team found that LED equipment did not have documentation to claim the savings for that measure. Additionally, the central heat pump documentation did not include the rated efficiency verification, and the evaluation identified different efficiency values for the unit installed. The adjusted efficiency reduced the energy savings associated with the heat pump and increased the energy savings associated with the smart thermostat. Overall, the adjustments resulted in project-level realization rates of 81 percent and 60 percent for demand reductions and energy savings, respectively.

Documentation Score

The EM&V team verified most key inputs and assumptions, including the project scope, baselines, and equipment specifications for the measures, except the new homes LED lighting and the Air Conditioning, Heating, and Refrigeration Institute certificate for one of the heat pumps. The remainder of the project documentation included field data and photos of rebated equipment for the new home's component. The project documentation for the Efficient Products component included the invoice and customer information. The EM&V team was mostly satisfied with the project documentation provided. A program documentation score of *good* was assigned, as SWEPCO meets the required photo documentation for all measures except the LED lighting equipment.

4.6 DETAILED FINDINGS—LOAD MANAGEMENT

4.6.1 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
52.5%	4,555	4,555	100.0%	0.4%	57,844	57,844	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 SWEPCO Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments at the electric service identifier ID (ESIID) level. In PY2023, load management events occurred on the following dates and times:

- May 22, 2023, from 4:00 p.m. to 5:00 p.m. (scheduled)[19],
- May 23, 2023, from 1:00 p.m. to 2:00 p.m. (scheduled),
- May 23, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled),
- May 23, 2023, from 5:30 p.m. to 6:30 p.m. (scheduled),
- May 24, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled),
- May 25, 2023, from 2:00 p.m. to 3:00 p.m. (scheduled),
- July 19, 2023, from 2:00 p.m. to 6:00 p.m. (unscheduled),
- August 2, 2023, from 2:00 p.m. to 6:00 p.m. (unscheduled), and
- August 24, 2023, from 2:00 p.m. to 6:00 p.m. (unscheduled).

The EM&V team received interval meter data and a spreadsheet summarizing the event-level savings for the six sponsors across eight sites. Only two sites participated in their associated scheduled event (used as a test event); two sites did not participate in one of the unscheduled events[20].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings SWEPCO provided for all sites. The demand reductions for each participating site corresponded to the average across the unscheduled events. The energy savings for each participating site were calculated by multiplying the demand reductions of all events (including the scheduled event) 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 SWEPCO's (claimed) calculated demand reductions and energy savings. No adjustments were made to the program savings; however, a negligible difference in demand reductions and energy savings resulted from different rounding practices during calculations. The realization rate for demand reductions and energy savings is 100 percent, with a documentation score of *good*.

[19] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for grid or system reliability.
[20] See the Report Volume 1 recommendation to monitor load management cooperation rates.

5.0 XCEL ENERGY SOUTHWESTERN PUBLIC SERVICE COMPANY IMPACT EVALUATION RESULTS

5.1 YEAR-OVER-YEAR COMPARISONS

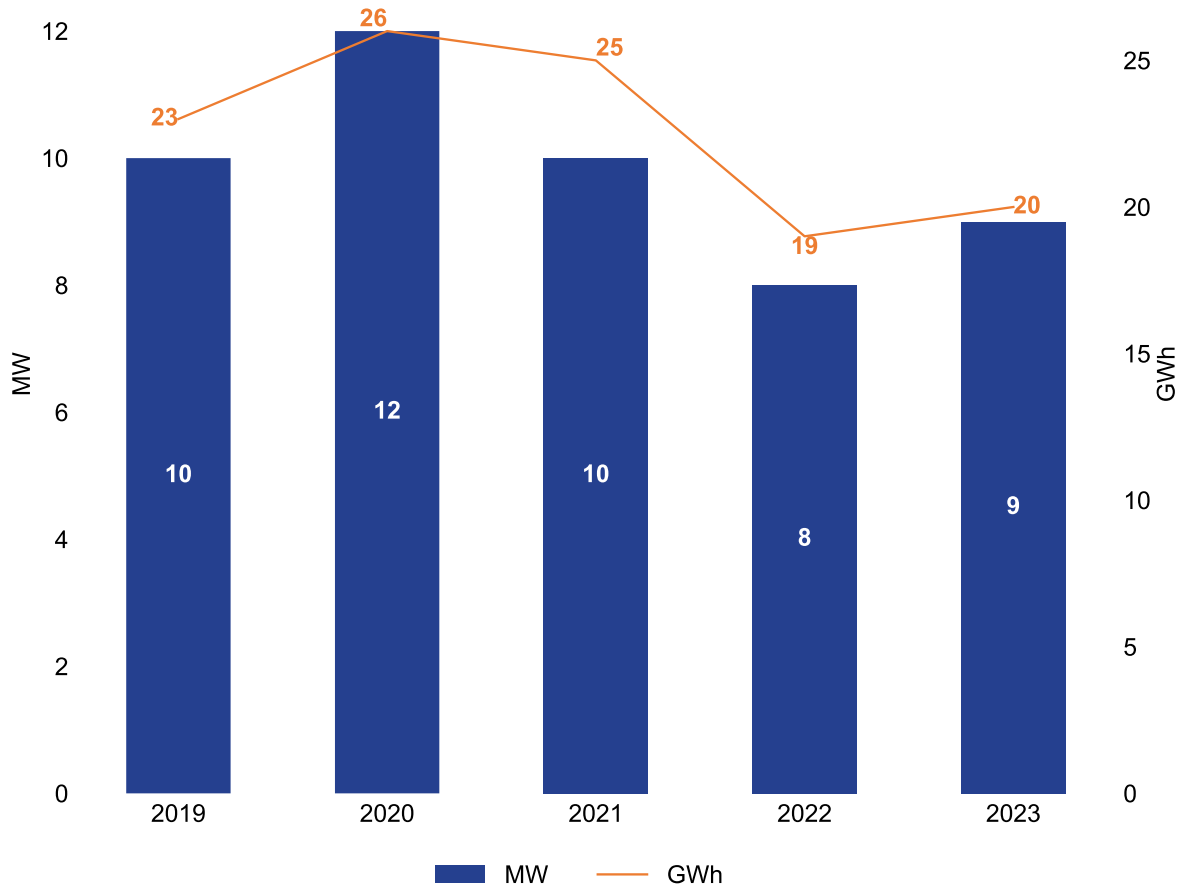
This section provides a trend analysis for the performance of Xcel Southwestern Public Service Company's (Xcel SPS) programs from program year (PY) 2019 (PY2019) to PY2023. This trend analysis provides insight into the PY2023 results included in Sections 5.2 through 5.8.

5.1.1 PY2019–PY2023

PY2023 saw a slight increase in demand reductions and energy savings across Xcel SPS's portfolio (Figure 28), which was a different trend than the other utilities in PY2023, which all saw a decrease in energy savings due to changes in federal standards. Xcel SPS was able to successfully transition to the new federal standards in lighting while maintaining the same level of program savings as prior years.

- **Recommendation:** The PUCT and evaluation, measurement, and verification (EM&V) team should discuss Xcel SPS' strategies used to successfully maintain program savings, even with the increase in federal baseline changes.

Figure 28. Xcel SPS Demand Reduction and Energy Savings across Program Years, PY2019–PY2023



In PY2023, Xcel SPS achieved almost two-thirds of their demand reduction goal through energy efficiency programs alone (Figure 29). Compared to the other investor-owned utilities (IOUs), Xcel SPS' programs achieved the highest percentage of demand reductions through energy efficiency—61.7 percent compared to the ERCOT IOU average of 29.8 percent and the outside-of-ERCOT IOUs average of 47.1 percent.[21] Xcel SPS' Commercial Market Transformation Programs (MTPs), Residential Standard Offer Program (SOP), and low-income (LI) and hard-to-reach (HTR) programs were all contributors to demand reductions, beyond load management.

- **Recommendation:** The PUCT and EM&V team should discuss with Xcel SPS their successful strategies used to achieve almost two-thirds of demand reductions through energy efficiency, and any future plans to continue this achievement.

In PY2023, the energy savings (Figure 29, right) achieved by Xcel SPS' Commercial SOP increased significantly from prior years—bringing them to the highest level in the past five years.

- **Recommendation:** The PUCT and EM&V team should discuss with Xcel SPS their successful strategies used to increase participation in their Commercial SOP program.

It is notable that Xcel SPS is delivering the highest percentage of its portfolio to LI and HTR customers at over 20 percent of demand reductions and about 16 percent of energy savings when compared to the other IOUs' percentage of portfolio savings. Additionally, Xcel SPS is the only outside-of-ERCOT utility that offers an LI program in addition to an HTR program.

- **Recommendation:** The PUCT and EM&V team should discuss with Xcel SPS their successful strategies used to deliver a high percentage of demand reductions and energy savings to HTR/LI customers.

[21] ERCOT, Volume 1, Executive Summary, Figure 4 and Outside-of-ERCOT, Figure 5.

Figure 29. Xcel SPS Demand Reduction and Energy Savings by Program Type, PY2019–PY2023[22]

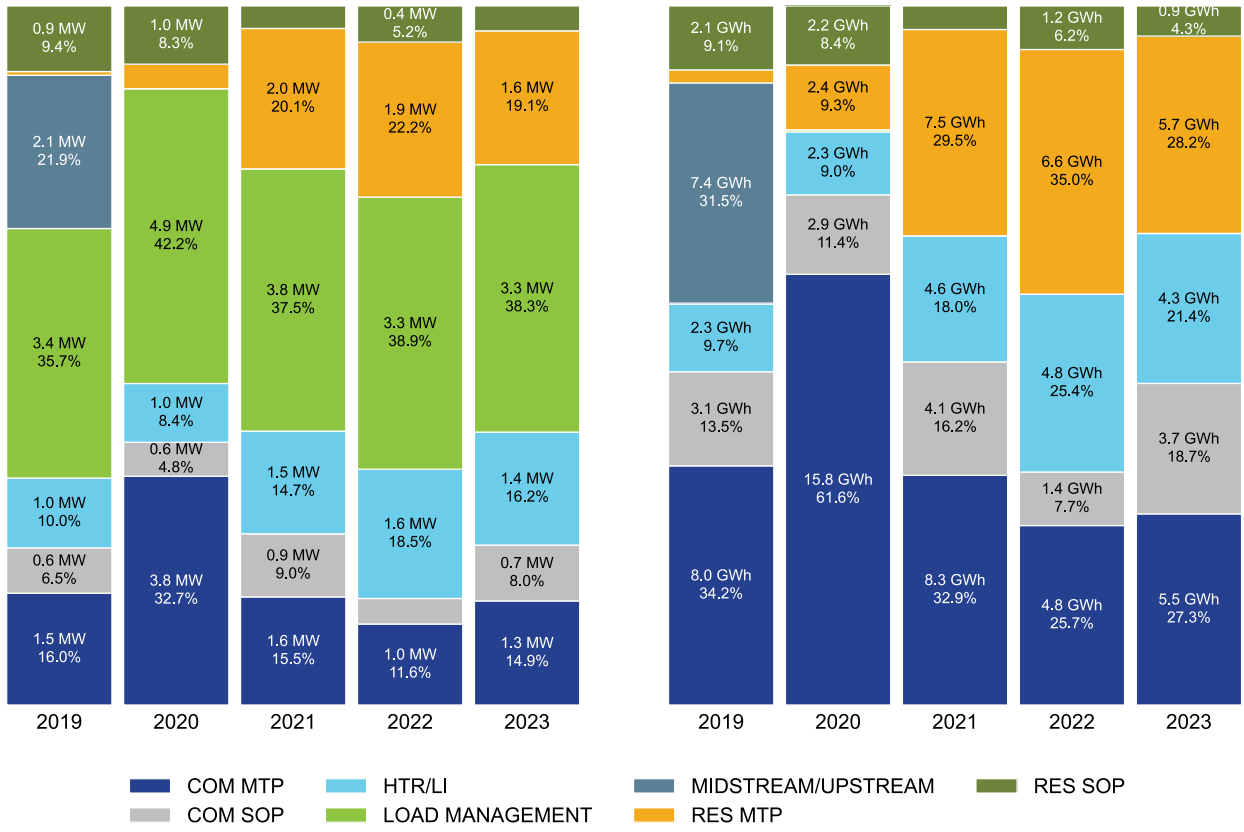
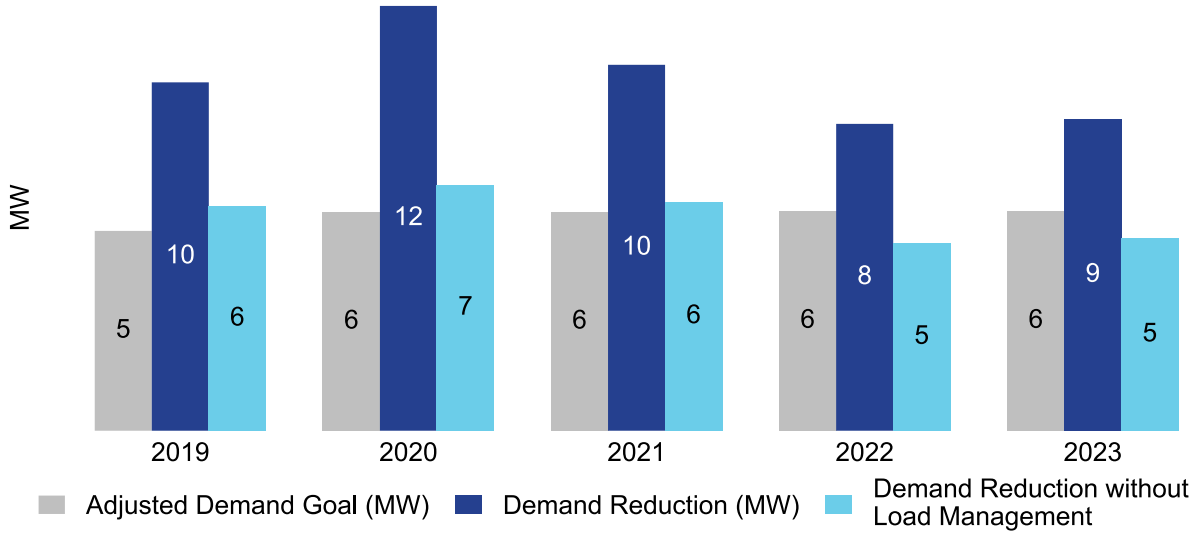


Figure 30 highlights how Xcel SPS' ability to meet its legislated demand reduction goal through energy efficiency alone has varied from PY2019 to PY2023. In some years, Xcel SPS has been able to fully meet the goal through energy efficiency alone, while in others, it is falling just short of doing so—even while having the highest percentage of demand reductions delivered by energy efficiency compared to the other IOUs.

- **Recommendation:** The PUCT and EM&V team should discuss with Xcel SPS their successful strategies in the past to meet its demand reduction goal through energy efficiency alone and their challenges in doing so consistently.

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

Figure 30. Xcel SPS's Legislated Goals and Demand Reduction, PY2019–PY2023



5.1.1.1 Commercial Savings

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

- 1.96 megawatts (MW) of demand reduction and
- 9.234 gigawatt-hours (GWh) of energy savings.

Figure 31 reflects an increase in demand reduction from PY2022; however, these values are still lower than those from PY2019 to PY2021. Similarly, energy savings in PY2023 increased by 3 GWh from PY2022; however, these values are still below those from PY2019 to PY2021.

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

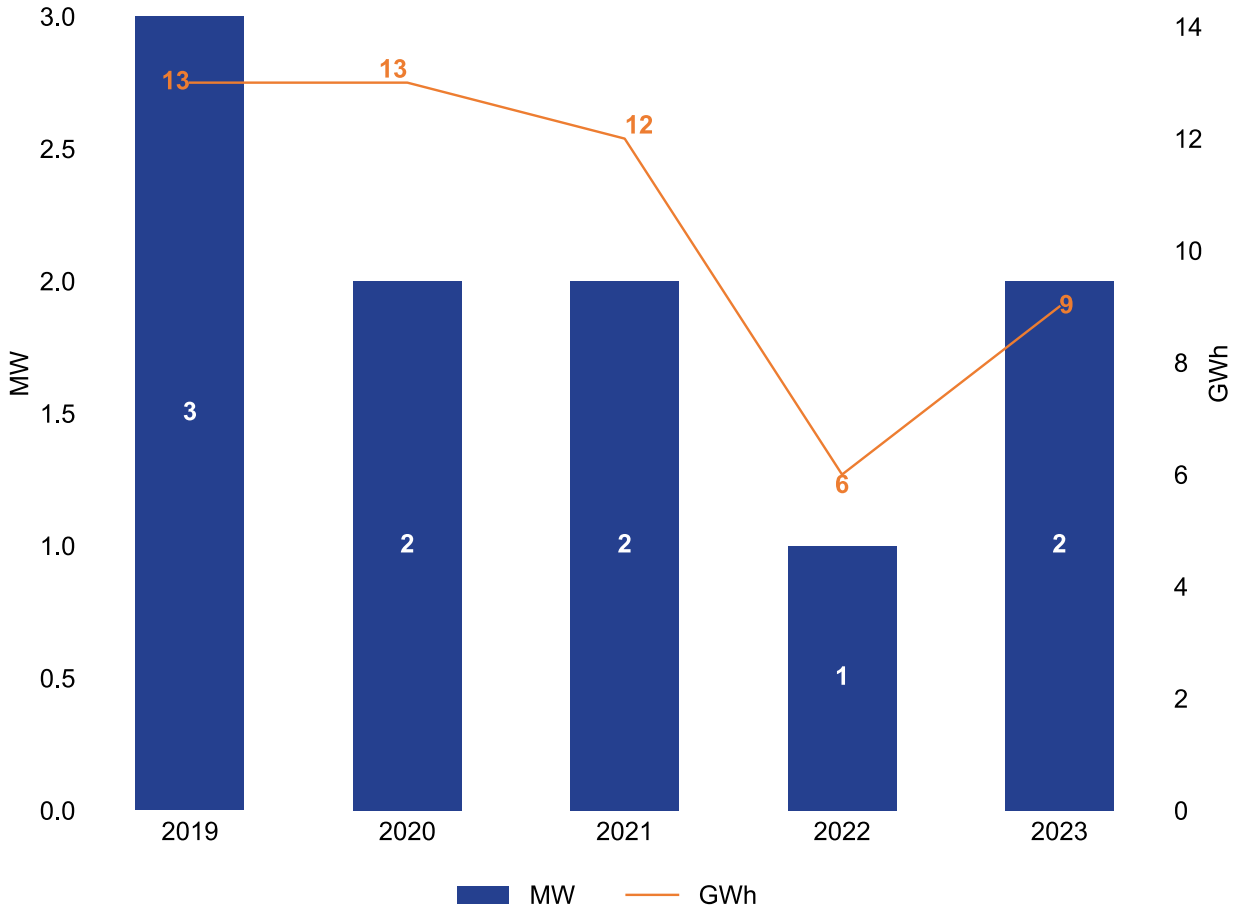
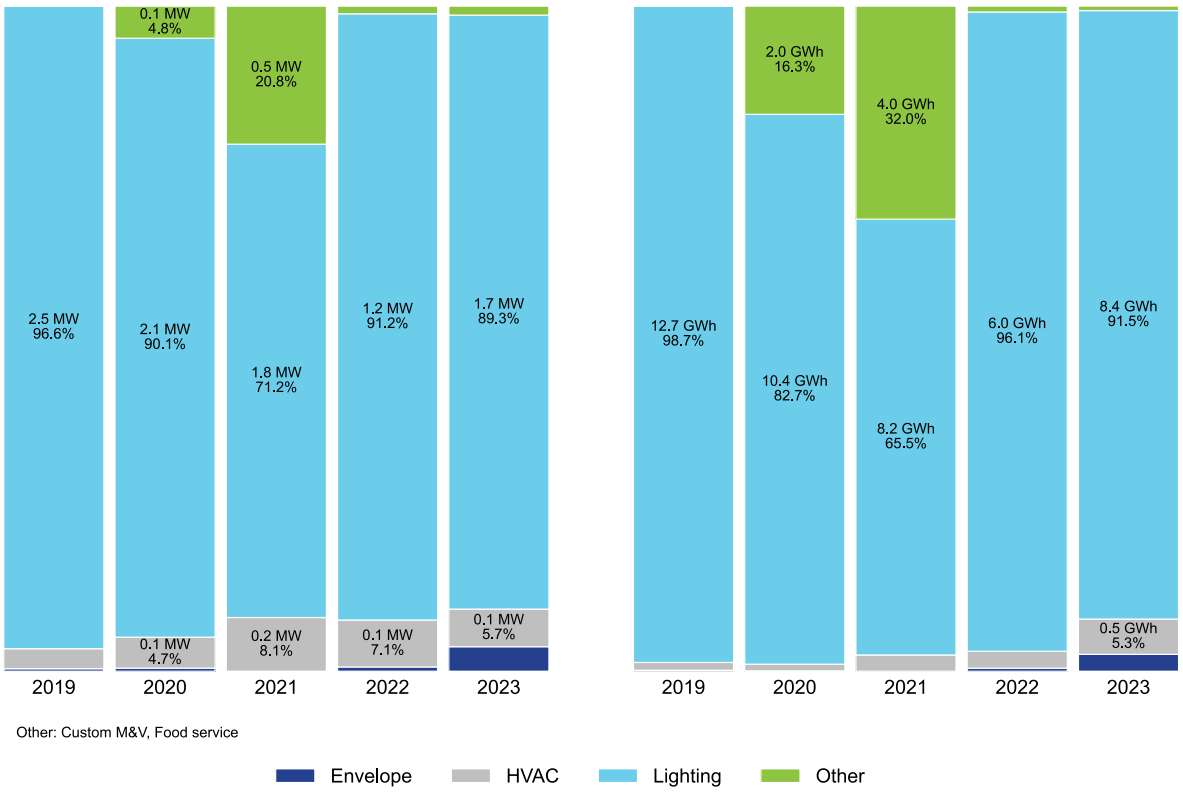


Figure 32 highlights how around 90 percent of Xcel SPS' commercial demand reductions (excluding load management) have been achieved by *lighting* measures each year, besides PY2021. In PY2023, energy savings from *HVAC* and *envelope* measures increased—making them the second- and third-most contributors to Xcel SPS' energy savings, respectively.

- **Recommendation:** The PUCT and EM&V teams should discuss with Xcel SPS their strategies and future plans to diversify their commercial measure mix beyond *lighting*.

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



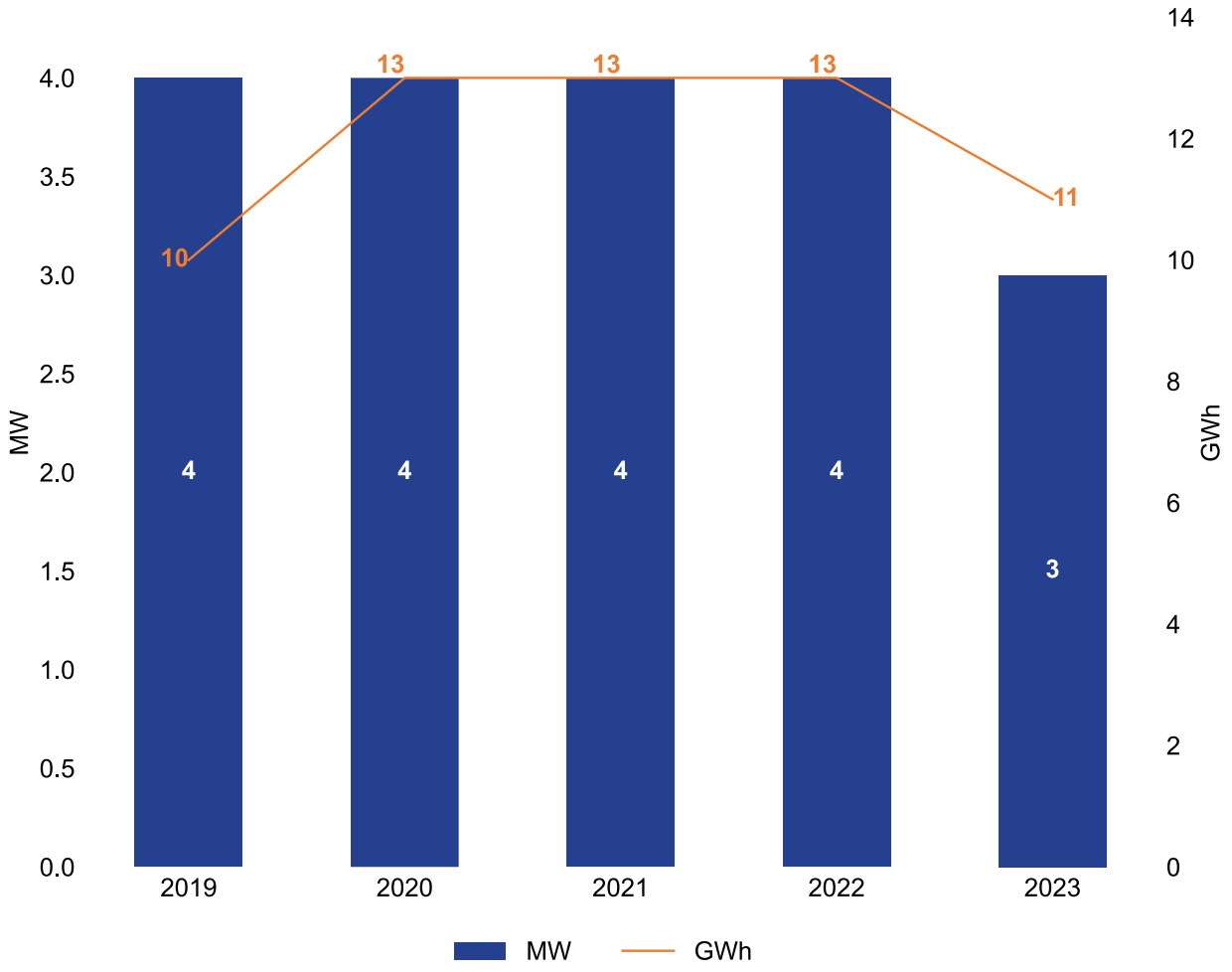
5.1.1.2 Residential Savings

The PY2023 gross savings from Xcel SPS's residential sector programs, excluding load management, were:

- 3.33 MW of demand reduction and
- 10.835 GWh of energy savings.

Figure 33 illustrates that the demand reductions and energy savings achieved in PY2023 by Xcel SPS' residential programs (excluding load management) were the lowest and second lowest in the last five years, respectively. Some of the decrease in demand reductions and energy savings for Xcel SPS were due to changes in the EISA backstop in PY2022, new federal standards for HVAC in 2023, and updates to the TRM in PY2021.

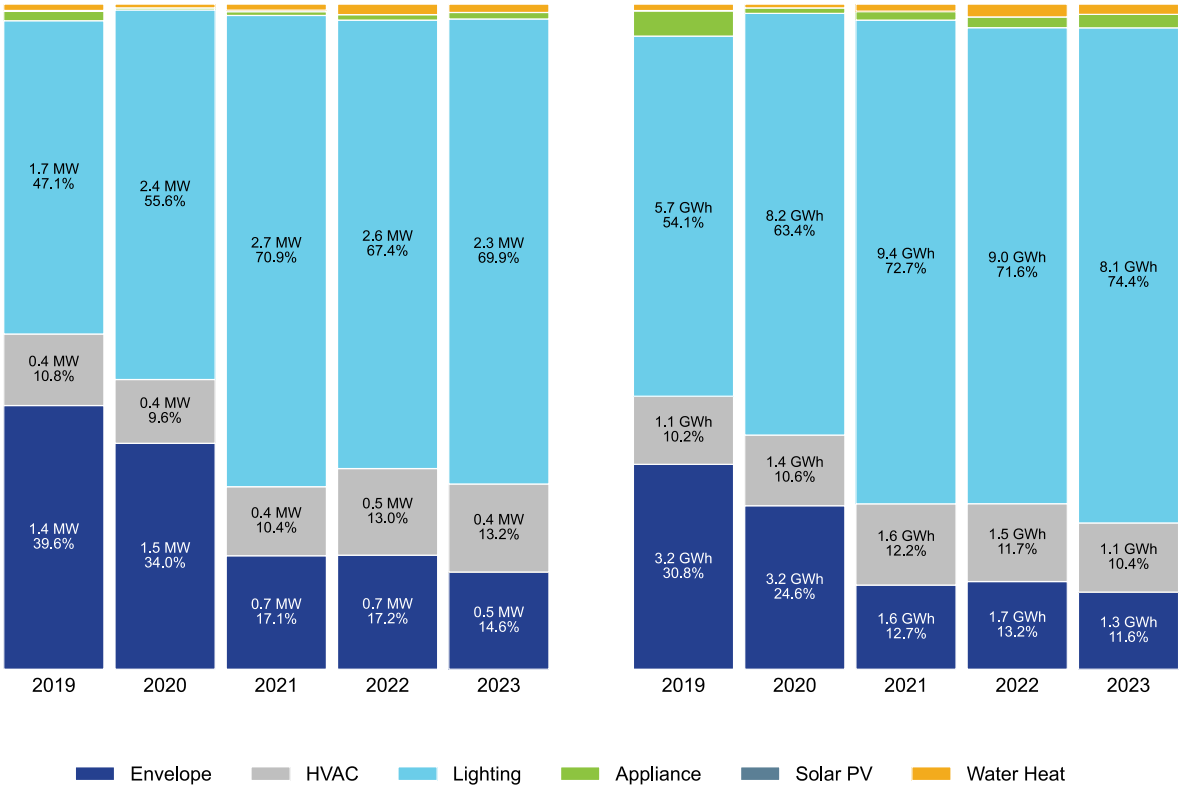
Figure 33. Xcel SPS's Demand Reduction and Energy Savings by Program Year—Residential Programs, Excluding Load Management, PY2019–PY2023



In PY2023, demand reductions and energy savings achieved by Xcel SPS's residential programs (excluding load management) were primarily derived from *lighting* measures—representing over two-thirds of demand reductions and nearly three-fourths of energy savings. Figure 34 presents the breakdown of savings by measure category, demonstrating that Xcel SPS has slightly increased *HVAC* measures in their residential portfolios. *Lighting* measures remain the top contributor to Xcel SPS's residential demand reductions and energy savings, followed by *envelope* and *HVAC* measures as the second- and third-largest contributor.

- **Recommendation:** The PUCT and EM&V teams should discuss with Xcel SPS their strategies and plans to diversify their residential measure mix beyond *lighting* to serve customers more comprehensively.

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



5.1.1.3 Load Management Savings

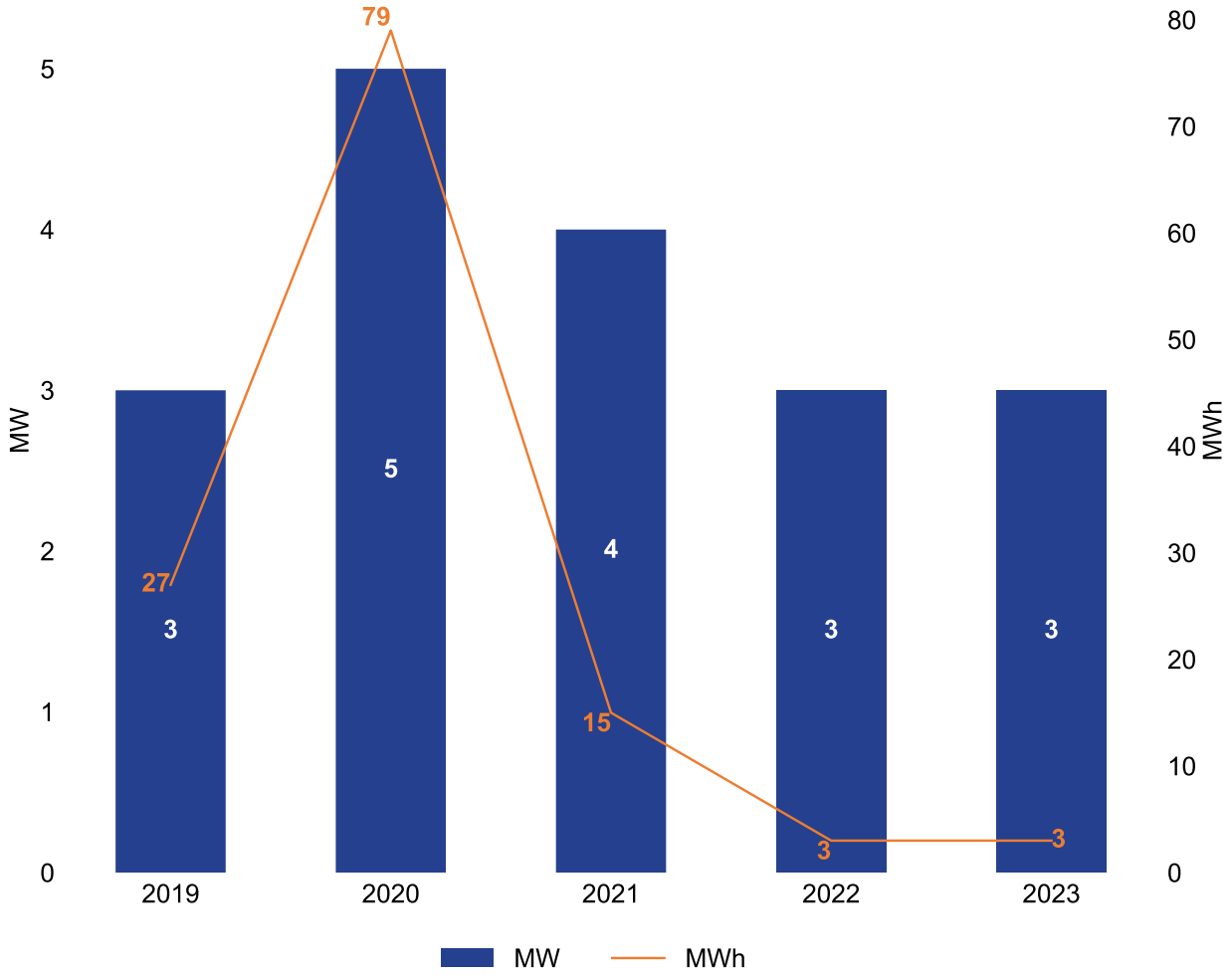
The PY2023 gross savings from Xcel SPS' load management programs were:

- 3.285 MW of demand reduction and
- 0.003 GWh of energy savings.

Figure 35 depicts the demand reductions and energy savings achieved by Xcel SPS' load management programs from PY2019 to PY2023, showing a peak in both in PY2020 and stable levels since PY2022.

Energy savings depend upon the number of curtailment events called each year and their duration. The high energy savings relative to demand reduction from PY2019 to PY2021 resulted from more events or extended event periods.

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

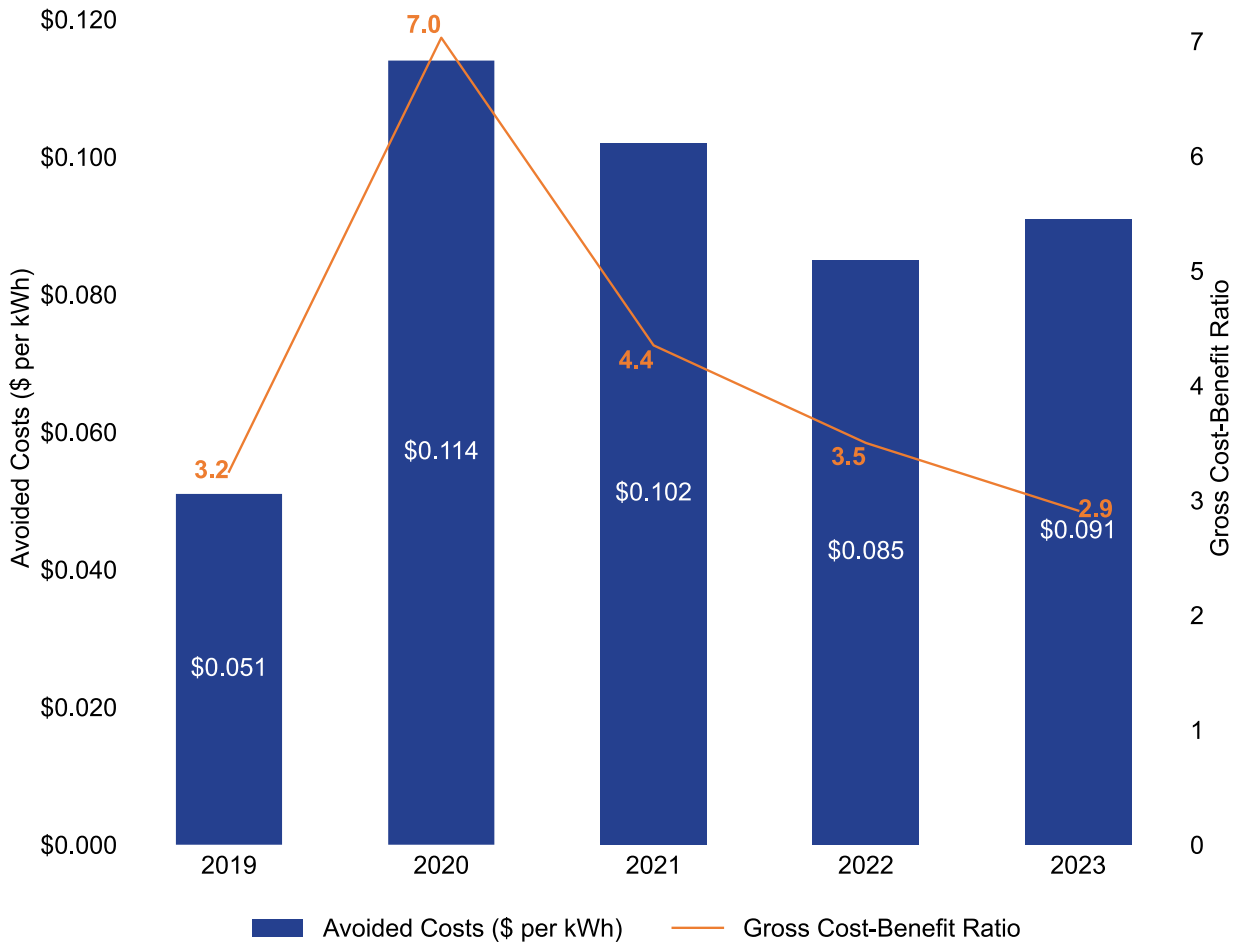


5.1.2 Cost-Effectiveness

Figure 36 overviews the avoided costs and cost-effectiveness ratios for Xcel SPS over the last five years.[23] The overall cost-effectiveness ratio has consistently remained above 2.0 for Xcel SPS. While PY2020 saw a high of 7.0, the cumulative cost-effectiveness of Xcel SPS' programs remains healthy at 2.9 in PY2023. The cost-effectiveness ratios over the last four years have been high largely due to the higher avoided costs of energy in the ERCOT market.

[23] The IOU program cost-effectiveness test compares the benefits of a program to the costs, with a ratio over 1.0 representing a cost-effective program. Texas EM&V utilizes the Program Administrator Cost Test for cost effectiveness.

Figure 36. Xcel SPS' Gross Cost-Benefit Ratio and Avoided Cost by Program Year, PY2019–PY2023



5.2 KEY FINDINGS

This section presents Xcel SPS' evaluated savings and cost-effectiveness results at both the portfolio- and program-level. The key findings are summarized first, followed by details for each program that had 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.

5.2.1 Evaluated Savings

Xcel SPS' evaluated savings for PY2023 were 8.6 MW in demand reductions and 20.1 GWh in energy savings. The overall demand reduction and energy savings realization rates are approximately 100 percent. Xcel SPS was responsive to all EM&V recommendations to adjust claimed savings based on EM&V results (Table 17), supporting healthy realization rates.

Table 14 shows the claimed and evaluated demand reductions for Xcel SPS' 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 14. Xcel SPS 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%**	**8,558**	**8,557**	**100.0%**	**N/A**
Commercial	22.9%	1,958	1,957	100.0%	N/A
Residential	34.8%	2,975	2,975	100.0%	N/A
Low-income	4.1%	350	350	100.0%	N/A
Load management*	38.3%	3,275	3,275	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 15 shows the claimed and evaluated energy savings for Xcel SPS' portfolio and broad customer sector and program categories for PY2023.

Table 15. Xcel SPS 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%**	**20,072,983**	**20,068,991**	**100.0%**	**N/A**
Commercial	46.0%	9,234,368	9,230,370	100.0%	N/A
Residential	49.6%	9,962,523	9,962,528	100.0%	N/A
Low-income	4.3%	872,817	872,817	100.0%	N/A
Load management*	0.0%	3,275	3,275	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. Xcel SPS received *good* documentation scores for all evaluated programs except the Commercial Standard Offer Program (SOP) and the Retro-Commissioning Market Transformation Program (MTP), which received *fair* documentation scores.

5.2.2 Program Funding and Cost-Effectiveness Results

Xcel SPS' total portfolio funding for PY2023 was $4,657,819, excluding research and development, EM&V, and their performance bonus; their portfolio had a cost-effectiveness score of 2.9 (or 3.1, excluding their low-income program).

The more cost-effective programs were the Smart Thermostat MTP and the commercial Home Lighting MTP; the less cost-effective programs were the Refrigerator Recycling MTP and the Residential HVAC MTP programs.

Both the Refrigerator Recycling MTP and the Residential HVAC MTP were not cost-effective. The Residential HVAC MTP had a cost-effectiveness of 0 because the program implementation began in Q3 of 2023 and did not have any accumulated savings benefits.

- **Recommendation:** While the EM&V team expects that the Residential HVAC MTP will pass cost-effectiveness in its second year once projects are completed, Xcel SPS should identify and implement program design changes to its Refrigerator Recycling MTP to achieve cost-effectiveness.

Table 16. Xcel SPS Cost-Effectiveness Results

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Total portfolio	**2.91**	**2.91**	**2.70**
Total portfolio excluding low-income programs	**3.11**	**3.11**	**2.87**
Commercial	**3.44**	**3.44**	**3.13**
Commercial SOP	6.57	6.57	5.96
Retro-Commissioning MTP	2.03	2.03	1.83
Small Commercial MTP	2.08	2.08	1.98
Home Lighting MTP	16.89	16.89	15.20
Residential	**2.97**	**2.97**	**2.78**
Residential SOP	2.44	2.44	2.21
Home Lighting MTP	3.16	3.16	2.84
Smart Thermostat MTP	11.81	11.81	9.45
Refrigerator Recycling MTP	0.56	0.56	0.44
Residential HVAC MTP	0.00	0.00	0.00
Hard-to-Reach SOP	1.98	1.98	1.98
Hard-to-Reach Food Bank MTP	7.23	7.23	7.23
Low-income *	**3.08**	**3.08**	**3.08**
Low-Income Weatherization*	3.08	3.08	3.08

Level of analysis	Claimed savings results	Evaluated savings results	Net savings results
Load management	**1.12**	**1.12**	**1.12**
Commercial Load Management SOP	1.12	1.12	1.12

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

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 17 summarizes savings differences identified by the EM&V team, which Xcel SPS 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. Xcel SPS adjusted claimed savings for all projects with a difference of more than five percent found by the EM&V team and will include these adjustments in their May 1st Energy Efficiency Cost Recovery Factor (EECRF) filing.

Table 17. Claimed Savings Differences by Program

Program	Evaluated demand reductions differences (kW)	Evaluated energy savings differences (kWh)
Commercial SOP	-87.00	-521,234
Retro-Commissioning MTP	-17.18	-86,668
Small Commercial MTP	-9.65	-41,644
Total	**-113.83**	**-649,546**

5.4 DETAILED FINDINGS—COMMERCIAL

5.4.1 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
8.0%	684	684	100.0%	18.7%	3,746,100	3,743,337	99.9%	Fair

Completed desk reviews*	On-site M&V visit
6	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 SOP evaluation efforts focused on desk reviews with on-site EM&V visits. The sample of completed desk reviews for this program is listed above.

The EM&V team adjusted the claimed savings for all six projects. Four projects had an adjustment of less than five percent, and two projects had adjustments greater than five percent compared to the original claimed savings. Xcel SPS accepted the evaluated results for two projects and matched the claimed savings to the evaluated. The remaining three projects were not adjusted to those of the evaluations, and therefore, the final program realization rate is 99.9 percent. Further details of the EM&V findings are provided below.

Participant ID 6-4-0-2-62598: A college installed energy-efficient lighting and HVAC measures. During the desk review and on-site M&V visit, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DesignLights Consortium® (DLC) qualified products list (QPL). These adjustments decreased demand reductions and resulted in a realization rate of 53 percent. The adjustments also decreased energy savings and resulted in a realization rate of 52 percent.

Participant ID 6-4-0-2-62605: A K-12 school installed energy-efficient lighting and HVAC measures. During the desk review and on-site M&V visit, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. Two variable speed heat pump calculations and assumptions were adjusted to match the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) certification for heating efficiency and rating format. These adjustments slightly decreased demand reductions and slightly increased energy savings, but the resulting realization rates round to 100 percent.

Participant ID 6-4-0-2-65063: A recreational park completed an exterior lighting retrofit. During the desk review and on-site M&V visit, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. The adjustment increased demand reductions and energy savings, resulting in a realization rate of 101 percent for both.

Participant ID 6-4-0-2-78401: A supermarket completed an interior lighting retrofit. During the desk review, the EM&V team adjusted the number of installed troffer fixtures that were not previously documented. The adjustment decreased demand reductions and energy savings, resulting in a realization rate of 96 percent for both.

Participant ID 6-4-0-2-79588: A new gas station and convenience store installed exterior LED lighting. During the desk review, the EM&V team adjusted the exterior lighting zone and total site areas. The adjustments resulted in zero savings in demand reductions and energy savings.

Participant ID 6-4-0-2-79603: A fairgrounds complex completed a lighting retrofit. During the desk review, the EM&V team adjusted the wattages of several lighting fixtures to match the DLC QPL. The adjustment decreased demand reductions and energy savings, resulting in a realization rate of 95 percent for both.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity, QPL qualifications) for the six projects with desk reviews. Project documentation included invoices, specification sheets, 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. However, neither HVAC project provided photos of nameplates on installed equipment, which made it difficult to verify equipment model numbers. Additionally, all four lighting projects did not include the certification documents or identification to verify fixture wattages. Finally, five projects identified issues with invoices that needed more information to confirm fixture and equipment quantities and models.

Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair*.

- **Recommendation:** Xcel SPS should implement requirements for itemized invoices, supporting certifications, and verification of installation for the energy-efficient equipment with the trade allies to develop a system that facilitates review of the project submittal.

5.4.2 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
7.9%	678	678	100.0%	13.1%	2,635,099	2,635,099	100.0%	Fair

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

The EM&V team adjusted the claimed savings for all four projects. All four projects had adjustments of greater than five percent compared to the originally claimed energy savings. Xcel SPS accepted the evaluated results and matched the claimed savings 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 6-6-0-2-11: An office building completed a lighting retrofit. During the desk review, the EM&V team adjusted the type of fixtures installed based on specification sheets and the quantity of installed equipment. These adjustments 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 86 percent.

Participant ID 6-6-0-2-12: A new elementary school installed air conditioning, interior and exterior LED lighting, and food service equipment. During the desk review, the EM&V team adjusted the evaluation to use a proportion of water heat attributed to the gas and electric storage volumes. These adjustments decreased demand reductions and resulted in a realization rate of 77 percent. The adjustments also increased energy savings and resulted in a realization rate of 102 percent.

Participant ID 6-6-0-2-22 & 23: A new construction church installed energy-efficient lighting and HVAC measures. During the desk review and on-site M&V visit, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. The team also adjusted estimated areas and lighting inventory associated with specialty lighting. These adjustments decreased demand reductions and resulted in a realization rate of 42 percent. The adjustments also decreased energy savings and resulted in a realization rate of 46 percent.

Participant ID 6-6-0-2-24 & 25: A new university science building installed interior and exterior LED lighting, air conditioners, and heat pumps. During the desk review and on-site M&V visit, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. 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 126 percent.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity, QPL qualifications) for the four projects with desk reviews. Project documentation included invoices, specification sheets, 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. However, certifications were not provided for equipment, and some projects did not include inspection reports or itemized invoices, which limited the ability to confirm calculation assumptions.

Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *fair*.

- **Recommendation:** Xcel SPS should consider the need for itemized invoices, supporting certifications, and verification of installation for the energy-efficient equipment with the trade allies to develop a system that eases the review of the project submittal.

5.4.3 Small Commercial 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
3.2%	277	277	100.0%	6.1%	1,214,970	1,214,020	99.9%	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 Small Commercial MTP evaluation efforts focused on desk reviews with on-site M&V visits. The sample of completed desk reviews for this program is listed above.

The EM&V team adjusted the claimed savings for three projects. Two projects had adjustments of greater than five percent compared to the originally claimed energy savings, and the other project had an adjustment of less than five percent. Xcel SPS accepted the evaluated results for two projects and matched the claimed savings to the evaluated. The remaining project was not adjusted to match the evaluation, and therefore, the final program realization rate is 99.9 percent. Further details of the EM&V findings are provided below.

Participant ID 6-4-0-2-72957: An office and warehouse installed interior and exterior LED lighting. During the desk review and on-site M&V visit, the EM&V team adjusted the building and exterior areas. These adjustments decreased demand reductions and resulted in a realization rate of 71 percent. The adjustments also decreased energy savings and resulted in a realization rate of 78 percent.

Participant ID 6-4-0-2-79526: A new stand-alone retail store installed interior and exterior LED lighting. During the desk review, the EM&V team adjusted the parking areas and the installed wattage of several lighting fixtures to match the DLC QPL. These adjustments decreased demand reductions and resulted in a realization rate of 87 percent. The adjustments also decreased energy savings and resulted in a realization rate of 83 percent.

Participant ID 6-4-0-2-79526: A motorcycle dealership installed LED lighting to replace interior fluorescent lighting. During the desk review, the EM&V team adjusted the installed wattage of several lighting fixtures to match the DLC QPL. The adjustment decreased demand reductions and energy savings, resulting in a realization rate of 99 percent for both.

Documentation Score

The EM&V team was mostly able to verify key inputs and assumptions (e.g., equipment quantity, QPL qualifications) for the four projects with desk reviews because sufficient documentation was provided for the sites. Project documentation included invoices, specification sheets, 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. However, some projects did not include inspection reports or itemized invoices, limiting the ability to confirm that the other calculation assumptions were accurate. Itemized invoices enhance the accuracy and transparency of project savings and ease of evaluation. Still, the EM&V team was able to verify equipment quantities through other documents provided because of the size of the projects.

Overall, the EM&V team was partially satisfied with the project documentation provided and assigned a program documentation score of *good*.

5.5 DETAILED FINDINGS—RESIDENTIAL

The PY23 evaluation's primary focus was on a retrofit consumption analysis. Xcel SPS was not part of the analysis because they don't have AMI fully deployed. Full deployment is expected in 2025. 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 Smart Thermostat 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%	0	0	0.0%	.5%	92,205	92,205	100.0%	Good

Completed desk reviews*
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 Smart Thermostat MTP evaluation efforts focused on desk reviews. The number of sampled and completed desk reviews for this program is listed above. The desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system and that savings were calculated in accordance with the TRM.

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

Documentation Score

The EM&V team verified key inputs and assumptions, including the project scope, baselines, and equipment specifications for all sampled projects that had desk reviews. Project documentation included the customer agreement, photos, and certifications.

Overall, the EM&V team was satisfied with the project documentation provided and assigned a program documentation score of *good.*

5.5.2 Hard-to-Reach Food Bank 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
7.9%	678	678	100.0%	12.4%	2,487,826	2,487,826	100.0%	Good

Completed desk reviews*
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 Hard-to-Reach Food Bank MTP evaluation efforts focused on desk reviews. The number of sampled and completed desk reviews for this program is listed above. The desk reviews were completed to check that the measure data and documentation collected by contractors aligned correctly with that in the tracking system and that savings were calculated in accordance with the TRM.

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

Documentation Score

The EM&V team verified most key inputs and assumptions, including the project scope, baselines, and equipment specifications for all sampled projects that had desk reviews. Project documentation included the customer agreement, photos, test results, and certifications.

Overall, the EM&V team was mostly satisfied with the project documentation provided and assigned a program documentation score of *good.*

5.6 DETAILED FINDINGS—CROSS-SECTOR

5.6.1 Home Lighting 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[24]	19.1%	1,630	1,630	100.0%	27.5%	5,520,111	5,520,116	100.0%	Good
Commercial	3.7%	319	319	100.0%	8.2%	1,638,189	1,637,914	100.0%	Good

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

The EM&V team adjusted the claimed savings for one project, which had adjustments of less than five percent compared to the originally claimed savings. Xcel SPS did not adjust claimed savings to match the evaluated; therefore, the final program realization rate is 100 percent for demand reductions in the residential portion, and the energy savings realization rate rounds to 100 percent. Further details of the EM&V findings are provided below.

Participant ID 6-7-0-2-74960: The energy efficiency project included the sale of specialty LEDs. During the desk review, the EM&V team found that the incorrect operating hours were used for reflector lamps. The remaining measures had no adjustments. Overall, the adjustments adjusted the energy savings slightly.

Documentation Score

The EM&V team verified inputs and assumptions (e.g., equipment quantity, equipment capacity, QPL qualifications) for the four projects that had desk reviews completed. Project documentation at these sites included 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 and ease of evaluation. Overall, the EM&V team assigned a program documentation score of *good*.

[24] The difference between claimed and evaluated energy savings is due to rounding difference between the disaggregated and aggregated bulb data. The rounding difference for the commercial program was 275 kWh or 0.02 percent, and the residential difference was 5 kWh or 0.004 percent. These differences are not reflected in Table 4 or Table 9 as EM&V adjustments.

5.7 DETAILED FINDINGS—LOAD MANAGEMENT

5.7.1 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
38.3%	3,275	3,275	100.0%	<0.0%	3,275	3,275	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 Xcel SPS Commercial Load Management SOP by applying the TRM calculation methodology to interval meter data. The meter data were supplied in 15-minute increments at the electric service identifier ID (ESIID) level. In PY2023, only one load management event occurred on June 20, 2023, from 3:00 p.m. to 4:00 p.m. (scheduled)[25].

The EM&V team received the interval meter data and a spreadsheet summarizing the event-level savings for the seven sponsors across 13 sites. Two sites had no load data associated with them for the event. All sponsors had at least one site that curtailed during the event[26].

After the EM&V team applied the *High 5 of 10* baseline calculation method, it was found that the evaluated savings matched the savings Xcel SPS provided for all sites. The demand reductions for each participating site corresponded to the energy reduced during the scheduled event. The energy savings for each participating site were calculated by multiplying the demand 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 Xcel SPS' (claimed) calculated demand reductions and energy savings. No adjustments were made to the program savings; however, a negligible difference in demand reductions and energy savings resulted from different rounding practices during calculations. Evaluated savings for the Xcel SPS Commercial Load Management SOP are 3,275 kW and kWh. The realization rate for demand reductions and energy savings is 100 percent, with a documentation score of *good.*

[25] Scheduled events are IOU program test events to ensure equipment is working and customers know how to respond whereas unscheduled events are for grid or system reliability.
[26] See the Report Volume 1 recommendation to monitor load management cooperation rates.

5.8 SUMMARY OF TRACKING-SYSTEM-ONLY EVALUATED PROGRAMS

Table 18 summarizes claimed savings for Xcel SPS' 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 18. 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)
Refrigerator Recycling MTP	0.1%	7	7	100.0%	0.3%	54,327	54,327	100.0%

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

APPENDIX A: EVALUATION, MEASUREMENT, AND VERIFICATION APPROACH

Appendix A discusses 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 reductions or savings by the utility-claimed reductions or savings. Utility-claimed reductions or 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 reductions or savings. Primary data were then collected for sampled projects to assess the accuracy of the claimed reductions or 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 quantity. 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 are estimated as 1,000 kWh per year. It is determined that this estimate has a 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 reductions or savings and load management reductions or 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 reductions or 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.

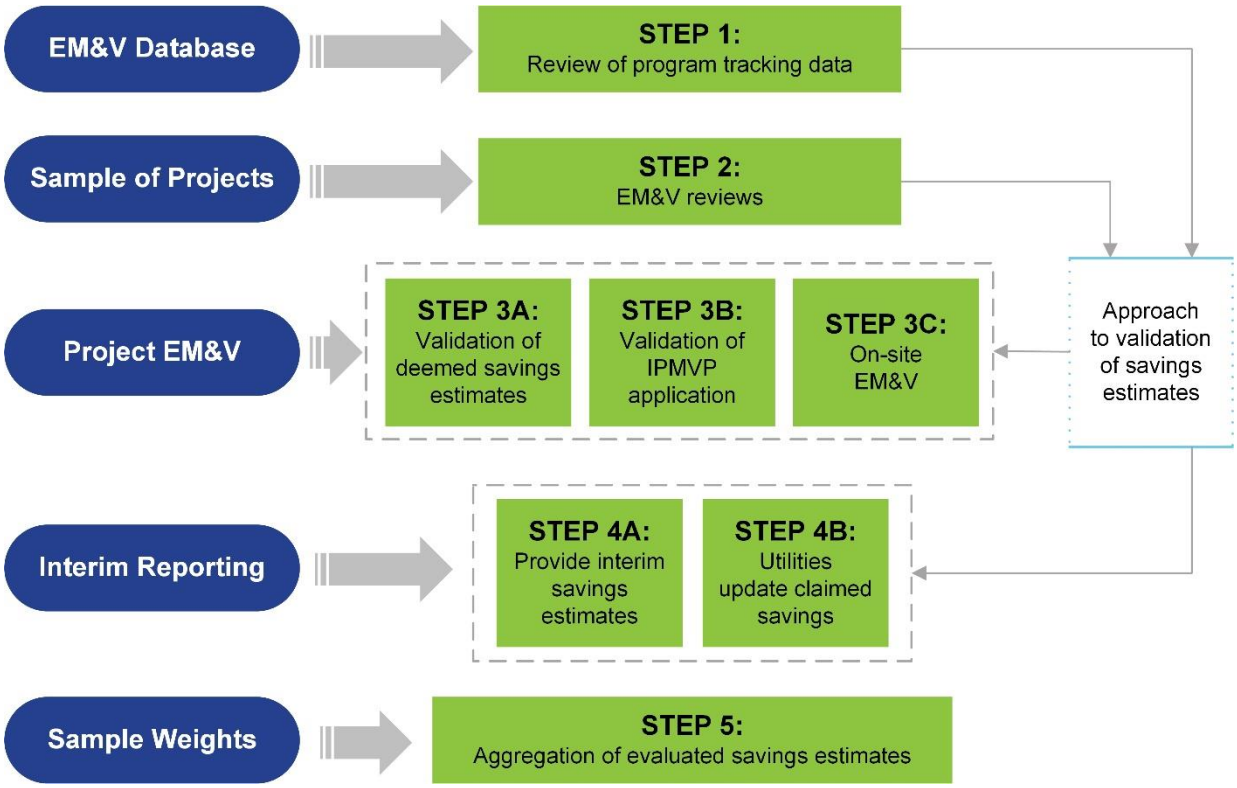
Our review accomplished two primary objectives. First, it ensured that the measures installed were consistent with those listed in the tracking system. Second, the desk reviews verified that the savings estimates in the tracking system were consistent with the savings calculated in the deemed calculation 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 reductions or 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 reductions or 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 19 lists the required inputs to the cost-effectiveness model and the sources of information.

Table 19. Cost-Effectiveness Model Inputs and Sources

Model input	Measurement level	Source
Reported demand reductions and demand savings	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	Energy Efficiency Plan and Reports (EEPRs)
Administrative and research and development (R&D) costs	Program/portfolio	EEPRs
EM&V costs	Program/portfolio	EM&V team budgets
Performance bonus earned in the program year[27]	Portfolio	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[28] IOUs only)	Utility	Utilities
Realization rates	Program	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[29], and program levels.

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

[27] Performance bonuses as an input into cost-effectiveness testing came into effect in 2012.
[28] Electric Reliability Council of Texas.
[29] 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 (§ 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 demand reduction and energy savings goals. These program-level costs include program administrative and incentive costs. 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)[30]. 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.

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

Also, the EM&V team reported the cost-per-lifetime for both kilowatts and kilowatt-hours. Cost-per-lifetime is calculated by attributing costs to demand reductions and energy savings 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 for each utility 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 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 the Annual IOU Energy Efficiency Report. The Annual IOU Energy Efficiency Report is a comprehensive report across all IOU portfolios.

For PY2023, the metrics to be used as the basis for recommendations in the reports are:

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

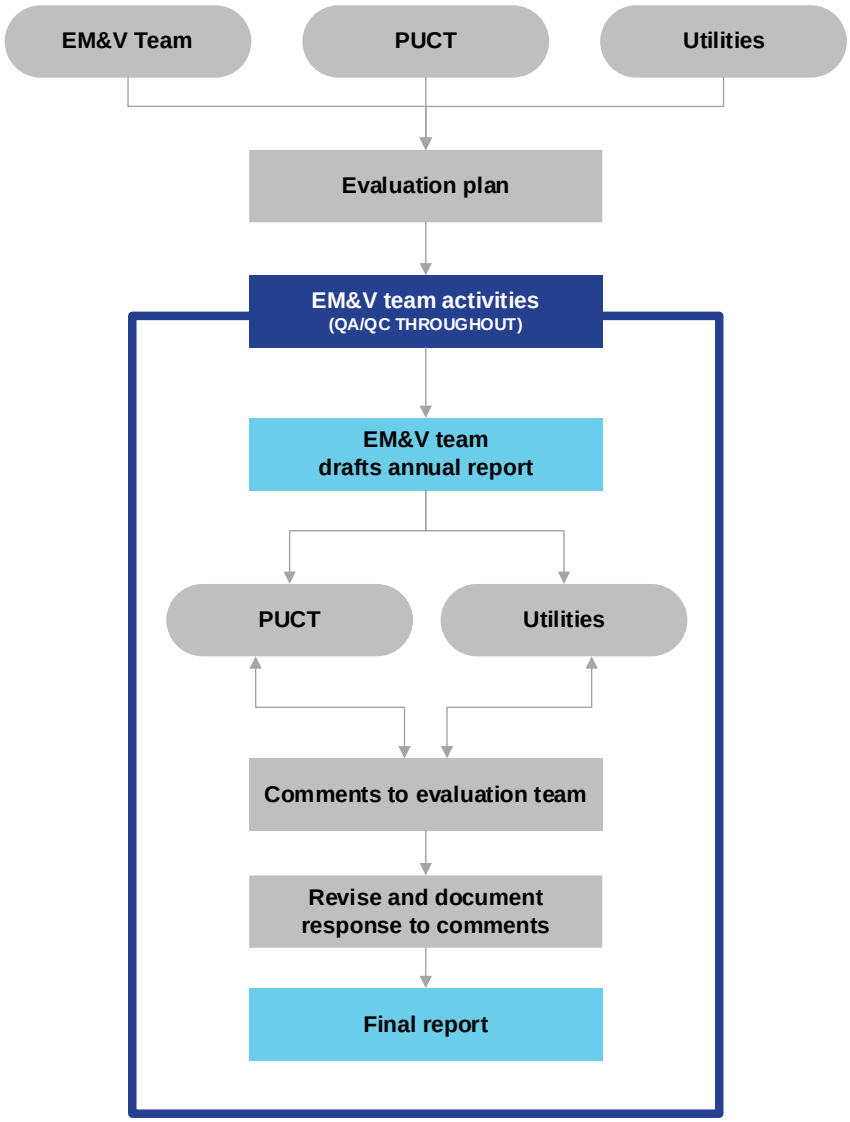
[30] Outside of ERCOT utilities are not required to offer LI programs, but may chose to do so. Xcel SPS is the only outside of ERCOT utility offering a LI program and therefore applying the SIR.

The EM&V database is at the core of reporting results; it houses the claimed and evaluated demand reductions and energy 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 reductions and 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.

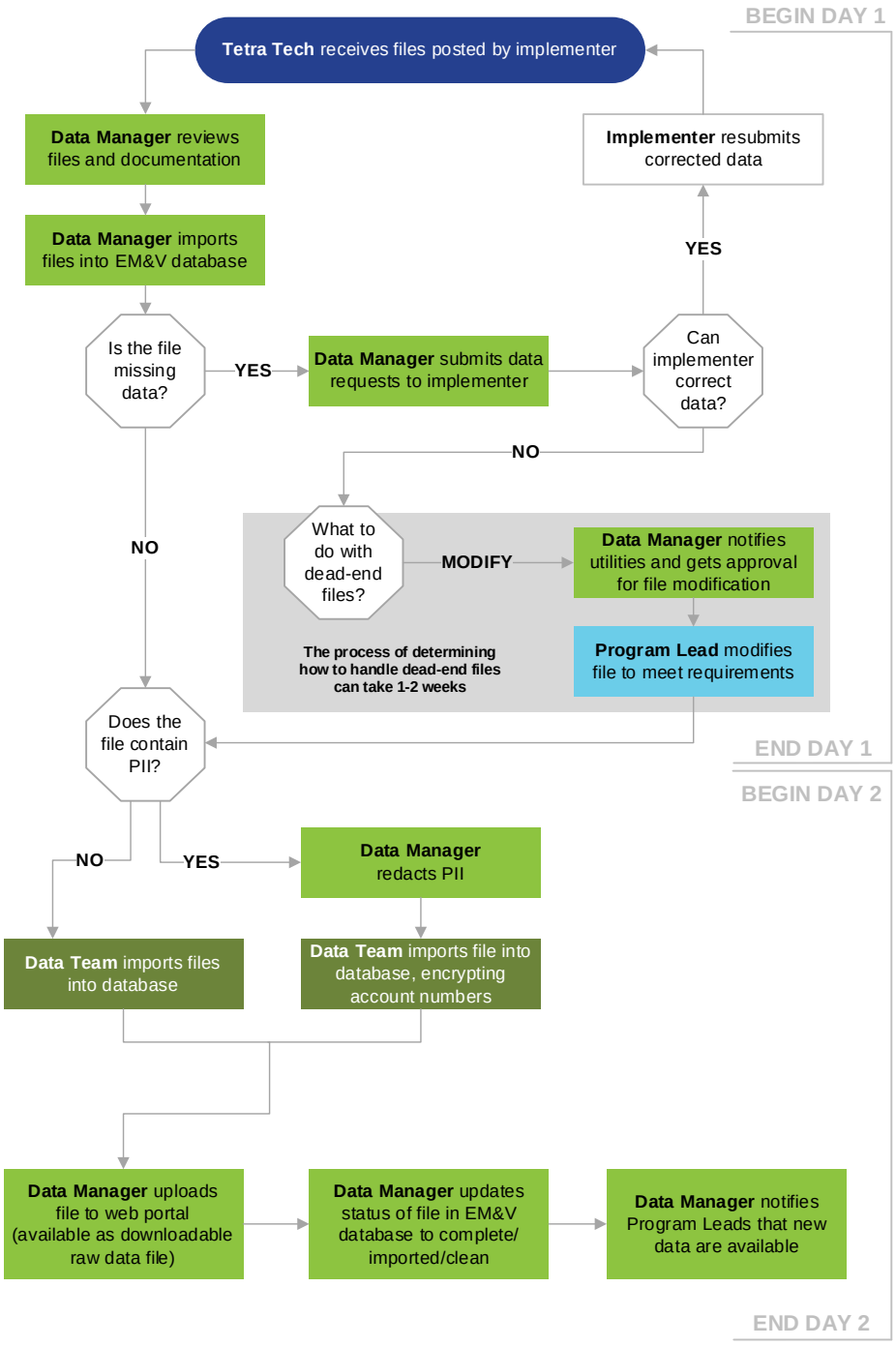
Figure 38. Reporting Flowchart



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 Public Utility Commission of Texas (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[31] 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 demand reductions and energy savings 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 or demand).

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.

[31] 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 demand reductions, 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. 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 20 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 20. 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 New Homes programs in 2023.

Table 21. Net-to-Gross Ratios Used to Calculate Cost-Effectiveness

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's Evaluation, Measurement, and Verification (EM&V) team for reporting claimed and evaluated demand reductions and energy savings. Although quality control is a function of all evaluation stages (e.g., populating the EM&V database, sampling, analysis), this appendix focuses on the QA/QC processes within the reporting stage. A QA/QC team, which will be led by the Tetra Tech reporting lead, will be developed and accountable for ensuring all QA/QC protocols are being followed.

Below, we summarize the specific activities that will be 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 will be provided by program implementers, read into the database in raw form, and organized for analysis. The database centrally stores the claimed (ex-ante) reductions and savings, which will be used for sampling and reporting those claimed reductions and savings. Data will be provided to the EM&V team quarterly. The EM&V team will characterize the data received in terms of demand reductions, energy savings, and participants served and report the information within the detailed research plans; these detailed research plans will be 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 will be generated in the EM&V database. The database will categorize 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 will conduct impact evaluations to obtain and report verification and NTG estimates at the utility and program-type level, which will then be aggregated and reported at the program-group level.

These impact estimates will be provided by the program leads and stored in two locations. First, the program leads will enter the impact results within an Excel tracking sheet stored on the SharePoint site. The Excel tracking sheet will include 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 will maintain current impact information. Should data be updated throughout the process, the outdated records will be moved to a separate worksheet within that file. Doing so will ensure one sheet will maintain the correct rates and that any modifications are documented, including the reason for the modification.

Second, the EM&V database will include an interface where program leads will directly enter their impact results. These results will then be stored and applied against the claimed reductions and 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 builds a point of verification of the data into the process. The evaluated and net reductions and savings results will be directly calculated out of the EM&V database using the rates supplied within the web interface. The EM&V team will then verify that the results are as expected using the values documented within the Excel impact reporting file. Should the results differ, the QA/QC team will be able to 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 will be aggregated and reported in various ways. At the most aggregate level, the data will be reported by program group overall and then by utility. At the most granular level, the data will be reported by program group for each utility. The annual report will, therefore, represent impacts in over 100 tables. It will be critical to spend considerable time conducting QA/QC against those reported values.

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

All results tables will be cross-referenced to ensure the results true up and are consistent with each other. For example, the sum of all residential MTPs evaluated net reductions and 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 will develop a checklist of tables to be cross-checked against which sources and will systematically go 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 will inherently allow 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 will tie back to results clearly for a secondary review.

- Responsibility: utilities (for providing claimed reductions and 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