MEEIA Cycle III PY3:
Residential & Demand Response
Measurement and Verification Report
Missouri Metro and Missouri West: Main Report

Prepared for:

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1 Introduction

This report presents an evaluation of the performance of the Residential energy efficiency, and Demand Response programs offered by Evergy, Inc. for MEEIA Cycle III, Program Year 3 (PY3). ADM Associates, Inc. (ADM) is submitting this report to fulfill the requirements outlined by the Missouri Code of State Regulations 20 CSR 4240-22.070 (8) (Missouri regulations).

Evergy contracted with ADM to perform comprehensive program evaluation, measurement, and verification (EM&V) for the Residential and Demand Response programs. ADM's impact evaluation approaches are provided in Chapter 3 of this report. The tactics for ADM's process evaluation are presented in Chapter 4. Chapter 5 outlines the Cost Effectiveness Tests that were utilized, as well as the source of Cost Effectiveness input data for ADM's Cost-Effectiveness approach. Evaluation findings and results are provided in Section 2 of this report, while the evaluation methodologies by program can be found in Section 6.

1.1 Reporting Period

MEEIA Cycle III refers to programs implemented in the timeframe of program years 2020 - 2023 (PY1 – PY4). Program Year 3 (PY3) refers to the 2022 program year.

1.2 How to Use This Report

The report is comprised of four elements:

- Main (Condensed) Report: This document—which provides the summary of our evaluation, measurement, and verification (EM&V) analyses and findings by program.
- Appendices A - M:
  - Program Specific Net-to-Gross (NTG) Methodology
  - Program Specific Methodology and Results
  - Process Evaluation Results
  - Survey Instruments
  - Deemed Savings and Algorithms
- Summary Results Tables File (Appendix N)
- Cost Effectiveness Results (Appendix O)

1.3 Document Structure

As agreed with Stakeholders and discussed during the Evergy Missouri Metro-West DSMAG EM&V Planning Meeting December 7, 2020, the ADM team is providing a condensed EM&V report that presents key impact evaluation findings and recommendations for both Missouri Metro and Missouri West jurisdictions.

Additionally, this report provides a summary of the MEEIA Cycle III PY3 process evaluation findings that address the five required questions per the Missouri Code of State Regulations 20 CSR 4240-22.070 (8) (Missouri regulations). ADM divided the document into the following sections:

- **Portfolio Findings and Evaluation Results:** This section provides findings and recommendations at the portfolio and sector level for gross and net savings, cost effectiveness, and overarching process findings.
- **Impact Evaluation Approach:** Provides a summary of the evaluation approaches for the impact evaluation and overviews of the approach for net-to-gross.
- **Cost Effectiveness Approach:** Provides a summary of the evaluation approaches for the cost effectiveness calculations, including methodology, inputs, and sources.
- **Process Evaluation Approach:** Provides a summary of the evaluation approaches for the process evaluation and data collection activities.
- **Evaluation Methodology by Program:** Provides a condensed summary of program level evaluation activities. Full program level reports can be found in the appendices outlined below.

Several appendices accompany this document, including:

- **Appendix A. Net-to-Gross Approaches by Program:** Includes program level specifics of how each program determines NTG savings.
- **Appendix B. Missouri Requirements for Impact Evaluation:** Provides an overview of MO regulation requirements for conducting an impact evaluation.
- **Appendix C – K. Program-Specific Methodologies:** Details program-specific methodologies
- **Appendix L. Survey Instruments:** Provides detailed survey guides for participants, general population, and trade allies.

- **Appendix M. Deemed Savings and Algorithms:** Details the gross energy savings and demand impacts algorithms as listed in the 2022 Evergy Technical Reference Manual (Evergy TRM)[1].
- **Appendix N. Excel Databook – CONFIDENTIAL:** Provides additional analytical data and figures for each program in addition to summary results tables for the portfolio.
- **Appendix O. Cost-Effectiveness Data – CONFIDENTIAL**: An Excel Databook containing the following:
  - All measure-specific input assumptions.
  - Program-level administrative costs incurred by the program administrator.
  - Detailed benefit and cost breakdowns by cost test and program/portfolio.

1.4 Report Definitions

1.4.1 Savings Types

Gross Reported Savings

Savings reported in Evergy's annual reports prior to any EM&V reported gross adjustments and NTG adjustments.

Gross Verified Savings

Savings verified through ADM's impact evaluation methods prior to NTG adjustments.

Gross Realization Rates

The ratio of gross verified savings to gross reported savings.

Net Verified Savings

Savings verified through ADM's impact evaluation methods and inclusive of NTG adjustments.

Missouri Energy Efficiency Investment Act (MEEIA)

Three-year savings target approved by the Missouri Public Service Commission for a given program cycle.

[1] Evergy MEEIA Cycle III Technical Reference Manual (2022-01-01).

Percentage of MEEIA Target Achieved

The ratio of net verified savings to the MEEIA target for the program cycle; reflects Missouri Metro & Missouri West's overall achievement toward the MEEIA target for the program cycle.

1.4.2 Net-to-Gross Components

Free Ridership (FR)

The program savings attributable to free riders (i.e., program participants who would have implemented a program measure or practice in the absence of the program).

Participant Spillover (PSO)

The additional energy savings achieved, because of the program's influence, when a program participant installs energy-efficiency measures or practices beyond the efficiency program after having participated.

Non-participant Spillover (NPSO)

The additional energy savings achieved when a non-participant implements energy efficiency measures or practices because of the program's influence (e.g., through exposure to the program), but is not accounted for in program's gross verified savings.

Net Sales Analysis Approach to Net-to-Gross

Approaches to estimating NTG that rely on the effect of program activity on total sales, yielding a market-level estimate of NTG that take FR, PSO, and NPSO into account.

Billing Analysis Approach to Net-to-Gross

Approaches to estimating NTG that rely on the use of control groups, either through randomized control trials (RCT) or quasi-experimental designs (e.g., the use of matching techniques to develop relevant non-participant comparison groups), and billing analysis to model participant net savings.

2 Portfolio Findings and Evaluation Results

In PY3, Evergy offered customers five residential programs and seven products and services incubator programs. Evergy also offered customers three demand response programs, one residential and two commercial/industrial.

2.1 Gross and Net Savings Results Summary: Combined Territories

This section summarizes the gross and net savings achievements for the Evergy Metro & Missouri West service jurisdiction combined and presents the percentage attainment of MEEIA Cycle III PY3 program targets.

2.1.1 Summary of Annual Energy Savings: Combined Territories

Evergy's Residential and Demand Response programs reported gross annual energy savings (kWh) across both jurisdictions for the program year of 108,723,463 kWh. Total gross verified annual energy savings were 103,358,605 kWh, resulting in a realization rate for gross energy savings of 95 percent.

The NTG ratio indicates the percentage of gross savings directly attributable to program influences. The residential and demand response program level net annual energy savings were 78,595,604 kWh, with a portfolio-level kWh net-to-gross ratio of 76 percent.

Table 2-1 summarizes the energy impacts of Evergy's energy efficiency and demand response programs for the program year.

Table 2-1: Combined Territories Energy Savings at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA3 PY3 Target (kWh)	Verified Savings (kWh)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling, and Home Comfort	11,015,961	9,318,475	85%	15,893,305	6,750,594	42%
	Energy Saving Products	56,372,523	52,821,956	94%	15,634,241	30,792,086	197%
	Income-Eligible Multi-Family	2,144,360	2,144,983	100%	2,342,925	2,144,983	92%
	Pay As You Save	1,364,394	1,279,831	94%	4,505,148	1,114,581	25%
	Residential EE Programs Subtotal	**70,897,238**	**65,565,245**	**92%**	**38,375,619**	**40,802,244**	**106%**
Educational Programs	Home Energy Report	33,091,154	33,431,252	101%	29,934,375	33,431,252	112%
	Income-Eligible Home Energy Report	983,931	1,588,363	161%	2,928,146	1,588,363	54%
	Educational Programs Subtotal	**34,075,085**	**35,019,615**	**103%**	**32,862,521**	**35,019,615**	**107%**
Pilot Programs	Appliance Recycling	173,731	168,816	97%	3,721,905	168,816	34%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	39,658	39,657	100%		39,657	
	Energy-Saving Trees	25,176	23,373	93%		23,373	
	Market Rate Multi-Family	1,812,403	1,046,525	58%		1,046,525	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**2,050,968**	**1,278,371**	**62%**	**3,721,905**	**1,278,371**	**34%**
DR Programs	Business Demand Response	The Business Demand Response Program did not claim any energy savings.					
	Residential Demand Response	1,485,774	1,395,270	94%	3,015,616	1,395,270	46%
	Business Smart Thermostat	214,398	100,104	47%	172,572	100,104	58%
	DR Programs Subtotal	**1,700,172**	**1,495,374**	**88%**	**3,188,188**	**1,495,374**	**47%**
Portfolio Total (Without Pilot Programs)		**106,672,495**	**102,080,234**	**96%**	**74,426,328**	**77,317,233**	**104%**
Portfolio Total		**108,723,463**	**103,358,605**	**95%**	**78,148,233**	**78,595,604**	**101%**

2.1.2 Summary of Peak Demand Impacts: Combined Territories

Evergy's Residential and Demand Response programs reported peak demand reduction (kW) across both jurisdictions of 95,485.52 kW. Total gross verified peak demand reduction was 97,114.51 kW. The realization rate for peak demand reduction was 102 percent.

The NTG ratio indicates the percentage of gross demand reduction directly attributable to program influences. The residential and demand response program level net annual peak demand reduction was 92,349.44 kW, with a portfolio-level kW net-to-gross ratio of 95 percent.

Table 2-2 summarizes the peak demand impacts of Evergy's energy efficiency and demand response programs during the program year.

Table 2-2: Combined Territories Peak Demand Reduction at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Demand Reduction (kW)	Verified Demand Reduction (kW)	Realization Rate (%)	MEEIA3 PY3 Target (kW)	Verified Demand Reduction (kW)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling and Home Comfort	6,619.02	6,266.64	95%	6,134.80	4,426.46	72%
	Energy Saving Products	7,303.26	6,932.85	95%	1,140.18	4,044.21	355%
	Income-Eligible Multi-Family	455.68	393.41	86%	450.37	393.41	87%
	Pay As You Save	275.98	281.16	102%	1,408.00	244.91	17%
	Residential EE Programs Subtotal	**14,653.94**	**13,874.06**	**95%**	**9,133.35**	**9,108.99**	**100%**
Educational Programs	Home Energy Report	3,776.61	5,616.82	149%	3,750.00	5,616.82	150%
	Income-Eligible Home Energy Report	112.93	266.86	236%	366.02	266.86	73%
	Educational Programs Subtotal	**3,889.54**	**5,883.68**	**151%**	**4,116.02**	**5,883.68**	**143%**
Pilot Programs	Appliance Recycling	42.71	25.82	60%	581.00	25.82	30%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	18.31	18.31	100%		18.31	
	Energy-Saving Trees	The Energy-Saving Trees Program did not claim any demand reductions.					
	Market Rate Multi-Family	196.90	131.38	67%		131.38	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**257.92**	**175.51**	**68%**	**581.00**	**175.51**	**30%**
DR Programs	Business Demand Response	66,244.32	65,618.90	99%	69,834.00	65,618.90	94%
	Residential Demand Response	10,229.50	11,317.28	111%	22,908.84	11,317.28	49%
	Business Smart Thermostat	210.30	245.08	117%	1,261.44	245.08	19%
	DR Programs Subtotal	**76,684.12**	**77,181.26**	**101%**	**94,004.28**	**77,181.26**	**82%**
Portfolio Total (Without Pilot Programs)		**95,227.60**	**96,939.00**	**102%**	**107,253.65**	**92,173.93**	**86%**
Portfolio Total		**95,485.52**	**97,114.51**	**102%**	**107,834.65**	**92,349.44**	**86%**

Table 2-3 provides a summary of the final free-ridership, spillover, and NTG ratios by program for both jurisdictions combined. Program-specific NTG methodologies are provided in Appendix A in the Appendices Report.

Table 2-3: Combined Territories NTG Components by Program

Program Name	Free Ridership	Participant Spillover	Non-Participant Spillover	NTGR
Heating, Cooling and Home Comfort	36.2%	2.0%	6.7%	72.4%
Energy Saving Products – Upstream Rebates[2]	46.6%	5.5%	-	57.3%[3]
Energy Saving Products – Thank You Kit	53.5%	0.0%	-	46.5%
Energy Saving Products – Online Marketplace	15.0%	5.5%	-	90.5%
Energy Saving Products – Giveaway Hub	0.0%	0.0%	-	100.0%
Income-Eligible Multi-Family	ADM assumed a NTG value of 1.0 for the IEMF Program.			
Home Energy Report	Program is designed as a randomized control trial, net-to-gross score of 1.0.			
Pay As You Save	9.5%[4]	0.5%	-	87.1%
Products & Incubator Programs	ADM assumed a NTG value of 1.0 for the pilot programs.			
Business Demand Response	ADM assumed a NTG value of 1.0 for the Demand Response programs.			
Residential Demand Response				
Business Smart Thermostats				

[2] NTG calculations contain an additional 1.35 percent reduction due to program leakage.

[3] Budget retailers are a component of Upstream Rebates and are assigned a 100 percent NTGR; therefore, the NTGR cannot be calculated from the free ridership, spillover and leakage.

[4] The sum of the proportion of free ridership is weighted by measure-level savings.

2.2 Gross and Net Savings Results Summary: Missouri West

2.2.1 Summary of Annual Energy Savings: Missouri West

Evergy's Residential and Demand Response programs reported annual energy savings (kWh) for the Missouri West jurisdiction of 58,486,090 kWh. Total gross verified annual energy savings were 57,067,374 kWh, resulting in a realization rate for gross energy savings of 98 percent.

The NTG ratio indicates the percentage of gross savings directly attributable to program influences. The residential and demand response program level net annual energy savings were 43,783,265 kWh, with a portfolio-level kWh net-to-gross ratio of 77 percent.

Table 2-4 summarizes the energy impacts of Evergy's energy-efficiency and demand response programs in the Missouri West jurisdiction during the program year.

Table 2-4: Missouri West Energy Savings at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA3 PY3 Target (kWh)	Verified Savings (kWh)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling and Home Comfort	6,674,569	5,572,188	83%	8,338,188	3,865,891	46%
	Energy Saving Products	30,927,705	29,198,473	94%	8,079,124	17,710,898	219%
	Income-Eligible Multi-Family	633,124	799,829	126%	1,181,931	799,829	68%
	Pay As You Save	725,990	697,713	96%	2,252,574	607,476	27%
	Residential EE Programs Subtotal	**38,961,388**	**36,268,203**	**93%**	**19,851,817**	**22,984,094**	**116%**
Educational Programs	Home Energy Report	17,673,336	19,426,866	110%	20,355,375	19,426,866	95%
	Income-Eligible Home Energy Report	The Income-Eligible Home Energy Report Program did not claim any energy savings in MO West.					
	Educational Programs Subtotal	**17,673,336**	**19,426,866**	**110%**	**20,355,375**	**19,426,866**	**95%**
Pilot Programs	Appliance Recycling	170,119	164,492	97%	1,852,097	164,492	34%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	-	-	-		-	
	Energy-Saving Trees	The Energy-Saving Trees Program did not claim any energy savings in MO West.				-	
	Market Rate Multi-Family	822,163	461,878	56%		461,878	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**992,282**	**626,370**	**63%**	**1,852,097**	**626,370**	**34%**
DR Programs	Business Demand Response	The Business Demand Response Program did not claim any energy savings.					
	Residential Demand Response	730,279	685,795	94%	1,549,459	685,795	44%
	Business Smart Thermostat	128,805	60,140	47%	85,104	60,140	71%
	DR Programs Subtotal	**859,084**	**745,935**	**87%**	**1,634,563**	**745,935**	**46%**
MO West Total (Without Pilot Programs)		**57,493,808**	**56,441,004**	**98%**	**41,841,755**	**43,156,895**	**103%**
MO West Total		**58,486,090**	**57,067,374**	**98%**	**43,693,852**	**43,783,265**	**100%**

2.2.2 Summary of Peak Demand Impacts: Missouri West

The Residential and Demand Response programs reported peak demand reduction (kW) across the Missouri West jurisdiction of 61,460.93 kW. Total gross verified peak demand reduction was 62,315.72 kW. The realization rate for peak demand reduction was 101 percent.

The NTG ratio indicates the percentage of gross savings directly attributable to program influences. The residential program and demand program net annual peak demand reduction was 59,508.67 kW, with a portfolio-level kW net-to-gross ratio of 95 percent.

Table 2-5 summarizes the peak demand impacts of Evergy's energy efficiency and demand response programs in the Missouri West jurisdiction during the program year.

Table 2-5: Missouri West Peak Demand Reduction at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Demand Reduction (kW)	Verified Demand Reduction (kW)	Realization Rate (%)	MEEIA3 PY3 Target (kW)	Verified Demand Reduction (kW)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling and Home Comfort	4,077.65	3,820.26	94%	3,654.69	2,554.26	70%
	Energy Saving Products	4,000.05	3,864.89	97%	581.83	2,342.61	403%
	Income-Eligible Multi-Family	71.64	87.14	122%	222.82	87.14	39%
	Pay As You Save	142.22	146.24	103%	704.00	127.47	18%
	Residential EE Programs Subtotal	**8,291.56**	**7,918.53**	**96%**	**5,163.34**	**5,111.48**	**99%**
Educational Programs	Home Energy Report	2,020.12	3,263.93	162%	2,550.00	3,263.93	128%
	Income-Eligible Home Energy Report	The Income-Eligible Home Energy Report Program did not claim any demand reductions in MO West.					
	Educational Programs Subtotal	**2,020.12**	**3,263.93**	**153%**	**2,550.00**	**3,263.93**	**128%**
Pilot Programs	Appliance Recycling	42.30	25.30	60%	295.10	25.30	28%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	-	-	-		-	
	Energy-Saving Trees	The Energy-Saving Trees Program did not claim any demand reductions.					
	Market Rate Multi-Family	86.99	55.99	64%		55.99	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**129.29**	**81.29**	**63%**	**295.10**	**81.29**	**28%**
	Business Demand Response	45,962.01	45,354.36	99%	54,834.00	45,354.36	83%
	Residential Demand Response	4,928.36	5,558.28	113%	11,773.80	5,558.28	47%
	Business Smart Thermostat	129.59	139.33	108%	622.08	139.33	22%
	DR Programs Subtotal	**51,019.96**	**51,051.97**	**100%**	**67,229.88**	**51,051.97**	**76%**
MO West Total (Without Pilot Programs)		**61,331.64**	**62,234.43**	**101%**	**74,943.22**	**59,427.38**	**79%**
MO West Total		**61,460.93**	**62,315.72**	**101%**	**75,238.32**	**59,508.67**	**79%**

Table 2-6 provides a summary of the final free-ridership, spillover, and NTG ratios by program in the Missouri West jurisdiction. Program specific NTG methodologies are provided in Appendix A in the Appendices Report.

Table 2-6: Missouri West NTG Components by Program

Program Name	Free Ridership	Participant Spillover	Non-Participant Spillover	NTGR
Heating, Cooling and Home Comfort	39.3%	2.0%	6.7%	69.4%
Energy Saving Products – Upstream Rebates[5]	43.3%	5.5%	-	60.5%[6]
Energy Saving Products – Thank You Kit	53.5%	0.0%	-	46.5%
Energy Saving Products – Online Marketplace	15.0%	5.5%	-	90.5%
Energy Saving Products – Giveaway Hub	0.0%	0.0%	-	100.0%
Income-Eligible Multi-Family	ADM assumed a NTG value of 1.0 for the IEMF Program.			
Home Energy Report	Program is designed as a randomized control, net-to-gross score of 1.0.			
Pay As You Save	9.6%[7]	0.5%	-	87.1%
Products & Incubator Programs	ADM assumed a NTG value of 1.0 for the pilot programs.			
Business Demand Response	ADM assumed a NTG value of 1.0 for the Demand Response programs.			
Residential Demand Response				
Business Smart Thermostats				

[5] NTG calculation contains an additional 1.35 percent reduction due to program leakage.

[6] Budget retailers are a component of Upstream Rebates and are assigned a 100% NTGR; therefore, the NTGR cannot be calculated from the free ridership, spillover, and leakage.

[7] The sum of the proportion of free ridership is weighted by measure-level savings.

2.3 Gross and Net Savings Results Summary: Missouri Metro

2.3.1 Summary of Annual Energy Savings: Missouri Metro

The Residential & Demand Response programs reported annual energy savings (kWh) across the Missouri Metro jurisdiction for the program year of 50,237,375 kWh. Total gross verified annual energy savings were 46,291,231 kWh, resulting in a realization rate for gross energy savings of 92 percent.

The NTG ratio indicates the percentage of gross savings directly attributable to program influences. The residential and demand response net annual peak demand reduction was 34,812,340 kWh, with a portfolio-level kWh net-to-gross ratio of 75 percent.

Table 2-7 summarizes the energy impacts of Evergy's energy efficiency and demand response programs in the Missouri Metro jurisdiction for the program year.

Table 2-7: Missouri Metro Energy Savings at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Savings (kWh)	Verified Savings (kWh)	Realization Rate (%)	MEEIA3 PY3 Target (kWh)	Verified Savings (kWh)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling and Home Comfort	4,341,392	3,746,287	86%	5,426,432	2,884,703	53%
	Energy Saving Products	25,444,819	23,623,482	93%	7,555,117	13,081,188	173%
	Income-Eligible Multi-Family	1,511,236	1,345,155	89%	1,160,994	1,345,155	116%
	Pay As You Save	638,404	582,118	91%	2,252,574	507,105	23%
	Residential EE Programs Subtotal	**31,935,851**	**29,297,042**	**92%**	**16,395,117**	**17,818,151**	**109%**
Educational Programs	Home Energy Report	15,417,818	14,004,386	91%	9,579,000	14,004,386	146%
	Income-Eligible Home Energy Report	983,931	1,588,363	161%	2,928,146	1,588,363	54%
	Educational Programs Subtotal	**16,401,749**	**15,592,749**	**95%**	**12,507,146**	**15,592,749**	**125%**
Pilot Programs	Appliance Recycling	3,612	4,324	120%	1,869,808	4,324	35%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	39,658	39,657	100%		39,657	
	Energy-Saving Trees	25,176	23,373	93%		23,373	
	Market Rate Multi-Family	990,241	584,647	59%		584,647	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**1,058,687**	**652,001**	**62%**	**1,869,808**	**652,001**	**35%**
DR Programs	Business Demand Response	The Business Demand Response Program did not claim any energy savings.					
	Residential Demand Response	755,495	709,475	94%	1,466,157	709,475	48%
	Business Smart Thermostat	85,593	39,964	47%	87,468	39,964	46%
	DR Programs Subtotal	**841,088**	**749,439**	**89%**	**1,553,625**	**749,439**	**48%**
MO Metro Total (Without Pilot Programs)		**49,178,688**	**45,639,230**	**93%**	**30,455,888**	**34,160,339**	**112%**
MO Metro Total		**50,237,375**	**46,291,231**	**92%**	**32,325,696**	**34,812,340**	**108%**

2.3.2 Summary of Peak Demand Impacts: Missouri Metro

The Residential and Demand Response programs reported peak demand reduction (kW) across the Missouri West jurisdiction of 34,024.57 kW. Total gross verified peak demand reduction was 34,798.79 kW. The realization rate for peak demand reduction was 102 percent.

The NTG ratio indicates the percentage of gross savings directly attributable to program influences. The residential and demand response program level net annual peak demand reduction was 32,840.82 kW, with a portfolio-level kW net-to-gross ratio of 94 percent.

Table 2-8 summarizes the peak demand impacts of Evergy's energy efficiency and demand response programs in the Missouri Metro jurisdiction during the program year.

Table 2-8: Missouri Metro Peak Demand Reduction at the Customer Meter – PY3

Sector	Program	Gross			Net		
		Reported Demand Reduction (kW)	Verified Demand Reduction (kW)	Realization Rate (%)	MEEIA3 PY3 Target (kW)	Verified Demand Reduction (kW)	% Of MEEIA3 PY3 Target Achieved
Residential EE Programs	Heating, Cooling and Home Comfort	2,541.36	2,446.38	96%	2,480	1,872.20	75%
	Energy Saving Products	3,303.21	3,067.97	93%	558	1,701.60	305%
	Income-Eligible Multi-Family	384.04	306.27	80%	228	306.33	135%
	Pay As You Save	133.76	134.92	101%	704	117.44	17%
	Residential EE Programs Subtotal	**6,362.37**	**5,955.54**	**94%**	**3,970.01**	**3,997.57**	**101%**
Educational Programs	Home Energy Report	1,756.49	2,352.89	134%	1,200	2,352.89	196%
	Income-Eligible Home Energy Report	112.93	266.86	236%	366	266.86	73%
	Educational Programs Subtotal	**1,869.42**	**2,619.75**	**140%**	**1,566.02**	**2,619.75**	**167%**
Pilot Programs	Appliance Recycling	0.41	0.52	127%	285.90	0.52	33%
	BPI Certification	-	-	-		-	
	Energy Efficiency Nonprofits	18.31	18.31	100%		18.31	
	Energy-Saving Trees	The Energy-Saving Trees Program did not claim any demand reductions.					
	Market Rate Multi-Family	109.91	75.39	69%		75.39	
	Power Check	-	-	-		-	
	Virtual Energy Management for Small Business	-	-	-		-	
	Pilot Programs Subtotal	**128.63**	**94.22**	**73%**	**285.90**	**94.22**	**33%**
DR Programs	Business Demand Response	20,282.31	20,264.54	100%	15,000	20,264.54	135%
	Residential Demand Response	5,301.14	5,758.99	109%	11,135	5,758.99	52%
	Business Smart Thermostat	80.70	105.75	131%	639	105.75	17%
	DR Programs Subtotal	**25,664.15**	**26,129.28**	**102%**	**26,774.40**	**26,129.28**	**98%**
MO Metro Total (Without Pilot Programs)		**33,895.94**	**34,704.57**	**102%**	**32,310.43**	**32,746.60**	**101%**
MO Metro Total		**34,024.57**	**34,798.79**	**102%**	**32,596.33**	**32,840.82**	**101%**

Table 2-9 provides a summary of the final free-ridership, spillover, and NTG ratios in the Missouri Metro jurisdiction by program. Program specific NTG methodologies are provided in Appendix A in the Appendices Report.

Table 2-9: Missouri Metro NTG Components by Program

Program Name	Free Ridership	Participant Spillover	Non-Participant Spillover	NTGR
Heating, Cooling and Home Comfort	31.7%	2.0%	6.7%	77.0%
Energy Saving Products – Upstream Rebates[8]	50.5%	5.5%	-	53.5%[9]
Energy Saving Products – Thank You Kit	53.5%	0.0%	-	46.5%
Energy Saving Products – Online Marketplace	15.0%	5.5%	-	90.5%
Energy Saving Products – Giveaway Hub	0.0%	0.0%	-	100.0%
Income-Eligible Multi-Family	ADM assumed a NTG value of 1.0 for the IEMF Program.			
Home Energy Report	Program is designed as a randomized control, net-to-gross score of 1.			
Pay As You Save	9.4%[10]	0.5%	-	87.1%
Products & Incubator Programs	ADM assumed a NTG value of 1.0 for the pilot programs.			
Business Demand Response	ADM assumed a NTG value of 1.0 for the demand response programs.			
Residential Demand Response				
Business Smart Thermostats				

[8] NTG calculations contain an additional 1.35 percent reduction due to program leakage.

[9] Budget retailers are a component of Upstream Rebates and are assigned a 100% NTGR; therefore, the NTGR cannot be calculated from the free ridership, spillover and leakage.

[10] The sum of the proportion of free ridership is weighted by measure-level savings.

2.4 Cost-Effectiveness Summary

ADM calculated the annual cost-effectiveness of Evergy's programs based on reported total spending, verified net energy savings, and verified net demand reduction for each of the energy efficiency and demand response programs. Additional inputs to the cost effectiveness tests included estimates of line-loss adjustments, measure lives, discount rates, participant costs, and avoided costs. All program spending inputs were provided by Evergy and the tracking data as shown in Appendix O in the Appendices Report. The total residential and demand response program spending was $19,766,433.26 excluding Research & Pilots (R&P). The methods used to calculate cost-effectiveness were informed by the California Standard Practice Manual.[11]

The specific tests used to evaluate cost-effectiveness for the Missouri Public Service Commission is the Total Resource Cost Test (TRC). The benefit-cost ratios for those tests as well as the Utility Cost Test (UCT), Rate Payer Impact test (RIM), Societal Cost Test (SCT), and the Participant Cost Test (PCT) are presented in Table 2-10 through Table 2-12. In addition, total portfolio costs and benefits for the programs evaluated are shown in Table 2-13. Detailed cost-effectiveness assumptions and findings are presented in Appendix O in the Appendices Report.

[11] California Standard Practice Manual: Economic Analysis of Demand Side Management Programs, October 2001. Available at: https://www.raponline.org/wp-content/uploads/2016/05/cpuc-standardpractice-manual-2001-10.pdf

Table 2-10: Combined Territories Benefit-Cost Ratios by Program and Cost Test – PY3

Sector	Program	TRC	UCT	RIM	SCT	PCT
EE Programs	Energy Saving Products	3.08	1.68	0.35	3.37	7.46
	Heating, Cooling and Home Comfort	1.04	1.53	0.42	1.29	1.89
	Income-Eligible Multi-Family	0.59	0.51	0.29	0.70	3.61
	Home Energy Report	1.62	1.62	0.28	1.62	-
	Income-Eligible Home Energy Report	0.71	0.71	0.21	0.71	-
	Pay As You Save	0.28	0.34	0.19	0.34	2.68
EE Overall		**1.49**	**1.30**	**0.35**	**1.69**	**4.52**
DR Programs	Business Demand Response	2.46	1.18	1.18	2.46	-
	Business Smart Thermostat	0.75	0.75	0.59	0.88	3.36
	Residential Demand Response	1.67	1.36	1.02	1.94	4.41
DR Overall		**1.88**	**1.26**	**1.07**	**2.06**	**7.23**
Residential and DR Total		**1.62**	**1.28**	**0.49**	**1.81**	**4.73**

Table 2-11: Missouri West Benefit-Cost Ratios by Program and Cost Test – PY3

Sector	Program	TRC	UCT	RIM	SCT	PCT
EE Programs	Energy Saving Products	2.68	1.52	0.34	2.94	7.50
	Heating, Cooling and Home Comfort	0.99	1.37	0.43	1.23	1.71
	Income-Eligible Multi-Family	0.42	0.31	0.20	0.48	5.30
	Home Energy Report	1.50	1.50	0.30	1.50	-
	Income-Eligible Home Energy Report	-	-	-	-	-
	Pay As You Save	0.29	0.36	0.20	0.36	2.61
EE Overall		**1.42**	**1.21**	**0.35**	**1.60**	**4.36**
DR Programs	Business Demand Response	2.47	1.17	1.17	2.47	-
	Business Smart Thermostat	0.62	0.63	0.51	0.73	3.29
	Residential Demand Response	1.57	1.25	0.98	1.82	4.37
DR Overall		**1.86**	**1.19**	**1.05**	**2.01**	**8.32**
Residential and DR Total		**1.56**	**1.20**	**0.49**	**1.74**	**4.64**

Table 2-12: Missouri Metro Benefit-Cost Ratios by Program and Cost Test – PY3

Sector	Program	TRC	UCT	RIM	SCT	PCT
EE Programs	Energy Saving Products	3.82	1.98	0.37	4.18	7.42
	Heating, Cooling and Home Comfort	1.11	1.81	0.41	1.39	2.15
	Income-Eligible Multi-Family	0.76	0.72	0.37	0.93	3.06
	Home Energy Report	1.82	1.82	0.26	1.82	-
	Income-Eligible Home Energy Report	0.71	0.71	0.21	0.71	-
	Pay As You Save	0.26	0.31	0.19	0.32	2.76
EE Overall		**1.59**	**1.43**	**0.35**	**1.81**	**4.72**
DR Programs	Business Demand Response	2.43	1.19	1.19	2.43	-
	Business Smart Thermostat	1.04	1.01	0.77	1.21	3.47
	Residential Demand Response	1.78	1.48	1.06	2.07	4.45
DR Overall		**1.91**	**1.37**	**1.09**	**2.13**	**6.15**
Residential and DR Total		**1.70**	**1.41**	**0.49**	**1.92**	**4.85**

Table 2-13: Combined Territories Program Costs and Benefits – PY3

Jurisdiction	Incentives	All Other Costs	Total TRC Costs	Total TRC Benefits	TRC Score
MO West	$5,071,856	$6,739,942	$10,203,984	$15,942,233	1.56
MO Metro	$3,514,632	$4,440,003	$7,354,737	$12,488,209	1.70
Total	**$8,586,488**	**$11,179,945**	**$17,558,722**	**$28,430,442**	**1.62**

***** Portfolio costs and benefits reported in this table do not include costs or benefits from Products & Services Incubator programs.

2.5 Process Evaluation Results Summary

This section provides an overview of the Residential & Demand Response PY3 process evaluation findings. For specific program findings, please refer to Appendix C through Appendix K in the Appendices Report.

Section 2.5.1 provides a summary of the five Missouri Process Evaluation Questions and the overarching themes across Evergy's portfolio of DSM programs. These findings are intended to provide the reader with a broad understanding of the portfolio and the progress made throughout the second program year of the cycle. Section 2.5.2 summarizes customer and trade ally program satisfaction analyzed over the MEEIA Cycle III PY3

2.5.1 Regulatory Research Questions

1. What are the primary market imperfections that are common to the target market segment?

We interpret "market imperfections" as used here to mean any factors that pose barriers to program participation. Historically, the primary barriers to program participation have been low awareness of program offerings, low motivation to reduce energy consumption, lack of understanding of value of efficient equipment (including the non-energy benefits) and of the technologies themselves, and the up-front cost of installing energy-saving equipment. Programs attempt to address these barriers through marketing and other educational activities to improve program awareness and to increase motivation and understanding and through monetary incentives to reduce the financial barriers. As indicated below, however, other barriers may exist for specific customer subsectors.

Residential Energy-Efficiency Programs

Evergy achieved the MEEIA overall target for residential energy-efficiency programs and for the educational program but fell below target for the demand response programs. This suggests, at a minimum, that the energy efficiency and educational programs, taken together, are doing at least as well as expected. However, there was wide variation in how well individual programs performed. Among the energy efficiency programs, Energy Saving Products (ESP) exceeded goals while Heating, Cooling and Home Comfort (HCHC) and Income-Eligible Multi-Family (IEMF) both fell short of their energy goals. The HCHC Program fell well below target at 58 percent and the IEMF Program at 92 percent. As a single program should not always be expected to outperform expectations; therefore, it is important to identify the factors that prevented the HCHC and IEMF programs from achieving their respective savings targets. It is also important to note that the Pay As You Save (PAYS) Program did not have specific energy goals, but did have participation goals that were met in 2022.

Lingering effects from the COVID-19 pandemic had a negative impact on the HCHC Program achieving its savings goals. The COVID-19 pandemic and other external factors, such as economic uncertainty and supply chain issues, led to increasing prices for contractor-delivered services and equipment. These external factors also made acquiring equipment (such as HVAC equipment and duct work) more difficult for trade allies.

Another issue that negatively affected the program was consolidation within the trade ally market occurring. Many trade allies are family-owned businesses, and these owners are selling out to larger regional and national firms. The buyouts and consolidation of trade allies has led to some changes in the relationships, but the implementer continues to work on developing relationships with the new business owners. Our evaluation did not find evidence of other substantial barriers, such as poor program awareness or resistance to adoption of energy-efficient measures.

Although the ESP program met savings goals, program staff reported that customer education and market saturation are challenges for the program. ADM's evaluation found that just under half of surveyed customers who reported buying light-emitting diode (LED) lightbulbs at participating stores through ESP were aware of the Evergy discount, which compares well to awareness rates we have identified in similar programs in other states. Given that the program met goals, this may be adequate, but given program staff's concerns, increasing customer awareness of the discounts and that Evergy provided them may help improve the proper assignment of attribution of the savings resulting from the purchases.

IEMF staff identified inflation as the most significant challenge the program faces. The long-term nature of most multifamily building rehabilitation projects compounds the impact inflation has on project budgets and financing.

Although there were no specific goals established for the PAYS Program in 2022, the program met most of its participation goals. This could have been a result of the addition of Spire and the joint collaboration for the delivery of the PAYS Program.

Educational Programs

The Home Energy Reports (HER) Program is an educational program that claims energy savings. It exceeded its MEEIA energy savings goals. As an educational program, there is no issue of up-front cost. As an opt-out program, there is no issue of awareness of the program itself. The primary potential barriers to program effectiveness would appear to be lack of customer motivation to save energy, lack of understanding of how to save energy, and differences among customer sub-segments in either of those two items. In this light, the primary barriers that our evaluation identified are that: 1) the rate with which report recipients review the reports in detail could be higher; 2) a small percentage of recipients may misunderstand the basis on which the report compares their home to that of other homes, which may lead to frustration and failure to accept the report's suggestions; 3) report recipients were no more familiar with some other Evergy program offerings – specifically, with rebates for smart thermostats, HVAC, and insulation and air sealing – than were the matched controls.

Demand Response Programs

The Residential Demand Response (RDR) Program and the Business Smart Thermostat (BST) Program both fell short of their MEEIA savings goals, and so, therefore, did the demand response programs in general. The Business Demand Response (BDR) Program did not claim energy savings. In terms of demand savings, all programs fell short of goals, including the BDR Program, which had the highest demand goals.

Market saturation may be a contributing factor in declining enrollments in the RDR and BST programs and led to not meeting overall program goals. The program has been offering free thermostats since 2016, and the program is now quite mature and well-known. Therefore, enrolling new participants has been more challenging in future program cycles. Another issue the evaluation identified was an increase in opt-out rates, which may have resulted from customer fatigue. Evergy called 12 residential events in 2022, which was higher than the previous years due to the increased temperatures during summer. The program may need to look for ways to be more innovative in calling events in order to avoid customer fatigue and decrease opt-out rates.

2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

The Evergy residential programs cover most subsegments of the residential market. The HCHC, ESP, HER, PAYS, and RDR programs all serve homeowners and renters, and IEMF serves lower- and middle-income customers. ADM's evaluation did not identify clear evidence that any specific program fails to serve any specific part of its target audience. We noted that the HCHC participant survey respondents were skewed toward homeowners, small households (one to two occupants), and were highly educated (Bachelor's degree or higher). From the general population survey respondents (for the ESP Program), we noted that most respondents were homeowners of single-family homes. For the PAYS participant survey respondents overall (both full and partial participants), we noted that more than two-thirds of participants reported incomes above 200% Federal Poverty Income Guidelines (FPIG). This means only about one third of all participants would qualify as income eligible. However, we cannot be certain that either of these reflects a bias in program participation or in survey response.

Based on the above, we cannot conclude that there is any need for any changes in how Evergy targets the residential market. There are several ways we can examine whether program participation represents the Evergy customer population, but each has its limitations. One approach would be to compare participation in income-qualified programs as a percentage of total residential participation (in terms of number of participants and/or energy savings) to the low-income share of the customer population. The limitation here is that some low-income customers may also participate in non-income-qualified programs. We also can compare the demographics of participant survey respondents to

the demographics of the customer population. The limitation here is that lack of a good comparison could mean either that participation is biased or that survey response is biased. Finally, since program tracking data usually includes the address of program participants, we can use the demographics of the Census tracts or block groups where participants live as a proxy for the participant demographics. Other program administrators have done this.[12,13,14] The limitation here is that, as ADM recently found in research for another client, Census data on income may provide an acceptable proxy for participation differences between higher- and lower-income households but not for participation differences between people of color and white households.[15]

3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

Of the various programs covered in our evaluation, only the ESP, HCHC, IEMF, and PAYS programs provide incentives for the installation of energy-saving measures or provide direct-install measures. Between these four programs, Evergy offers a wide range of residential measures. However, limited uptake of some measure types may hamper program savings.

HCHC offers energy saving measures through three program components: 1) an Energy Savings Kit with an assortment of low-cost measures (LED lightbulbs, faucet aerators, low-flow showerheads, pipe insulation, and advanced power strips); 2) insulation and air sealing measures; and 3) HVAC measures. HCHC participants and trade allies were generally satisfied with the program, and over two-thirds of trade allies were satisfied with the equipment that the program offers, the rebate/discount payment process, the program paperwork, and Evergy's website. The primary substantive suggestion that trade allies made regarding the program offerings was to push higher SEER (>17) HVAC equipment, as well as an increase in the incentives offered for higher-efficiency HVAC models.

ESP provides upstream discounts for energy efficient products, with the vast majority of savings coming from a selection of LED lighting measures. Non-lighting measures have

[12] DNV-GL 2020. Final Report: Residential Nonparticipant Customer Profile Study. Prepared for the Massachusetts Program Administrators and Energy Efficiency Advisory Council Consultants, February 6, 2020. Available at: https://ma-eeac.org/wp-content/uploads/MA19X06-B-RESNONPART_Report_FINAL_v20200228.pdf.

[13] Energy Trust of Oregon 2018. "2018 Diversity, Equity and Inclusion Data and Baseline Analysis." Published December 26, 2018. Available at: https://www.energytrust.org/documents/energy-trust-of-oregon-2018-racial-diversity-equity-and-inclusion-data-and-baseline-analysis/.

[14] Wirtshafter, Robert M., Susan L. Radke, Robert Bodner, Virginia Kreitler, and Shahana Samiullah 2001. "Using Geographic Information Systems to Establish Who Is Hard to Reach." 2001 International Energy Program Evaluation Conference, Salt Lake City, 2001.

[15] ADM Associates 2021. Final Report: 2020 Customer Insights Study. Published July 12, 2021. Available at: https://energytrust.org/wp-content/uploads/2021/04/Energy-Trust-CIS-Final-Report-wSR.pdf.

been added to the online marketplace channel in 2022; however, high shipping costs represent a barrier to growing this segment of the program.

IEMF provides a wide range of prescriptive appliances and HVAC measures that offer deep energy savings opportunities to multifamily building owners and residents. Prescriptive measures account for over 78 percent of program savings. In-unit, direct install lighting continues to decline in importance to the program, while common area custom light measures accounted for 20 percent of program savings during PY3 and continue to be an important category for the program.

PAYS financed the installation of energy efficient air conditioners, heat pumps, smart thermostats, ceiling insulation, air sealing, and duct sealing. Program participants also received direct install energy saving measures at no-cost during their initial home audits. These included a variety of LED lightbulbs, power strips, pipe insulation, faucet aerators, and low flow showerheads.

4. Are the communication channels and delivery mechanisms appropriate for the target market segment?

Our evaluation found that Evergy and its program implementers use a variety of methods to communicate about the programs to customers and trade allies. Some findings pointed to potential shortcomings of some aspects of the program communication channels and delivery mechanisms.

Our evaluation found that HCHC has consistent structures in place with rebate distribution, a well-developed internal marketing team, and continued trade ally support. HCHC participants and trade allies were satisfied with program processes and interactions with program and implementation staff. However, some trade allies reported that the application process/paperwork can be complicated and would prefer a more simplified application form.

ESP participants also were satisfied with the program. Our evaluation found that about half of surveyed customers who reported buying standard and specialty LEDs at participating lighting rebate stores were aware of the Evergy discount. The most common sources that led to participants' awareness of the Evergy lighting discounts are the Evergy newsletter and in-store displays. However, awareness of lighting rebates did not appear to have a substantial effect on the ESP Program as goals continue to be met. Program staff indicated that the lighting rebate portion of the program focuses exclusively on promoting LED lighting products and was viewed as Evergy's final push to promote energy-efficient lighting before this measure is being removed from future program plans.

Most IEMF participants (property owners and managers) learned about the program via outreach from program staff or from sustainability consultants or contractors. Given the nature of the program, this mechanism for developing program participant leads is appropriate and effective.

For the PAYS Program, our evaluation found that about one-third of participant survey respondents had considered other financing options prior to enrolling in PAYS. Some of the other types of financing options included a home equity line of credit or a bank loan. The biggest barriers preventing participants from purchasing energy-saving products were not having enough money and concern about the overall cost. Expanding program marketing would help increase program awareness which could, in turn, increase program participation by having customers reach out to Evergy about energy-saving products before applying for a loan through some other source.

One of the primary findings from the demand response programs is that participants in both the RDR and BST indicated they would like more advance notice of events. Our evaluation also found an increase in opt-out rates, which might indicate some customer fatigue. It is important to note that Evergy called 12 residential events, which was higher than in previous years. The program is approaching maturity, so finding ways to keep customers participating in the program will be a challenge. Offering free thermostats did lead to increased program enrollments; however, this offer was most successful when coupled with an email activation campaign.

5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

<u>Heating, Cooling and Home Comfort Recommendations</u>

- Consider hosting contractor briefings/meetings and/or in-person trainings for trade allies. Trying to engage trade allies virtually can be much more challenging than in-person meetings where the trade allies can feel more engaged. In-person meetings also create opportunities to introduce the Evergy program staff to trade allies who are consolidating or expanding their operations.
- Identify potential energy-savings measures for the Energy Savings Kit as the emphasis shifts away from residential lighting. The kits could include additional weather-stripping measures and energy-savings tips. The Evergy Savings Kit sub-program should continue to be actively promoted through community events, especially those targeting low-income areas.
- Develop a simplified and more automated application process to reduce the load on trade allies. As it is, some trade allies reported that the application process has many required components that can be easily overlooked. Drop-down options with

pre-programmed equipment and AHRI numbers could be utilized to reduce the time it takes for trade allies to look up the information themselves and would reduce input error.

- Determine the program impacts of the code/standard changes and economic influences and make adjustments accordingly to the current rebate structure. Due to the baseline SEER rating of HVAC equipment updating in 2023 and other economic effects, such as inflation, Evergy should assess if the rebates currently offered through the program provide enough incentive to drive customers to install energy efficient equipment. As prices of HVAC equipment continue to increase, the financial burden on customers to install energy efficient equipment increases as well. By not raising the incentives to cover more of the cost of installing the equipment, this can drive the rate of program free ridership up. Revisions to incentives can be implemented on a per-equipment-type basis and be based on customer needs, equipment inventory, current market conditions, etc.
- Create additional QA/QC checks for reviewing program tracking data prior to end-of-year reporting. During the final review of the program tracking data by the evaluation team at ADM, it was discovered that 25 central air conditioner projects were mistakenly processed as air source heat pumps. It was decided that the verified savings would report the projects as central air conditioners, while the reported savings would reflect the projects as air source heat pumps, which resulted in a lower realization rate. Additional implementation QA/QC checks to the program tracking data could help avoid future discrepancies between the reported and verified savings.

Energy Saving Products Recommendations

- Provide additional customer education and cross-promotion of programs. Customer awareness of the ESP Program remains low. Additional educational materials in stores (as permitted by the retailers), as well as promotion through social media, bill inserts, and emails could improve the program performance and customer engagement.
- Add additional non-lighting measures to the ESP Program. Evergy should pivot away from LED lighting-only point-of-sale rebates to include non-lighting measures such as ENERGY STAR® appliances and smart thermostats.
- Continue to develop an online marketplace. Program staff indicated that the online marketplace was successful in PY1 and PY2 and are exploring additional avenues for marketing the availability of the online marketplace and opportunities to add measures for purchase. The online marketplace provides an avenue to reach hard-to-reach customers and expand to additional measures.

- Evergy should continue to push for free shipping on all its online products. This will become increasingly important as sales of LEDs are discontinued in the next program year.
- Evergy should consider creating product bundles, such as home security bundles. This would increase the overall transaction amount and also make it easier for customers to purchase and install this equipment (Utility Online Marketplace Strategies).

Income-Eligible Multi-Family Recommendations

- When multiple models of a measure are installed in a project, create separate records for each model number. Savings are calculated using model specifications and would be easier to verify if each savings were calculated separately for each distinct equipment model number.
- Add waste heat factors and coincident factors drawn from Illinois Technical Reference Manual (IL TRM) to reported custom lighting savings calculations.
- Correct baseline efficiency values for IEMF - ASHP SEER 16 - replace ASHP ER: MF measure to reflect early replacement versus time-of-sale efficiency.
- Add clothes washer and dishwasher measures to Evergy Technical Reference Manual (Evergy) TRM that specify water heater fuel type.
- ADM recommends the collection of additional documentation by the implementer in the form of an attestation that HVAC units categorized as early replacement were in working order at the time of replacement. ADM will work with both implementation and Evergy program staff to ensure the operating status of early replacement HVAC units in the program is being included as part of the data collection.

Home Energy Report Recommendations

- Work with ADM to include more information about when customers stop receiving reports. Many customers are filtered out of the analysis for not having enough post-period data for the months in PY3. While it is likely that many of these customers are no longer a part of the program, it would be beneficial to include a data field that informs us of exactly when that occurs. This will help ADM perform a more robust data validation process and ensure that no customers are unintentionally removed from the analysis.
- Evergy and Opower should continue efforts to make the information on home comparisons more salient. Given that the recent revisions to the report did not result in more thorough review by recipients, Evergy and Opower should consider carrying out additional research to determine what drives the thoroughness of report review and how to get customers to read them more thoroughly.

- Evergy should consider doing additional research to assess what increases motivation or intent to engage in the recommended behaviors. That information can be used to increase the effectiveness of its various outreach efforts and tools.
- If it has not yet done so, Opower may also consider discontinuing the practice of telling recipients (and Energy Analyzer users) they are being compared to their "neighbors". A one-mile radius encompasses far more homes than many individuals may consider to be a neighbor. This practice may reinforce an inaccurate interpretation of how the comparison is actually made.

Pay As You Save Recommendations

- Continue to refine and expand program tracking metrics. Improved program tracking metrics could provide Evergy staff with enhanced clarity of overall program operations as well as increase data available for M&V.

  Additional metrics that the implementer could include in quarterly reports are:

  - Number of completed audits
  - Conversion rate (audits/number of participants)
  - Number of program dropouts
  - Program enrollment processing time
  - Average loan amounts for Evergy customers

  Additional information that would benefit M&V activities include:

  - Blower door test ratings before and after installations
  - Efficiency ratings of old and new equipment
  - R-values before and after installations
  - Complete tracking of heating fuel type
  - Tracking of premises for which program installations will yield significant changes in electric consumption (e.g., tracking of premises without cooling equipment prior to program installation)
- Update reported savings calculations to account for heating fuel type as well as the presence of cooling equipment.
- Provide implementation's modelled home energy savings estimates to ADM for review. Comparisons to implementation's modeled savings as well as input variables would enable beneficial benchmarking of the reported, TRM-derived savings as well as of the impact evaluation findings.

- Continue to monitor regression-derived savings estimates. As the program continues to enroll more participants and as more post-installation billing data is available for participants from the 2022 program year, the regression analysis will likely improve in validity.
- Review the participant application process to ensure that income eligible participants are aware of other low-cost options available to them. Twenty-three percent of surveyed participants (and 16% of full participants) reported income levels that would qualify their families for other income-qualified programs offered by Evergy.
- Continue to monitor free ridership and spillover rates to ensure that the program is continuing to reach its critical target markets.

Business Demand Response Recommendations

- The program implementer should continue to look for creative ways to market this program to smaller commercial and industrial customers by scaling the kW enrollment targets. This approach may be especially effective at reaching smaller customers in the rural Missouri West service territory.
- The program implementer should continue to develop customized tailored curtailment plans with facility managers. However, these plans may need to be reviewed during the DR season if customer usage changes unexpectedly. The program implementer should clarify for customers when load baselines are expected to change to minimize customer confusion and dissatisfaction.

Residential Demand Response Recommendations

- Evergy should continue to implement creative DR event strategies to minimize customer fatigue.
- The program implementer should conduct additional QA/QC to ensure that all respondents receive notification of upcoming events, which is the chief source of participant dissatisfaction. The implementer should also consider sending notifications through multiple channels, such as email and text, to ensure that program participants are aware of the upcoming DR event.
- The program implementer and Evergy should coordinate follow-up engagement strategies after each DR event. This would ensure that customers receive the notification promptly and understand the benefits of program participation.

Business Smart Thermostat Recommendations

- See the recommendations in the “Residential Demand Response Recommendations” section above.

Appliance Recycling Recommendations

- Add additional data collection requirements to the reporting fields for the program tracking data. This would allow for ARCA Recycling data to be combined with the tracking data allowing for easier calculations of savings. Additionally, this could catch errors in the data earlier in the year, allowing for changes to be made, such as the dehumidifier capacity being reported as a cubic feet capacity and not pints/day.
- Use the coincident peak demand savings from the Evergy TRM, not the nameplate demand savings to account for demand savings more accurately during peak events.
- Combine promotional efforts with other pilot programs. For example, the Appliance Recycling program could be promoted at the local libraries that are partnered with the Power Check program. This could attract an additional part of the community. Fliers could be added to the Power Check device boxes or attached to the trees given out with the Energy-Saving Trees program, assuming the locations coincide with the Appliance Recycling targeted area.
- Evaluation surveying efforts could be conducted to confirm the unit characteristics, verify the unit was in working condition and determine the participant satisfaction with the program. If the pickup location was a basement, the survey should include a question on if the basement is conditioned or not.

BPI Certification Recommendations

- Evergy staff should continue this pilot in 2023. Specifically, the staff should work with the implementation contractor to identify additional contractors, especially those who support other Evergy Diversity, Equity and Inclusion (DEI) initiatives, to increase the quality and availability of contractors to support Evergy's residential programs.

Energy Efficiency Nonprofits Recommendations

- Evergy should follow up with program participants in six months after measure installation. This follow-up will help remind these participants of the available energy savings opportunities, particularly the recommendations identified through the energy audit.

Energy-Saving Trees Recommendations

- Send follow-up emails to monitor the tree delivery and follow-up care to ensure that all trees remain healthy and are planted promptly.
- Continue to offer driveway drop-offs to ensure that the trees are delivered to the program participants.

- Explore strategies to increase program participation among low and moderate-income residents in these urban areas. This may include reaching out to landlords to increase participation among low-income renters.
- Conduct additional surveying efforts to better understand where participants are planting their trees. This may include additional questions to obtain the quantitative data needed for the correct adjustments to be made.

Market-Rate Multi-Family Recommendations

- Evergy should consider removing the current MEEIA restrictions of buildings with four or more units to open up this program to a broader pool of building professionals. This includes those who typically specialize in single-family residences.
- The program should continue to reach out to property owners rather than property managers, as they are the decision-makers.

Power Check Recommendations

- Evergy should continue to cover all of the program costs to improve participation and target smaller, regional businesses with multiple locations instead of small mom-and-pop businesses with single locations.

2.5.2 Program Satisfaction

Table 2-14 below summarize customer and trade ally program satisfaction analyzed over the MEEIA Cycle III PY3. Customers and trade allies were asked to rank their satisfaction with the respective programs in which they participated. Ninety-one percent of participants and 90 percent of all trade-allies surveyed in the HCHC Program were satisfied with the program overall. The consistently high satisfaction scores among program participants and trade allies are indicative of Evergy's leadership and Product Managers focus on addressing their specific market needs, removing barriers to participation, offering an extensive and comprehensive array of measures, and broadening means of communicating with customers and key market players.

Table 2-14: Overall Program Satisfaction Reported by Program Participants[16]

Program Name	Overall Program Satisfaction
Heating, Cooling and Home Comfort	91% (Participants)
	90% (Trade Allies)
Business Demand Response	68%
Residential Demand Response	77%
Business Smart Thermostats	100%
Energy-Saving Trees	89%

[16] Programs included in Table 2-14 had a full process evaluation completed in 2022. For all other programs not listed, either a complete process evaluation was not performed, the survey was not managed by ADM, or there was no program satisfaction to report (such as the ESP Program).

3 Impact Evaluation Approaches

This report section describes the impact evaluation activities that ADM performed for Evergy's MEEIA Cycle III Residential and Demand Response Programs

In accordance with the Missouri Energy Efficiency Investment Act (MEEIA) Rules and the Stipulation and Agreement, Evergy Services, Inc. (ESI) (hereafter referred to as Evergy) on behalf of its affiliates Evergy Missouri West and Evergy Metro, has contracted with ADM Associates to evaluate, measure, and verify the information tracked by Evergy Missouri West and Evergy Metro for its portfolio of five residential programs, three demand response programs, and seven products and services incubator programs for PY3 beginning January 1, 2020 through December 31, 2023. Specific Evergy programs covered by this evaluation include:

Residential Programs:

- Heating Cooling & Home Comfort
- Energy Savings Products
- Income-Eligible Multi-Family
- Home Energy Report
    - Income-Eligible Home Energy Report: Metro Only
- Pay As You Save

Demand Response Programs:

- Business Demand Response
- Residential Demand Response
- Business Smart Thermostats

Products & Services Incubator Programs:

- Appliance Recycling
- BPI Certification
- Energy Efficiency Nonprofits
- Energy-Saving Trees
- Market Rate Multi-Family
- Power Check
- Virtual Energy Management for Small Business

In accordance with the Missouri Code of State Regulations 20 CSR 4240-22.070 (8) (Missouri regulations), Evergy is required to complete an impact evaluation for each program using one or both methods detailed below.

Impact evaluation methods 1: *At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:*

a. *Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other inter-temporal differences; and*

b. *Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same period.*

Load impact measurement protocols 2: *The* evaluator *shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:*

a. *Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or*

b. *Audit and survey data on appliance and equipment type, size and efficiency levels, household characteristics, or energy-related building characteristics.*

Table 3-1 presents ADM's methods and protocols for the impact evaluation with the associated Missouri requirement.

Table 3-1: Missouri Regulations Impact Evaluation Methods and Protocols

Sector	Program	Impact Evaluation Method	Impact Evaluation Protocol
Residential	Heating Cooling & Home Comfort	1a	2b
	Energy Saving Products	1a	2b
	Income-Eligible Multi-Family	1a	2b
	Home Energy Report	1b	2a
	Pay As You Save	1a	2b
Demand Response	Business Demand Response	1a	2a
	Residential Demand Response	1b	2a
	Business Smart Thermostats	1b	2a
Products & Services Incubator	Appliance Recycling	1a	2b
	BPI Certification*	N/A	N/A
	Energy Efficiency Nonprofits	1a	2b
	Market Rate Multifamily	1a	2b
	Power Check*	N/A	N/A
	Energy-Saving Trees	1a	2b
	Virtual Energy Management for Small Business*	N/A	N/A

*These programs had no reported impact evaluations in PY3.

3.1 Data Collection and Measure Verification

ADM reviewed data tracking systems associated with the program to ensure that the data provides sufficient information to calculate energy and demand impacts. The data review included an assessment of whether savings reported in the tracking system comply with energy savings calculations and guidelines set by the Evergy TRM. The Evergy TRM stipulated the source of the savings algorithms used to calculate energy and demand savings for each measure in the programs in 2022. The Evergy TRM was submitted prior to the beginning of the program year. The main source from the Evergy TRM that was used to calculate energy and demand savings was the IL TRM. If a measure could not be sourced from the IL TRM, a different source was used and noted in Appendix M of the Appendices Report.

Data sources used for the evaluation of programs for which ADM calculated kWh and kW impacts are reported in Table 3-2 below.

Table 3-2: Data Sources Used for Residential and Demand Response Program Evaluation

Data Sources Used	Heating Cooling and Home Comfort	Energy Savings Products	Income Eligible Multi-Family	PAYS	Home Energy Report	Business Demand Response	Residential Demand Response	Business Smart Thermostats	Products & Services Incubator
Program tracking data from Nexant's Energy Data tracking system	X	X	X	X	X	-	X	X	X
Program tracking data from Evergy's Distributed Energy Management Resource System (DERMS).	-	-	-		-	X	-	-	
Unit savings algorithms from the Evergy Technical Reference Manual	X	X	X-	X	-	-	-	-	X
Program applications and supporting documentation;	X	-	-	-	-	-	-	-	-
Participant survey data collected through online survey	X	-	-	-	X	-	-	-	X
Property manager survey data	-	-	X	-	-	-	-	-	-
General population survey data from Evergy customers obtained via online survey	X	X	-	-	X	-	-	-	-
Secondary data from ENERGY STAR® databased of Certified Products and/or AHRI	X	X	X	-	-	-	-	-	-
Geospatial map (shapefile) of Evergy Missouri West and Evergy Missouri Metro service territories	-	X	-	-	-	-	-	-	-
Billing Consumption Data (Monthly)	-	-	-	-	X	-	-	-	-
Billing Consumption Data (15 Minute Interval)	-	-	-	-	X	X	-	-	-
Schedule of Program Events	-	-	-	-	-	X	X	X	-
National Oceanographic and Atmospheric Administration (NOAA) Weather Data	-	-	-	-	X	X	X	X	-

Table 3-3 below summarizes the data collection activities and corresponding impact evaluation research objectives.

Table 3-3: Summary of Approaches and Data Collection

Data Collection Activity	Impact Evaluation Research Objectives
Program Tracking Data Review and Audit: Nexant iEnergy & DERMS	Verify that the tracking data provides sufficient information to calculate energy and demand impacts
	Verify proper application of unit energy savings estimates and algorithms
	Audit data to insure there are no duplicate or erroneous entries
Online Participant Survey	Verify measure installation
	Assess customer purchasing and decision-making processes; estimate net-to-gross ratio
	Assess customer satisfaction with measures and overall program
General Population Survey	Verify upstream measure installation
	Assess customer purchasing and decision-making processes; estimate net-to-gross ratio
	Assess customer satisfaction with recent purchases of program promoted measures
	Determine drive times for leakage analysis
Program applications and supporting documentation	Verify tracking data inputs
Secondary data from ENERGY STAR® databased of Certified Products and or AHRI	Verify claimed wattage and HVAC SEER
Billing Consumption Data	Inputs in regression models
Schedule of Program Events	
National Oceanographic and Atmospheric Administration (NOAA) Weather Data	

Table 3-4 below summarizes sample sizes for each evaluated program.

Table 3-4: Sample Size by Program

Program	Measure	Sample Size
Heating Cooling & Home Comfort	DI Kit Measures	Census of participants
	Home Envelope and Weatherization Measures	
	Energy-Efficient HVAC Equipment	
Energy Savings Products	LED Lighting Rebates	Sample of 15,000 Evergy customers
	LED Thank You Kits	Sample of 2,000 participants
Business Demand Response	Commercial Customer Incentive	Census of participants
Residential Demand Response	Residential Customer Incentive	Census of participants
Business Smart Thermostats	Commercial Smart Thermostats	Census of participants
Pay-As-You-Save	DI Kit Measures, Financed Measures	Census of participants
Products & Services Incubator - Energy Saving Trees	Trees	Census of participants
Products & Services Incubator - Appliance Recycling	Recycled Refrigerators, Freezers, Dehumidifiers, and Room ACs	Census of participants

3.1.1 Estimating Net Savings

Net-to-Gross Ratio

Program implementation is designed to minimize free-ridership and maximize net-to-gross ratios, while ensuring the program does the following: appropriately influences customer decisions, accurately tracks and verifies equipment and its installation, and drives market transformation.

ADM used self-reported data collected as part of program participant, general population, and trade ally surveys, to assess free ridership. A separate free ridership estimate was developed for each category of measures by program. ADM assessed spillover at the program level as described below.

Self-report approaches were used for both free ridership and spillover assessment. Self-report free ridership assessment relied upon responses from program participants. Program participants were identified from the tracking data.

Free Ridership

The free ridership self-report uses participant surveys to develop an estimate of savings that would have occurred absent the program. Data was collected on contextual factors that influence customers' decisions in addition to customers' perceptions of program influence to estimate free ridership. Customers were asked questions about the circumstances around the decision to implement measures. The surveys focused on factors that limit energy efficiency investments that the program may directly address. For example,

- Would the customer still have installed the measure or allocated the money for the efficiency improvement without the program incentive?
- Did the customer already have plans to install the equipment before learning of the program or is the program effectively reaching customers who would otherwise not be engaged in making the efficiency improvement?
- Did the customer have previous experience with similar efficiency measures that demonstrate a familiarity with them? Were they aware that they could save on energy costs before exposure to program informational support such as energy audits?

The participant surveys included questions that directly ask customers to estimate the influence of the program and/or their likelihood of taking the same action if the program was not available. The responses to the questions about the decision-making context provide more information to help make decisions about program design and implementation than responses to rating scale questions.

For some projects, there may be program influences that are not directly observable by program participants. In such cases the participant's response creates an incomplete picture of the program's influence. For example, a contractor's recommendation may have influenced a customer's decision and that contractor's recommendation may have in turn been influenced by the program. In the case of the HCHC program, the ADM evaluation team used enhanced self-report methodologies that incorporated self-reports from other market actors in addition to participant self-reports.

Survey respondents were asked a series of questions to elicit feedback regarding influences on their decision to participate in the program. Each respondent was assigned a free ridership score based on a consistent free ridership scoring algorithm. The participant surveys, trade ally surveys, and a flow chart showing the free ridership scoring algorithm from the survey are provided in the accompanying appendices.

Participant and Non-Participant Spillover

Spillover refers to energy-saving purchases or actions that result from program influence but did not receive direct program support, such as incentives. This can occur both with participants and non-participants. Among participants, the program influence typically is understood to be the program participation itself. Among non-participants, the program influence could result from program marketing or outreach, including engagement with program representatives or trade allies. “Like spillover” refers to program-induced actions participants make outside the program that are of the same type as those made through the program.

Like spillover for measures similar to what is offered through each program was assessed by asking survey respondents and the general population of Evergy customers (participants and non-participants) if they have implemented any efficient equipment in the service territory without receiving a program incentive. Respondents that indicate that they did implement such equipment were asked a series of follow-up questions to facilitate estimation of the energy savings associated with the equipment and to assess the program’s influence on the equipment implementation.

Establishing Free Ridership and Spillover Values

Some programs received new research to establish free ridership and spillover values in 2022, while some programs used carryover values from prior program years or were assigned a deemed overall net-to-gross value. Table 3-5 outlines the sources of free ridership and spillover values for PY3.

Table 3-5: PY3 Free Ridership and Spillover Sources

Program	Source	Method	Year Determined
Free Ridership			
Heating, Cooling and Home Comfort	Participant Survey	Calculated	2023
Pay As You Save	Participant Survey	Calculated	2023
Energy Saving Products – Upstream Rebates	General Population Survey	Calculated	2023
Energy Saving Products – Online Marketplace	Participant Survey	Calculated	2021
Energy Saving Products – Thank You Kit	Participant Survey	Calculated	2023
Spillover			
Heating, Cooling and Home Comfort	Participant Survey	Calculated	2023
Pay As You Save	Participant Survey	Calculated	2023
Energy Saving Products – Upstream Rebates	Benchmarking study	Deemed	Benchmark study conducted: 2022 Referenced studies: 2016-2020
Energy Saving Products – Online Marketplace	Benchmarking study	Deemed	
Energy Saving Products – Thank You Kit	No spillover applied		
Other Programs			
Energy Saving Products – Giveaway Hub	ADM assumed a NTG value of 1.0 for these programs/program channels, or the program was designed as a randomized control trial.		
Home Energy Report			
Income-Eligible Multi-Family			
Products & Incubator Programs			
Business Demand Response			
Residential Demand Response			
Business Smart Thermostats			

4 Process Evaluation Approach

This chapter describes the process evaluation activities that ADM performed for Evergy's Residential & Demand Response programs.

The process evaluations included the following activities:

- In-depth interviews with Evergy program staff and implementation staff along with annual reviews of the program database and materials
- Participant surveys
- Trade ally survey
- General population survey
- Feedback from surveys and/or interviews with program contractors and installers

4.1 Program Tracking Review

The first critical task was to review the program databases that complemented the impact evaluation review of the program databases. Specifically, this review determined that the program databases are capturing all critical information. The database review included summaries of the essential program metrics such as:

- Number of measures installed by program and program delivery channel
- Number of unique participants by program and by jurisdiction relative to program participation estimates
- Review of unit level savings assumptions

4.2 Program Staff and Implementer Interviews

ADM conducted interviews with both Evergy program staff and implementation staff. ADM conducted interviews with the utility program staff responsible for deploying the programs. The in-depth interviews were conducted though video conferences. These interviews discussed the respondent's roles and responsibilities for the program, the effectiveness of current program design, assessed overall program operations, outreach and marketing approaches, customer and contractor satisfaction, barriers to participation and areas for program improvement.

ADM also conducted interviews with appropriate staff from the various implementation contractors involved in program operations, as well as any program partners. The in-depth interviews were conducted via video conference. Discussions covered the same process evaluation topics as mentioned above to ensure consistency across interview guides.

4.3 Trade Ally Surveys

ADM conducted trade ally surveys to provide additional information regarding specific downstream and midstream program activities. The annual online survey of trade allies for the HCHC Program included questions addressing program awareness, barriers to program participation, current installation rates and market trends, and program satisfaction.

4.4 Participant Surveys

ADM conducted participant surveys as part of the process and impact evaluation in 2022. These surveys were almost exclusively conducted via online through email invite (with the exception of the HCHC Program)[17] and assessed satisfaction and customer decision-making, identified areas for program improvement, and included questions regarding free ridership and spillover (if applicable).

The programs that had ADM-managed surveys in 2022 are listed below:

- Heating, Cooling, and Home Comfort Program
- Energy Saving Products Program (Thank You Kit only)
- Pay As You Save Program
- Business Demand Response Program
- Residential Demand Response Program
- Business Smart Thermostat Program
- Products & Services Incubator - Energy Saving Trees Program

For a summary of sample sizes for each evaluated program, see Table 3-4. Detailed information regarding each survey and the results are included in each program section (Appendix C through Appendix K) in the Appendices Report.

[17] In 2022, 30 phone surveys were completed to supplement the online survey for the HCHC Program.

4.5 General Population Survey

ADM conducted an online general population survey in the residential sector for PY3 MEEIA 3 program cycle. The purpose of this survey was to:

1. Provide insights regarding overall awareness of Evergy's program offerings among program participants and non-participants

2. Assess the influence of programs and trade allies (contractors and distributors) on equipment purchases to assess spillover rates

Evergy customer records were used to develop the sample frame for the general population survey. The sample and programed survey link was developed by ADM and provided to the Evergy customer engagement team to send out. This approach allowed Evergy to operate within the customer email contact guideline while allowing ADM to independently collect the data necessary for the evaluation effort. The survey was deployed once at the end of the program year.

5 Cost-Effectiveness Approach

5.1 Calculation

Cost-effectiveness ratios were calculated using an Excel based model that incorporated ADM-verified EM&V findings, including energy and demand impacts, incremental costs, NTG ratios, and measure lifetimes. Avoided costs, discount rates, and program data were provided by Evergy. Incremental costs were calculated using inputs from the Evergy PY3 TRM. A table listing cost effectiveness calculation inputs is provided in Section 5.3.

5.2 Cost Tests Utilized

ADM performed the PCT, RIM, UCT, TRC, and SCT for PY3. These tests help to provide a wholistic perspective on the program's annual cost effectiveness.

MEEIA Cycle III uses the TRC test as "the preferred cost effectiveness test" to measure program cost effectiveness. In addition to TRC results, ADM completed four other cost effectiveness tests to provide a more comprehensive view of each program.

Each test is useful and accurate and is intended to answer a distinct set of questions. The questions to be addressed by each cost test[18] are shown in Table 5-1.

[18] National Action Plan for Energy Efficiency (2008) Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. *Energy and Environmental Economics, Inc., and Regulatory Assistance Project*. *Last accessed March 2020 via:* https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf

Table 5-1: Questions Addressed by the Various Cost Tests

Cost Test	Questions Addressed
Total Resource Cost Test	■ What is the regional benefit of the energy efficiency project including the net costs and benefits to the utility and its customers? ■ Are the benefits greater than the costs (regardless of who pays the costs and who receives the benefits)? ■ Is more or less money required by the region to pay for energy needs?
Utility Cost Test (also referred to as the Program Administrator Cost Test or PACT)	■ Do total utility costs increase or decrease? ■ What is the change in total customer bills required to keep the utility whole?
Ratepayer Impact Measure	■ What is the impact of the energy efficiency project on the utility's operating margin? ■ Would the project require an increase in rates to reach the same operating margin?
Societal Cost Test	■ What is the overall benefit to the community of the energy efficiency project? ■ Are the benefits greater than the costs (regardless of who pays the cost and who receives the benefits)?
Participant Cost Test	■ Is it worth it to the customer to install energy efficiency? ■ Is the customer likely to want to participate in a utility program that promotes energy efficiency?

The results of all five-cost effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC and SCT cost tests help to answer whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM help to answer where the selection of measures and design of the program is balanced from participant, utility, and non-participant perspectives, respectively. The scope of the benefit and cost components included in each test ADM performed are summarized in Table 5-2.

Table 5-2: Summary of Benefits and Costs Included in Cost-Effectiveness Test

Test	Benefits	Costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ■ Applicable tax credits	■ Program overhead costs ■ Program installation costs ■ Incremental measure costs
UCT (Perspective of utility, government agency, or third party implementing the program)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation	■ Program overhead costs ■ Utility/program administrator incentive & installation costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	■ Program overhead costs ■ Utility/program administrator incentive & installation costs ■ Lost revenue due to reduced energy bills
SCT (Benefits and cost to all in the utility service territory, state, or nation)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	■ Program overhead costs ■ Program installation costs ■ Incremental measure costs
PCT (Benefits and costs from the perspective of the customer installing the measure)	■ Incentive payments ■ Bill Savings ■ Applicable tax credits or incentives	■ Incremental equipment costs ■ Incremental installation costs

5.3 Source of Cost Effectiveness Input Data

The inputs and sources utilized for the cost effectiveness calculations are outlined in Table 5-3.

Table 5-3: Inputs and Sources for Cost Effectiveness Calculations

Input	Source
Avoided energy costs	Provided by Evergy
Avoided capacity costs	
Retail rates	
Load shapes	
Discount rates	
Line loss factors	
Program Costs	
EUL	Evergy TRM and IL TRM[19]
Equipment Costs	
Energy and peak demand savings	ADM program evaluations
NTG	
Program Incentives	Program Tracking Data

[19] If the EUL was not specifically listed for a measure in the Evergy TRM, the EUL was pulled from the IL TRM.

6 Evaluation Methodology by Program

6.1 Heating, Cooling and Home Comfort

The Heating, Cooling, and Home Comfort Program provides educational and financial incentives to residential customers by increasing awareness and incorporation of energy efficiency into their homes, while also generating cost-effective energy and demand savings for Evergy. The program encourages home improvements that increase operational energy efficiency and home comfort. It consists of four primary components: 1) Energy Savings Kit (ESK), 2) Online Marketplace, 3) Insulation and Air Sealing, and 4) HVAC as show in Table 6-1.

The program seeks to provide financial incentives on a variety of categorically applicable measures and drive market adoption of energy efficient measures and practices through the education of customers and the community of local contractors. This program is eligible to customers that own or rent a residence or are building a new residence. HVAC contractors are also eligible for participation as trade allies for the program. In 2022, energy-efficient equipment sold through an Online Marketplace was added to the program where customers could purchase measures such as LED lightbulbs, faucet aerators, low flow showerheads, and advanced power strips. In PY3, customers could receive the following eligible energy-efficient equipment/upgrades through the following program components:

Table 6-1: Program Components and Equipment Offered

Program Component	Measure
Energy Savings Kit*	LED Lightbulbs
	Faucet Aerators
	Low Flow Showerheads
	Pipe Insulation
	Advanced Power Strips
Online Marketplace	LED Lightbulbs
	Faucet Aerators
	Low Flow Showerheads
	Advanced Power Strips
Insulation and Air Sealing	Attic/Ceiling Insulation
	Air Sealing
HVAC	Central AC
	Air Source Heat Pump
	Ground Source Heat Pump
	Ductless Mini-Split Heat Pump
	AC Mini-Split

*There was one furnace filter alarm included in the Energy Savings Kit Program in 2022.

Performance metrics for 2022 are summarized in Table 6-2. Overall, gross verified energy savings were close to the targeted value, while the gross verified peak demand savings exceeded the targeted value.

Table 6-2: Performance Metrics - Heating, Cooling, and Home Comfort Program

Metric	PY3 Total	MO West	MO Metro
Number of Participants*	5,436	3,111	2,325
Energy Savings (kWh)			
Targeted Energy Savings	15,893,305	8,338,188	7,555,117
Reported Energy Savings	11,015,961	6,674,569	4,341,392
Gross Verified Energy Savings	9,318,475	5,572,188	3,746,287
Net Verified Energy Savings	6,750,594	3,865,891	2,884,703
Peak Demand Reduction (kW)			
Targeted Peak Demand Savings	6,134.80	3,654.69	2,480.11
Reported Peak Demand Savings	6,619.02	4,077.65	2,541.36
Gross Verified Peak Demand Savings	6,266.64	3,820.26	2,446.38
Net Verified Peak Demand Savings	4,426.46	2,554.26	1,872.20
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	1.04	0.99	1.11

*Represents the number of unique account numbers in the program.

6.1.1 Gross Impact Methodologies

The methods used to calculate and verify energy savings (kWh) and peak demand reduction (kW) consisted of:

- Program tracking data census. The tracking data was reviewed for a census of homes and measures. The data was verified for duplicate participation within the program and to ensure there were no discrepancies within the tracking data.
- Measure installation verification. In-service rates (ISR) were calculated by measure for a sample of program participants using data from the participant survey.
- HVAC efficiency verification. The AHRI data from a sample of approximately 151 HVAC units (70 central ACs, 40 air source heat pumps, 20 ground source heat pumps, 20 ductless mini-split heat pumps, and one A/C mini-split) and from the program were pulled. The efficient SEER and EER values reported in the tracking data were then verified using the AHRI database for each unit.
- Reported savings review. Reported savings calculations were reviewed for all measures to determine the cause of savings discrepancies.

- Standard for verification of savings. The calculation of gross energy savings and demand impacts primarily relied on energy savings values and algorithms from the Evergy TRM. The data collected from the participant survey, along with program tracking data were used as inputs to the savings algorithms as outlined in the Evergy TRM.

6.1.2 Net-to-Gross Estimation

The net to gross estimation for the program includes calculation of measure-level free ridership score, project-level free ridership score, and spillover score. The participant survey included questions aimed at estimating program attribution and identifying spillover measures. Survey respondents were asked a series of questions aimed at determining the program influence on the purchase decisions for each installed measure. Each respondent was assigned a free ridership score (ranging from 0 for no free ridership to 1 for complete free ridership) based on their responses for each measure they had installed. The measure-level free ridership of each survey participant was then weighted by the measure energy savings and averaged to determine the project-level free ridership score. This score was applied to the other measures where a survey response was not obtained.

6.1.3 Impact Evaluation Summarized Findings

Table 6-3 through Table 6-5 summarize the verified gross and net energy and demand savings for the HCHC Program.

Table 6-3: Program Gross Energy Savings (kWh) and Peak Demand Reduction (kW) - Heating, Cooling, and Home Comfort Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reductions (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reductions (kW)	RR (kWh)	RR (kW)
MO West	6,674,569	4,077.65	5,572,188	3,820.26	83%	94%
MO Metro	4,341,392	2,541.36	3,746,287	2,446.38	86%	96%
Total	**11,015,961**	**6,619.02**	**9,318,475**	**6,266.64**	**85%**	**95%**

Table 6-4: Verified Gross and Net Annual Energy Savings (kWh) - Heating, Cooling, and Home Comfort Program

Jurisdiction	Spillover (Participant)	Spillover (Non-Participant)	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	2.0%	6.7%	39.3%	69.4%	5,572,188	3,865,891
MO Metro	2.0%	6.7%	31.7%	77.0%	3,746,287	2,884,703
Total	**2.0%**	**6.7%**	**36.2%**	**72.4%**	**9,318,475**	**6,750,594**

Table 6-5: Verified Gross and Net Peak Demand Reduction (kW) - Heating, Cooling, and Home Comfort Program

Jurisdiction	Spillover (Participant)	Spillover (Non-Participant)	Free Ridership	NTG Ratio	Gross Verified Demand Reductions (kW)	Net Demand Reductions (kW)
MO West	2.0%	6.7%	41.8%	66.9%	3,820.26	2,554.26
MO Metro	2.0%	6.7%	32.2%	76.5%	2,446.38	1,872.20
Total	**2.0%**	**6.7%**	**38.0%**	**70.6%**	**6,266.64**	**4,426.46**

6.2 Energy Saving Products

The Energy Saving Products Program focuses on promoting, cultivating, and facilitating the adoption of energy efficient products in residential settings. The program has been designed with two key focuses:

- *Education* – the expansion of both residential customer and sales associate knowledge of and familiarity with the advantages of various energy efficient products available; and
- *Efficient Product Adoption* – market transformation resulting from increased awareness of the benefits of energy efficient technology and is supported through financial, point-of-sale incentives for the purchase of products that meet high efficiency standards.

Through the ESP Program, customers can receive instant discounts for a variety of efficient measures. From 2020 to 2021 these included a selection of LED lighting measures, including standard, specialty, and smart bulbs. In 2021, non-lighting measures were added such as showerheads, aerators, and advanced power strips through the online marketplace.

In 2022, the ESP Program included several different channels from which customers could participate. These channels include upstream rebates at retail outlets and an online marketplace. In addition, two different kit distribution methods were employed in 2022: Thank You Kits and Giveaway Hub. Thank You Kits were shipped to customers free of charge and without the customer opting in or making a request. Customers were targeted from previous HVAC program participants, specifically targeting renters or homeowners with large homes and thus a large number of sockets for LED applications. Thank You Kits included 4 bulbs from each of the following bulb types: A19, BR30 and Globe. The Giveaway Hub Channel targeted customers in predominantly low-income zip codes and customers opt-in to receive the kit in the mail. For Giveaway Hub, the kit included a 6-bulb package of A-19s.

The upstream Rebate and Thank You Kit channels were implemented by ICF while the Online Marketplace and Giveaway Hub channels were implemented by Uplight.

Figure 6-1 provides the expected kWh savings distribution in 2022 by channel. Eighty-four percent of expected savings come from the upstream Rebate channel, fifteen percent come from Thank You Kits, and less than two percent come from the other channels.

Figure 6-1: Expected kWh Savings by Channel

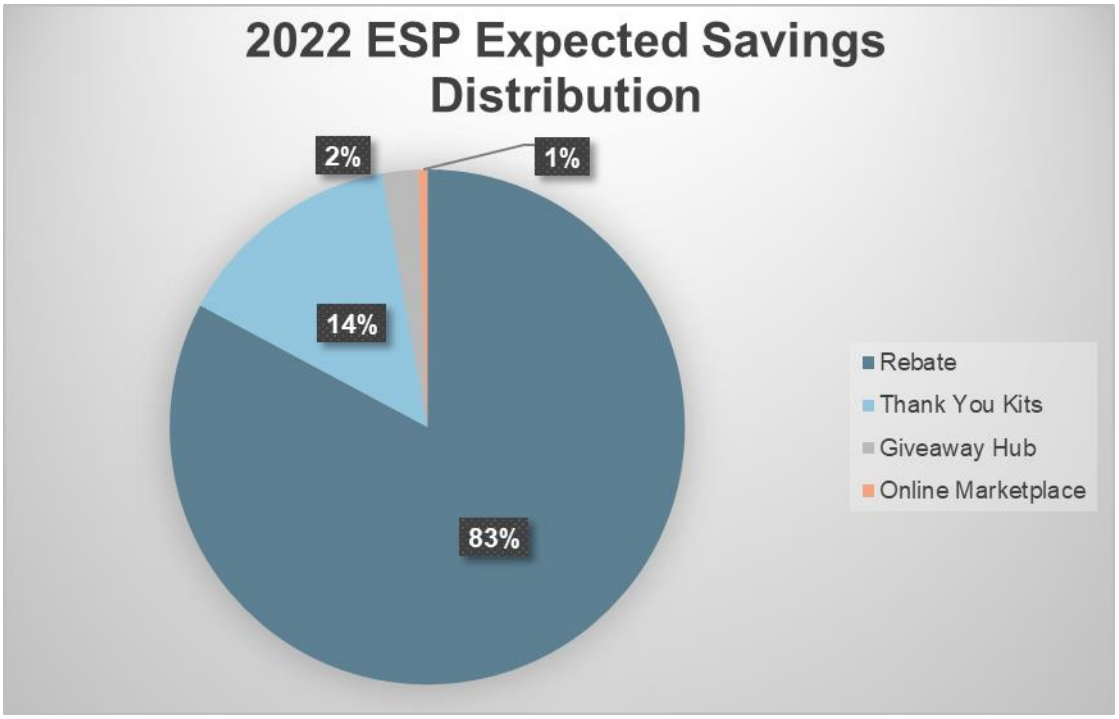

Table 6-6 provides a summary of program metrics for the 2022 program year. Verified energy savings far exceeded program targets but fell slightly short of the reported energy savings.

Table 6-6: Performance Metrics – Energy Saving Products Program

Metric	PY3 Total	MO West	MO Metro
Number of Rebated Packages	404,942	224,480	180,462
Energy Savings (kWh)			
Targeted Energy Savings	15,634,241	8,079,124	7,555,117
Reported Energy Savings	56,372,523	30,927,705	25,444,819
Gross Verified Energy Savings	52,821,956	29,198,473	23,623,482
Net Verified Energy Savings	30,792,086	17,710,898	13,081,188
Peak Demand Reductions (kW)			
Targeted Peak Demand Reduction	1,140.18	581.83	558.35
Reported Peak Demand Reduction	7,303.26	4,000.05	3,303.21
Gross Verified Peak Demand Reduction	6,932.85	3,864.89	3,067.97
Net Verified Peak Demand Reduction	4,044.21	2,342.61	1,701.60
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	3.08	2.68	3.82

6.2.1 Data Sources

Several primary and secondary data sources were used for the evaluation. Tracking data and supporting documentation for the program was obtained from the program implementor. This tracking data was used as the basis for quantifying participation and assessing program impacts. A general population survey was sent to a randomly selected, representative sample of Evergy's residential customers. In addition, a survey was sent to Thank You Kit recipients. ADM also conducted in-depth interviews with program staff at Evergy and the implementation contractor to gain a better understanding of ESP's program design, operations, challenges, and future opportunities.

6.2.2 Gross Impact Methodologies

Reported energy and peak demand impacts for the program were calculated using savings algorithms from the Evergy TRM. ADM's evaluation consisted of: (1) reviewing the assumptions and inputs associated with the energy savings values, (2) calculating verified per-unit impacts and (3) making appropriate adjustments for in-service rates and cross sector sales based on survey responses.

6.2.3 Net-to-Gross Estimation

The program Net-to-Gross ratio was calculated using responses from surveys of participants and customers to determine the free-ridership rate for each program channel and/or jurisdiction. Program spillover was estimated based on a review of spillover rates for similar programs in other states. Additional details regarding the program net-to-gross ratio estimation are available in Appendix A in the Appendices Report.

6.2.4 Impact Evaluation Summarized Findings

The tables below summarize the verified gross energy and demand savings for the ESP Program by jurisdiction and channel.

Table 6-7: Gross Energy Savings (kWh) - Energy Saving Products Program

Jurisdiction	Channel	Reported Energy Savings (kWh)	Gross Verified Energy Savings (kWh)	RR (kWh)
MO West	Rebate	24,953,403	26,341,776	106%
MO Metro	Rebate	21,736,358	21,526,871	99%
MO West	Thank You Kits	5,272,271	1,997,838	38%
MO Metro	Thank You Kits	2,821,014	911,693	32%
MO West	Giveaway Hub	511,843	752,452	147%
MO Metro	Giveaway Hub	759,586	1,115,787	147%
MO West	Marketplace	190,188	106,407	56%
MO Metro	Marketplace	127,861	69,131	54%
Totals		**56,372,523**	**52,821,956**	**94%**

Table 6-8: Gross Peak Demand Savings (kW) - Energy Saving Products Program

Jurisdiction	Channel	Reported Demand Reduction (kW)	Gross Verified Demand Reduction (kW)	RR (kW)
MO West	Rebate	3,214.46	3,494.54	109%
MO Metro	Rebate	2,817.14	2,803.90	100%
MO West	Thank You Kits	698.87	264.64	38%
MO Metro	Thank You Kits	376.45	118.70	32%
MO West	Giveaway Hub	63.23	92.03	146%
MO Metro	Giveaway Hub	93.83	136.46	145%
MO West	Marketplace	23.49	13.69	58%
MO Metro	Marketplace	15.80	8.90	56%
Totals		**7,303.26**	**6,932.85**	**95%**

Table 6-9 and Table 6-10 summarize the verified net impacts of the Energy Savings Products Program.

Table 6-9: Verified Gross and Net Annual Energy Savings (kWh) - Energy Saving Products Program

Jurisdiction	Channel	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)	NTG Ratio
MO West	Rebate	26,341,776	15,934,207	60%
MO Metro	Rebate	21,526,871	11,477,598	53%
MO West	Thank You Kits	1,997,838	927,950	46%
MO Metro	Thank You Kits	911,693	425,208	47%
MO West	Giveaway Hub	752,452	752,452	100%
MO Metro	Giveaway Hub	1,115,787	1,115,787	100%
MO West	Marketplace	106,407	96,290	90%
MO Metro	Marketplace	69,131	62,595	91%
Totals		**52,821,956**	**30,792,086**	**58%**

Table 6-10: Verified Gross and Net Peak Demand Reduction (kW) - Energy Saving Products Program

Jurisdiction	Channel	Gross Verified Demand Reduction (kW)	Net Demand Reduction (kW)	NTG Ratio
MO West	Rebate	3,494.54	2,112.97	60%
MO Metro	Rebate	2,803.90	1,500.67	54%
MO West	Thank You Kits	264.64	125.23	47%
MO Metro	Thank You Kits	118.70	56.40	48%
MO West	Giveaway Hub	92.03	92.03	100%
MO Metro	Giveaway Hub	136.46	136.46	100%
MO West	Marketplace	13.69	12.39	91%
MO Metro	Marketplace	8.90	8.06	91%
Totals		**6,932.85**	**4,044.21**	**58%**

6.3 Income-Eligible Multi-Family

The Income Eligible Multi-Family Program provides qualifying, income-eligible properties with assistance through energy assessments, program applications, technical support, and upgrade incentives. Evergy has contracted with ICF International Inc. to manage and implement the program. The program consists of three components: direct install, prescriptive, and custom measures. During 2022, the direct install measures included 5- and 6-watt specialty LED bulbs (candelabras and globes) and 9-watt general purpose LED bulbs that the implementation contractor installed in multi-family units. In addition to direct install measures, prescriptive measures were installed in existing multi-family units as part of updating inefficient equipment. The following prescriptive measures were installed through the program:

- Air source heat pumps
- Bathroom exhaust fans
- Central air conditioning units
- Dishwashers
- Clothes washers and dryers
- Programable and smart thermostats
- Refrigerators
- LED lighting

Custom projects included the replacement of in-unit and common area existing lighting with high-efficiency LED lighting and installation of a limited number of faucet aerators and low-flow showerheads with low-flow replacements.

Table 6-11 provides a summary of program metrics for the PY3. Reported annual energy savings exceeded program projections. Gross verified energy savings (kWh) had a 100 percent realization rate and a peak demand reduction (kW) had a realization rate of 86 percent. Program targets and PY3 savings are shown in Table 6-11.

Table 6-11: Performance Metrics - Income-Eligible Multi-Family Program

Metric	PY3 Total	MO West	MO Metro
Number of Sites	18	7	11
Energy Impacts (kWh)			
Targeted Energy Savings	2,342,925	1,181,931	1,160,994
Reported Energy Savings	2,144,360	633,124	1,511,236
Gross Verified Energy Savings	2,144,983	799,829	1,345,155
Net Verified Energy Savings	2,144,983	799,829	1,345,155
Peak Demand Impacts (kW)			
Targeted Peak Demand Reduction	450.37	222.82	227.55
Reported Peak Demand Reduction	455.68	71.64	384.04
Gross Verified Peak Demand Reduction	393.41	87.14	306.27
Net Verified Peak Demand Reduction	393.41	87.14	306.27
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	0.59	0.42	0.76

6.3.1 Data Sources

Data collection IEMF Program activities consisted of tracking data, program application and documentation, and interviews program staff. Evergy uses SightLine, a project tracking database, in conjunction with Nexant reporting services as its central tracking and reporting system. The process evaluation drew information from an in-depth interview with Evergy and ICF program staff.

6.3.2 Gross Impact Methodologies

ADM used the following steps to evaluate IEMF Program gross energy savings and peak demand reduction.

- Reviewed the program tracking data to determine the scope of the program and to ensure there were no duplicate or erroneous project entries.

- Reviewed all available data for each site including invoices, equipment cut sheets, pre- and post-inspection reports, and estimated savings calculators. This review process informed ADM's evaluation by identifying potential uncertainties and missing data, as well as providing model specifications and other measure characteristics.
- Calculated verified gross savings. The calculation of gross energy savings and demand impacts primarily relied on energy savings values and algorithms from the Evergy TRM. The program tracking data were used as inputs to the savings algorithms as outlined in the Evergy TRM.

6.3.3 Net-to-Gross Estimation

The NTG ratio for the IEMF Program is stipulated at 1.00, due to (1) the specific targeting of the low-income sector; and (2) the small contributions of the program to the overall portfolio saving, which do not justify the cost of conducting primary research needed to adjust the NTG ratio from stipulated values.

6.3.4 Impact Evaluation Summarized Findings

Table 6-12, Table 6-13 and Table 6-14 summarize the verified energy and demand savings for the IEMF Program.

Table 6-12: Program Gross Energy Savings (kWh) and Peak Demand Reduction (kW) - Income-Eligible Multi-Family Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	633,124	71.64	799,829	87.14	126%	122%
MO Metro	1,511,236	384.04	1,345,155	306.37	89%	80%
Total	**2,144,360**	**455.68**	**2,144,983**	**393.41**	**100%**	**86%**

Table 6-13: Verified Gross and Net Annual Energy Savings (kWh) - Income-Eligible Multi-Family Program

Jurisdiction	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	100%	799,829	799,829
MO Metro	100%	1,345,155	1,345,155
Total	**100%**	**2,144,983**	**2,144,983**

Table 6-14: Verified Gross and Net Peak Demand Reduction (kW) - Income-Eligible Multi-Family Program

Jurisdiction	NTG Ratio	Gross Verified Demand Reduction (kW)	Net Demand Reduction (kW)
MO West	100%	87.14	87.14
MO Metro	100%	306.27	306.27
Total	**100%**	**393.41**	**393.41**

6.3.5 Program Metrics

MEEIA Cycle III specifies two program metrics to be used in evaluating the performance of the IEMF Program.

- Average Percent Energy Savings per Project: "The Average Percent Energy Savings Per Project performance element will be calculated using a pre-project property energy benchmarking tool to identify each project's energy usage and the TRM's energy savings calculations. Each Program Year, the total number of projects will be divided by the total number of kWh's saved for a project average."[20]
- Spend of at least 85% of Budget: "The Spend of at least 85 percent of Budget performance element will create a threshold criterion that ensures at least 85 percent of the Commission-approved annual budget (administrative cost, plus customer incentive cost) for the program year is spent. The actual spend will be reported directly out of the Company's accounting system and included in the EM&V report. The Company will also provide a list of 'lock-in projects' and their locked-in date for inclusion for the program year spend."[21]

[20] MEEIA 3 (2019 – 2022) filing, Nov 29, 2018. pg 59
[21] MEEIA 3 (2019 – 2022) filing, Nov 29, 2018. pg 59

Average Percent Energy Savings per Project

ADM reviewed the total site consumption for each project reported in the program tracking data and calculated reported savings as a percentage of total site consumption prior to project completion. The average percentage energy savings per project was 19 percent. One new construction project was excluded from the calculation as no pre-treatment consumption existed. Another project was excluded because it involved HVAC fuel switching, therefore calculating percent savings where benchmark conditions did not include heating would not accurately reflect a percent electricity savings. Average percent savings by jurisdiction is reported in Table 6-15.

Table 6-15: Average Percent Energy Savings by Jurisdiction - Income-Eligible Multi-Family Program

Jurisdiction	Total Energy Use	Verified Total kWh	% Savings
MO West	4,446,555	799,829	18%
MO Metro	4,865,075	1,014,415	21%
Total	**9,311,631**	**1,814,244**	**19%**

Percent of Budget Spent

The total 2022 program expenditures were 103 percent of the annual budget, exceeding the 85 percent spending requirement (see Table 6-16). Ninety-six percent of the budget was spent for the 2020 - 2022 cycle (see Table 6-17). Long lead projects are projects that are approved in one year but not completed until the following year; long lead projects are included in the expenditure calculation of the year the expense is approved. As such, 2022 long lead time projects were added to this year's expenditures and 2021 long lead projects that were included in the 2021 calculation of percentage of budget spent were removed from the 2022 calculation.

Table 6-16: 2022 Program Budget and Spending - Income-Eligible Multi-Family Program

Jurisdiction	Program Budget	2022 Program Spending	2022 Long Lead Spending	2021 Long Lead Spending[22]	Adjusted 2022 Spend	Total Program Spending (% of Budget)
MO West	$933,668	$840,812	$99,074	$81,182	$858,704	92%
MO Metro	$818,672	$967,337	$222,193	$249,120	$940,411	115%
Total	**$1,752,340**	**$1,808,149**	**$321,267**	**$330,302**	**$1,799,114**	**103%**

Table 6-17: 2020 – 2022 Program Budget and Spending - Income-Eligible Multi-Family Program

Jurisdiction	2020-2022 Program Budget	2020-2022 Spending	2022 Long Lead Spending	2020-2022 Plus Long Lead	Cumulative % Spending
MO West	$2,761,841	$2,386,109	$99,074	$2,485,183	90%
MO Metro	$2,420,633	$2,249,489	$222,193	$2,471,682	102%
Total	**$5,182,474**	**$4,635,598**	**$321,267**	**$4,956,865**	**96%**

6.4 Home Energy Report

The Home Energy Report Program is designed to provide information to residential customers and intended to educate and influence customer's behavior to lower energy usage. The Home Energy Report is delivered in paper and/or email format and contains several informative modules designed to help customers understand and manage their home energy consumption. The households receive personalized information about their own energy consumption as well as comparisons of their usage to household energy usage by similar customers, called "neighbors" in the reports. These reports also include information on other Evergy energy-efficiency programs to encourage further home improvements towards reduced energy usage. This normative information on electric usage and targeted tips on energy saving behaviors is aimed to reduce participant households' energy consumption. Table 6-18 provides a summary of the HER Program participation.

[22] The following amounts were reported as 2021 long lead spending reported in the 2021 EM&V report: MO Metro $343,909 and MO West $99,321. The 2021 long lead spending has been adjusted here to reflect project reductions and extensions. The revised percentage of budget spent for 2021 was 89 percent.

Table 6-18: Summary of Home Energy Report Program Participation

Jurisdiction	Cohort	Treatment Start Date	Number of Treatment Group Customers	Number of Control Group Customers
MO West	201309_e_gmo	August 2013	59,293	29,763
	201503_e_gmo	March 2015	13,239	9,655
	201604_e_gmo	April 2016	77,458	9,716
	201706_e_gmo	June 2017	25,024	11,606
	201904_e_gmo	April 2019	59,855	23,492
	202002_e_gmo	May 2020	9,987	3,924
		March 2021	14,985	5,887
		February 2022	14,946	7,496
MO Metro	201407_e_high_users	July 2014	91,342	12,204
	201503_e_kmo	March 2015	12,229	9,683
	201607_e_kmo	July 2016	17,334	11,122
	202002_e_kmo	May 2020	19,974	9,989
		March 2021	14,982	7,496
		February 2022	14,956	7,471
MO Metro: Low-Income	201407_e_low_income	August 2014	20,373	12,215
Total			**465,977**	**171,719**

PY3 performance metrics for the HER Program are summarized in Table 6-19.

Table 6-19: Performance Metrics - Home Energy Report Program

Metric	PY3 Total	MO West	MO Metro	MO Metro Low-Income
Number of Participants	465,977	274,787	170,817	20,373
Energy Savings (kWh)				
Targeted Energy Savings	32,862,521	20,355,375	9,579,000	2,928,146
Reported Energy Savings	34,075,085	17,673,336	15,417,818	983,931
Gross Verified Energy Savings	35,019,615	19,426,866	14,004,386	1,588,363
Net Verified Energy Savings	35,019,615	19,426,866	14,004,386	1,588,363
Peak Demand Reduction (kW)				
Targeted Peak Demand Savings	4,116.02	2,550.00	1,200.00	366.02
Reported Peak Demand Savings	3,889.53	2,020.12	1,756.49	112.93
Gross Verified Peak Demand Savings	5,883.68	3,263.93	2,352.89	266.86
Net Verified Peak Demand Savings	5,883.68	3,263.93	2,352.89	266.86
Benefit / Cost Ratios				
Total Resource Cost Test Ratio	1.62	1.50	1.82	-
Total Resource Cost Test (Income-Eligible HER)	0.71	-	0.71	-

6.4.1 Data Sources

Data for this analysis included tracking data for participant and nonparticipant accounts, active and account inactive dates including date of installation, and verified kWh savings for each measure installed.

6.4.2 Gross impact methodologies

The work effort was divided into six distinct steps:

1. Data preparation and cleaning, including true-up, calendarization, and combination with weather data;
2. Validity testing of remaining treatment and control groups during the baseline period;
3. Estimation of monthly and annual billed consumption differences between treatment and control groups via regression modelling;
4. Estimation and removal of cross-participant savings from other programs (cross-participation);
5. Estimation of demand savings; and
6. Estimation of program attrition.

ADM explored several linear regression models for the impact evaluation of the HER Program, including Difference in Difference (D-in-D) with monthly controls, D-in-D with weather controls, and Post-Program Regression (PPR) models. Each approach involves panel linear regression models to estimate energy savings for the treatment group. The explored methods required monthly billing data for the program participants and a comparable counterfactual group. All groups passed equivalency tests and therefore did not require the Evaluators to create any ad-hoc control groups. ADM noted that the PPR model was used for all waves due to its higher Adjusted R-Squared values.

6.4.3 Net-to-Gross Estimation

Because the HER Program is designed as a randomized control trial, ADM used a net-to-gross score of 1.

6.4.4 Impact Evaluation Summarized Findings

The HER Program verified savings were found to be 35,019,615 kWh with an average annual household savings value of 146.04 kWh. A summary of gross and net verified energy and demand savings is shown in Table 6-19.

Table 6-20: Reported Gross Energy Savings (kWh) and Peak Demand Savings (kW) - Home Energy Report Program

Jurisdiction	Reported Energy (kWh)	Reported Demand (kW)	Gross Verified Energy (kWh)	Gross Verified Demand (kW)	RR (kWh)	RR (kW)
MO West	17,673,336	2,020.12	19,426,866	3,263.93	110%	162%
MO Metro	15,417,818	1,756.49	14,004,386	2,352.89	91%	134%
MO Metro Low-Income	983,931	112.93	1,588,363	266.86	161%	236%
Total	**34,075,085**	**3,889.53**	**35,019,615**	**5,883.68**	**103%**	**151%**

Table 6-21: Impact Evaluation Results - Home Energy Report Program

Cohort	Reported kWh Savings (kWh)	Reported Demand Savings (kW)	Verified kWh Savings (kWh)	Verified Demand Savings (kW)	Verified kWh Realization Rate	Verified kW Realization Rate
kcpl_201309_e_gmo	6,106,990	699.14	7,069,355	1,187.73	116%	170%
kcpl_201503_e_gmo	850,777	96.96	1,348,253	226.52	159%	234%
kcpl_201604_e_gmo	6,176,531	705.28	6,425,793	1,079.60	104%	153%
kcpl_her_201706_e_gmo	1,911,529	217.93	1,738,814	292.14	91%	134%
kcpl_her_201904_e_gmo	3,602,096	410.82	2,844,652	477.93	79%	116%
kcpl_her_202002_e_gmo	-974,587	-110.01	-	-	-	-
kcpl_201407_e_high_users	12,291,258	1399.46	10,251,455	1,722.36	83%	123%
kcpl_201503_e_kmo	753,139	86.74	-	-	0%	-
kcpl_201607_e_kmo	802,997	91.60	1,540,103	258.75	192%	282%
kcpl_her_202002_e_kmo	1,570,424	178.69	2,212,829	371.78	141%	208%
kcpl_201407_e_low_income	983,931	112.93	1,588,363	266.86	161%	236%
Total	**34,075,085**	**3,889.53**	**35,019,615**	**5,883.68**	**103%**	**151%**

6.1 Pay As You Save

The Pay As You Save Program supports the adoption of energy efficient equipment in residential homes by offsetting the upfront cost associated with major home improvements and upgrades. Through the PAYS Program, customers can reduce their monthly electric bills while also making their home more energy efficient. Each project approved through the program is designed to be a cost-effective bundle of upgrades, meaning that the estimated savings on customer's monthly bills from the installation of the upgrades must be more than the cost to install the measures. Customers finance the upgrades through a fixed monthly PAYS charge added to their monthly bills.

In 2022, the PAYS Program financed the installation of energy efficient air conditioners, heat pumps, smart thermostats, air and duct sealing, and ceiling insulation. Program participants also received direct install energy saving measures at no-cost during the initial program audits. The direct install measures included a variety of LED lightbulbs, power strips, pipe insulation, faucet aerators, and low-flow shower heads.

Table 6-22 provides a summary of program metrics for the 2022 program year. Actual savings for 2022 fell below program expectations although the program grew significantly in participation since 2021.

Table 6-22: Performance Metrics – Pay As You Save Program

Metric	PY3 Total	MO West	MO Metro
Number of Projects Completed	158	72	86
Energy Savings (kWh)			
Targeted Energy Savings	4,505,148	2,252,574	2,252,574
Reported Energy Savings	1,364,394	725,990	638,404
Gross Verified Energy Savings	1,279,831	697,713	582,118
Net Verified Energy Savings	1,114,581	607,476	507,105
Peak Demand Reduction (kW)			
Targeted Peak Demand Savings	1,408.00	704.00	704.00
Reported Peak Demand Savings	275.98	142.22	133.76
Gross Verified Peak Demand Savings	281.16	146.24	134.92
Net Verified Peak Demand Savings	244.91	127.47	117.44
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	0.28	0.29	0.26

6.1.1 Data Sources

For 2022, the primary data resource used for M&V review was program tracking data obtained from the iEnergy database. This tracking data was used as the basis for quantifying participation and assessing program impacts. Tracking data contained measure descriptions, measure characteristics, and project dates which were used for verification. Additionally, ADM used customer billing data provided by Evergy to support the regression-based analysis.

6.1.2 Gross Impact Methodologies

ADM's analysis included data preparation and cleaning, estimation of monthly and annual billed consumption differences between pre-installation and post-installation of measures via regression modeling, and engineering analysis validating savings according to the Evergy TRM.

Due to the low sample size and insufficient post-installation data, the regression analyses were not able to produce accurate results. ADM undertook three distinct regression analyses; 1) grouping customers based on installed measures and running the models for each group, 2) an analysis of all customers with dummy variables for each measure,

and 3) analyses for each customer at the premise level, individually. While the regression analyses for each customer individually produced the best results, numerous customers were below the 90% confidence intervals and lacked statistical significance. Given the results from the regression analyses, ADM compared savings attributed to the retrofit measures installed through the PAYS Program by validating savings according to the relevant unit energy savings methodology from the Evergy TRM. ADM's engineering-based evaluation consisted of reviewing the assumptions and inputs associated with the deemed savings values and verifying that the deemed per-unit impacts were applied appropriately.

6.1.3 Net-to-Gross Estimation

To determine a suitable NTG ratio, ADM included a battery of survey questions designed to evaluate free ridership as well as spillover in the participant survey. Both full participants (customers who received financed measures) as well as partial participants (customers who received only direct install measures and did not participate in additional measure financing) were surveyed. A total of 124 program participants completed the online survey, 68 partial participants and 56 full participants. The methodology used as well as findings are summarized in Appendix A in the Appendices Report. The calculated NTG ratio of 87.1 percent was applied to all program measures in both jurisdictions.

6.1.4 Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified gross energy savings for the PAYS Program are 1,279,831 kWh, and the total verified gross peak demand savings are 281.16 kW. Table 6-23 summarizes the verified gross energy and demand savings for the PAYS Program.

Table 6-23: Gross Energy Savings (kWh) and Peak Demand Reduction (kW) - Pay As You Save Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	725,887	142.21	697,713	146.24	96%	103%
MO Metro	638,404	133.77	582,118	134.92	91%	101%
Total	**1,364,291**	**275.98**	**1,279,831**	**281.16**	**94%**	**102%**

Table 6-24 summarizes the verified net energy savings of the PAYS Program, while Table 6-25 summarizes the net demand reduction.

Table 6-24: Verified Gross and Net Annual Energy Savings (kWh) - Pay As You Save Program

Jurisdiction	Free Ridership	Spillover	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	9.7%	0.5%	87.1%	697,713	607,476
MO Metro	9.5%	0.5%	87.1%	582,118	507,105
Total	**9.6%**	**0.5%**	**87.1%**	**1,279,831**	**1,114,581**

Table 6-25: Verified Gross and Net Peak Demand Reduction (kW) - Pay As You Save Program

Jurisdiction	Free Ridership	Spillover	NTG Ratio	Gross Verified Energy Savings (kW)	Net Energy Savings (kW)
MO West	9.7%	0.5%	87.1%	146.24	127.47
MO Metro	9.5%	0.5%	87.1%	134.92	117.44
Total	**9.6%**	**0.5%**	**87.1%**	**281.16**	**244.91**

6.2 Business Demand Response

The Business Demand Response Program is designed to reduce participant load during peak periods to improve system reliability, offset forecasted system peaks that could result in future generation capacity additions, and/or provide a more economical option to generation or purchasing energy in the wholesale market. The Program can call events from June 1 to September 30 and within designated curtailment hours of 12:00 p.m. to 8:00 p.m., Monday through Friday excluding Holidays.

The BDR Program provides an incentive for those commercial customers who reduce their electrical load during events. The incentive for customers enrolled in the program for one year is calculated as:

Equation 6-1: One Year Incentive Calculation

$$Incentive = \$28.00 \times kW\ Enrolled \times Percentage\ of\ Enrolled\ kW\ Achieved$$

For incentive purposes, “kW Enrolled” refers to the electrical load that participants with assistance from Evergy have identified that can be eliminated or shifted (curtailed) during demand response events. After events, Evergy estimates what the electric load would have been if an event had not taken place and subtracts the actual energy usage to determine the kW achieved during events. This “kW achieved” is then divided by the “kW enrolled” to calculate the “Percentage of Enrolled kW Achieved.”

The incentive for customers enrolled in the program for multiple years is calculated as:

Equation 6-2: Multi-Year Incentive Calculation

$$Incentive = \$30.00 \times kW\ Enrolled \times Percentage\ of\ Enrolled\ kW\ Achieved$$

There were four BDR events called in 2022: on June 17, July 29, August 11, and August 25. The curtailment events began at 1400 CDT and ended at 1800 CDT.

PY3 performance metrics for the BDR Program are summarized in Table 6-26.

Table 6-26: Performance Metrics - Business Demand Response Program

Metric	PY3 Total	MO West	MO Metro
Number of Participants*	160	142	18
Energy Savings (kWh)			
Targeted Energy Savings	0	0	0
Reported Energy Savings	0	0	0
Gross Verified Energy Savings	0	0	0
Net Verified Energy Savings	0	0	0
Peak Demand Reduction (kW)			
Targeted Peak Demand Savings	69,834.00	54,834.00	15,000.00
Nominated Peak Demand Savings[23]	80,790.25	58,494.25	22,296.00
Reported Peak Demand Savings	66,244.32	45,962.01	20,282.31
Gross Verified Peak Demand Savings	65,618.90	45,354.36	20,264.54
Net Verified Peak Demand Savings	65,618.90	45,354.36	20,264.54
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	2.46	2.47	2.43

*Represents the number of unique account numbers in the program.

6.2.1 Data Sources

Data used for this evaluation include program tracking data that identifies which customers participated in the program and contains data fields such as contract curtailment amount, hourly usage, hourly baseline estimates, 15-minute interval meter data (AMI) for each customer participating in the BDR Program, and a full schedule of BDR program events, including the time of the event. ADM also collected recorded weather data from the NOAA to estimate the impact of weather on usage.

6.2.2 Gross Impact Methodologies

In the evaluation of demand response programs, energy savings are estimated by comparing a participant's load shape during a demand response event with a baseline load shape. This baseline load is assumed to be a good estimate of the counterfactual load—that is, the load that would have manifested had there not been an event called that day.

[23] Evergy reports based on the kW Enrolled at the beginning of the season.

6.2.3 Net-to-Gross Estimation

In demand response programs, it is typically assumed that there are neither spillover effects (customers are not expected to curtail without participating), nor free ridership. Although customers can find workarounds to make up for lost productivity due to demand response events, they are compensated only if they reduce their load during the peak demand window, the primary program goal. As such, the net-to-gross ratio for this program is assumed to be 100%.

6.2.4 Impact Evaluation Summarized Findings

Table 6-27 summarizes the verified peak demand reduction for the Business Demand Response Program. The average demand savings for Missouri Metro participants during the DR season was 1,192 kW while Missouri West participants averaged 313 kW. Evergy does not claim energy savings for DR; thus, the evaluation team did not calculate energy savings.

Table 6-27: Peak Demand Reduction (kW) - Business Demand Response Program

Jurisdiction	# of Customer	# of Service Point IDs	Expected kW	Realized kW	RR (kW)
MO West	145	439	45,962.01	45,354.36	99%
MO Metro	17	95	20,282.31	20,264.54	100%
Total	**162**	**534**	**66,244.32**	**65.618.90**	**99%**

6.3 Residential Demand Response

The Residential Demand Response Program uses smart thermostat, automatic event call technology to reduce energy use during peak demand periods. Participating customers receive an incentive to participate in curtailment events. Prior to an event, customers receive a notification on their smart device application, and the smart thermostat pre-cools the home. During the event, the smart thermostat increases a customer's setpoint from between 2- and 5-degrees Fahrenheit. The program includes both customer-installed and professional-installed options.

As shown in Table 6-28, there were 12 demand response events called in 2022 falling in the months of June, July, August, and September. Curtailment events were called between the hours of 3 p.m. through 6 p.m. CDT, with most events lasting two hours.

Table 6-28: Residential Demand Response Events in 2022

Date	Hours Called	Jurisdiction
6/13/2022	4-6 PM	MO West/MO Metro
6/14/2022	4-6 PM	MO West/MO Metro
6/21/2022	4-6 PM	MO West/MO Metro
7/5/2022	4-6 PM	MO West/MO Metro
7/6/2022	4-6 PM	MO West/MO Metro
7/19/2022	4-6 PM	MO West/MO Metro
7/21/2022	4-6 PM	MO West/MO Metro
8/2/2022	4-6 PM	MO West/MO Metro
8/3/2022	4-6 PM	MO West/MO Metro
9/7/2022	3-6 PM	MO West/MO Metro
9/19/2022	4-6 PM	MO Metro
9/20/2022	4-6 PM	MO West

Table 6-29 reports the smart thermostat devices that were included in the program during the evaluation period.

Table 6-29: Smart Thermostat Types by Service Area

Jurisdiction	Device Type	Number of Devices
MO West	ecobee	1,750
MO West	Google Nest	1,501
MO Metro	ecobee	1,445
MO Metro	Google Nest	2,022

PY3 performance metrics for the RDR Program are summarized in Table 6-30.

Table 6-30: Performance Metrics - Residential Demand Response Program

Metric	PY3 Total	MO West	MO Metro
Number of Participants	6,343	3,095	3,248
Energy Savings (kWh)			
Targeted Energy Savings	3,015,616	1,549,459	1,466,157
Reported Energy Savings	1,485,774	730,279	755,495
Gross Verified Energy Savings	1,395,270	685,795	709,475
Net Verified Energy Savings	1,395,270	685,795	709,475
Peak Demand Reduction (kW)			
Targeted Peak Demand Savings	22,908.84	11,773.80	11,135.04
Reported Peak Demand Savings	10,229.50	4,928.36	5,301.14
Gross Verified Peak Demand Savings	11,317.28	5,558.28	5,758.99
Net Verified Peak Demand Savings	11,317.28	5,558.28	5,758.99
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	1.67	1.57	1.78

*Represents the number of unique account numbers in the program

6.3.1 Data Sources

Program data used for this evaluation include:

- Program tracking data for 2022. This data identifies which customers participated in the program and contains data fields such as thermostat installation date, number of devices installed, thermostat device type, measure type, and other relevant data fields.
- 15-minute interval meter data (AMI) for each participating customer.
- A full schedule of RDR Program events, including the time of the event.
- ADM collected recorded weather data from the NOAA to estimate the impact of weather on usage.

ADM reviewed the data tracking systems associated with the program to ensure that the data provides sufficient information to calculate energy and demand impacts. ADM determined that all the relevant data fields were included in the tracking data and savings reported in the tracking system complied with the energy savings calculations and guidelines set by the Evergy TRM.

6.3.2 Gross Impact Methodologies

For PY3, peak demand reductions were calculated using estimates from PY1 and PY2, accounting for average temperature (F) during event hours in PY3. Annual energy savings (kWh) in PY3 are based on estimates from PY2. Prior program year methodologies are detailed below.

Peak demand reduction (kW) for the demand response portion of the program was estimated using a weather-adjusted Linear Fixed Effects Regression (LFER) model.

Annual energy savings for smart thermostat customers were estimated using a weather-adjusted PPR ordinary least-squares (OLS) regression model. A matched comparison group was created using a propensity score matching (PSM) approach.

6.3.3 Net-to-Gross Estimation

In demand response programs, it is typically assumed that there are neither spillover effects nor free ridership (only participating customers are expected to curtail usage). As such, the net-to-gross ratio for this program is assumed to be 100%

6.3.4 Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified net energy savings for the Residential Demand Response Program are 1,395,270 kWh, and the total verified net peak demand savings are 11,317.28 kW.

Table 6-31 and Table 6-32 summarize the verified net energy and peak demand reduction for the RDR Program.

Table 6-31: Annual Energy Savings (kWh) - Residential Demand Response Program

Jurisdiction	Expected kWh/Unit Savings	Realized kWh/Unit Savings	Eligible Units	Expected kWh Savings	Realized kWh Savings	RR (kWh)
MO West	197	185	3,707	730,279	685,795	94%
MO Metro	197	185	3,835	755,495	709,475	94%
Total			**7,542**	**1,485,774**	**1,395,270**	**94%**

Table 6-32: Peak Demand Reduction (kW) - Residential Demand Response Program

Jurisdiction	Expected kW/Unit Savings	Realized kW/Unit Savings	Eligible Units	Expected kW Savings	Realized kW Savings	RR (kW)
MO West	1.19	1.34	4,138	4,928.36	5,558.28	113%
MO Metro	1.19	1.29	4,451	5,301.14	5,758.99	109%
Total			**8,589**	**10,229.50**	**11,317.28**	**111%**

6.4 Business Smart Thermostat

The Business Smart Thermostat Program uses automatic event call technology to reduce energy use during peak demand periods. Participating customers receive an incentive to participate in curtailment events. Prior to an event, customers receive a notification on their smart device application, and the smart thermostat pre-cools the home. During the event, the smart thermostat increases a customer's setpoint between 2 to 5 degrees Fahrenheit.

Depending upon the thermostat type, customers could choose to receive a $50.00 incentive if they installed their own thermostat (BYOT) or to purchase a qualifying thermostat at a discounted price via Evergy's new online customer portal. Customers could also schedule and pay for the installation of the qualifying thermostat through Evergy's customer center or online Portal.

As shown in Table 6-33, there were 12 demand response events called in 2022 falling in the months of June, July, August, and September. Curtailment events were called between the hours of 3 p.m. through 6 p.m. CDT, with most events lasting two hours.

Table 6-33: Business Smart Thermostat DR Event Dates

Date	Hours Called	Jurisdiction
6/13/2022	4-6 PM	MO West/MO Metro
6/14/2022	4-6 PM	MO West/MO Metro
6/21/2022	4-6 PM	MO West/MO Metro
7/5/2022	4-6 PM	MO West/MO Metro
7/6/2022	4-6 PM	MO West/MO Metro
7/19/2022	4-6 PM	MO West/MO Metro
7/21/2022	4-6 PM	MO West/MO Metro
8/2/2022	4-6 PM	MO West/MO Metro
8/3/2022	4-6 PM	MO West/MO Metro
9/7/2022	3-6 PM	MO West/MO Metro
9/19/2022	4-6 PM	MO Metro
9/20/2022	4-6 PM	MO West

Table 6-34: Smart Thermostat Types by Service Area

Jurisdiction	Device Type	# of Devices
MO West	ecobee	40
MO West	Google Nest	88
MO Metro	ecobee	56
MO Metro	Google Nest	20

PY3 performance metrics for the BST Program are summarized in the following table.

Table 6-35: Performance Metrics - Business Smart Thermostats Program

Metric	PY3 Total	MO West	MO Metro
Number of Participants*	87	54	33
Energy Savings (kWh)			
Targeted Energy Savings	172,572	85,104	87,468
Reported Energy Savings	214,398	128,805	85,593
Gross Verified Energy Savings	100,104	60,140	39,964
Net Verified Energy Savings	100,104	60,140	39,964
Peak Demand Reduction (kW)			
Targeted Peak Demand Savings	1,261.44	622.08	639.36
Reported Peak Demand Savings	210.30	129.59	80.70
Gross Verified Peak Demand Savings	245.08	139.33	105.75
Net Verified Peak Demand Savings	245.08	139.33	105.75
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	0.75	0.62	1.04

*Represents the number of unique account numbers in the program. Benefit/Cost Ratios for Business Smart Thermostats are included with Residential Demand Response.

6.4.1 Data Sources

Program data used for this evaluation include:

- Program tracking data for 2022. This data identifies which customers participated in the program and contains data fields such as thermostat installation date, number of devices installed, thermostat device type, measure type, and other relevant data fields.
- 15-minute interval meter data (AMI) for each participating customer.
- A full schedule of RDR Program events, including the time of the event.
- ADM collected recorded weather data from the NOAA to estimate the impact of weather on usage.

Program data used for this evaluation include program tracking data for 2022. This data identifies which customers participated in the program and contains data fields such as thermostat installation date, number of devices installed, thermostat device type, measure type, and other relevant data fields. Additional data included: 15-minute interval meter data (AMI) for each customer participating in the RDR Program, a full schedule of RDR program events, including the time of the events; and ADM collected recorded weather data from the NOAA to estimate the impact of weather on usage.

6.4.2 Gross Impact Methodologies

Demand savings (kW) for the demand response portion of the program was estimated using a weather-adjusted LFER model.

Annual energy savings for smart thermostat customers were estimated using a weather-adjusted PPR OLS regression model. A matched comparison group was created using a PSM approach.

6.4.3 Net-to-Gross Estimation

In demand response programs, it is typically assumed that there are neither spillover effects nor free ridership (only participating customers are expected to curtail usage). As such, the net-to-gross ratio for this program is assumed to be 100%.

6.4.4 Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified net energy savings for the Business Thermostat Program are 100,104 kWh, and the total verified net peak demand savings are 245.08 kW.

Table 6-36 and Table 6-37 summarize the verified net energy and peak demand reductions for the BST Program.

Table 6-36: Annual Energy Savings (kWh) - Business Smart Thermostats Program

Jurisdiction	Expected kWh/Unit Savings	Realized kWh/Unit Savings	Eligible Units	Expected kWh Savings	Realized kWh Savings	RR (kWh)
MO West	831	388	155	128,805	60,140	47%
MO Metro	831	388	103	85,593	39,964	47%
Total			**258**	**214,398**	**100,104**	**47%**

Table 6-37: Peak Demand Reduction (kW) - Business Smart Thermostats Program

Jurisdiction	Expected kW/Unit Savings	Realized kW/Unit Savings	Eligible Units	Expected kW Savings	Realized kW Savings	RR (kW)
MO West	0.78	0.83	167	129.59	139.33	108%
MO Metro	0.78	1.02	104	80.70	105.75	131%
Total			**271**	**210.30**	**245.08**	**117%**

6.5 Products & Services Incubator

6.5.1 Appliance Recycling

The Appliance Recycling Program is a new pilot program offered by Evergy starting in 2022. The program is a collaboration between Evergy and ARCA Recycling Inc. (ARCA) that works to provide customers in the St. Joseph, Maryville and surrounding areas with an easy way to recycling old, working appliances.[24].

The goal of the program is to reduce the number of older, inefficient appliances in use. To accomplish this goal, Evergy provides eligible customers with a $75 incentive for old, working refrigerators or freezers and a $25 incentive for room air conditioners or dehumidifiers.

Participating Evergy customers can schedule an appointment through phone or online. The appliance can be left inside or at an outside location and a contractor then verifies the appliance is working, picks it up and recycles it.

PY3 performance metrics for the Appliance Recycling Program are summarized in Table 6-38.

[24] Research and Pilot Program. Evergy. Available online: https://www.evergy.com/ways-to-save/programs-link/research-and-pilot-program

Table 6-38: Performance Metrics – Appliance Recycling Program

Metric	PY3 Total	MO West	MO Metro
Number of Recycled Appliances	211	207	4
Energy Savings (kWh)			
Targeted Energy Savings	-	-	-
Reported Energy Savings	173,731	170,119	3,612
Gross Verified Energy Savings	168,816	164,492	4,324
Net Verified Energy Savings	168,816	164,492	4,324
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	-	-	-
Reported Peak Demand Reduction	42.71	42.30	0.41
Gross Verified Peak Demand Reduction	25.82	25.30	0.52
Net Verified Peak Demand Reduction	25.82	25.30	0.52
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	-	-	-

Data Sources

For the PY3 evaluation, ADM used two primary data resources for M&V review.

1. Program data provided by Evergy, containing the quantity, appliance type, and savings for the year.
2. Program data provided by ARCA, containing the age, model type, size, unit brand and unit location of the old unit being picked up.

Gross Impact Methodologies

The calculation of gross energy savings and demand reduction relied on energy savings values and algorithms from the Evergy TRM. The data collected from ARCA, along with program tracking data were used as inputs to the savings algorithms as outlined in the Evergy TRM.

The gross energy savings and demand reduction algorithms are outlined in Appendix M in the Appendices Report.

Net-to-Gross Estimation

For PY3, ADM applied a designated NTG value of 1. The designation as pilot program and the small overall size of the Appliance Recycling Program did not justify the development of a net-to-gross ratio for this program.

Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified gross energy savings for the Appliance Recycling Program are 168,816 kWh and 25.82 kW. Table 6-39 below summarizes the verified gross energy and demand savings and Table 6-40 summarizes the verified net impacts for the Appliance Recycling Program.

Table 6-39: Gross Energy Savings (kWh) and Peak Demand Reduction (kW) - Appliance Recycling Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	170,119	42.30	164,492	25.30	97%	60%
MO Metro	3,612	0.41	4,324	0.52	120%	126%
Total	**173,731**	**42.71**	**168,816**	**25.82**	**97%**	**60%**

Table 6-40: Verified Gross and Net Annual Energy Savings (kWh) - Appliance Recycling Program

Jurisdiction	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	0%	100%	164,492	164,492
MO Metro	0%	100%	4,324	4,324
Total	**0%**	**100%**	**168,816**	**168,816**

6.5.2 Energy Efficiency Nonprofits Program

As part of the Stipulation Order from the Missouri Public Service Commission, Evergy identified and launched its Energy Efficiency Nonprofits (EENP) Program. This pilot program targets organizations that provide transitional housing and emergency services to residential customers living in Evergy's service territory.

The EENP Program offered by Evergy targeted 501(c)(3) to organizations that provide lodging and social services to low-income, homeless, or at risk populations in the Evergy Missouri service territory, so they can better serve these individuals and families. Lodging must be the facility's primary function. Satellite facilities associated with the headquarters organization are also eligible (EENP Application).

The program offers these organizations low- and no-cost energy efficiency measures and incentives and includes an energy audit and recommendations for energy efficiency improvements. Eligible measures include interior and exterior lighting upgrades, HVAC tune-ups, water conservation measures and power strips. In addition, the organizations may also qualify for additional rebates or incentives based on the results of the energy audit (EENP Application).

The program officially ended in February 2022 with its last project ending. This final project began in December of 2021 and was a "carry-over" from the pilot, with savings being claimed in 2022. The EENP project funded a mix of indoor and outdoor lighting as well as wall packs and emergency strips for a homeless shelter that includes a health care clinic, children's advocacy center and provides shelter services for runaways. The one EENP project in PY3 was in Missouri Metro and there were no projects completed in Missouri West. PY3 performance metrics for the EENP Program are summarized in Table 6-41.

Table 6-41: Performance Metrics – Energy Efficiency Nonprofits Program

Metric	PY3 Total	MO West	MO Metro
Number of Businesses	1	-	1
Energy Savings (kWh)			
Targeted Energy Savings	-	-	-
Reported Energy Savings	39,658	-	39,658
Gross Verified Energy Savings	39,657	-	39,657
Net Verified Energy Savings	39,657	-	39,657
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	-	-	-
Reported Peak Demand Reduction	18.31	-	18.31
Gross Verified Peak Demand Reduction	18.31	-	18.31
Net Verified Peak Demand Reduction	18.31	-	18.31
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	-	-	-

Gross Impact Methodologies

All of the program savings for PY3 from the EENP program came from custom lighting.

ADM utilized the same evaluation methodology as PY2. ADM compared savings attributed to the measures installed through the EENP program by validating savings according to the relevant unit energy savings methodology from the Evergy TRM. ADM's evaluation consisted of:

- Confirm that savings for measures that were part of the reference manual were calculated in accordance with the Evergy TRM.
- Verified that the measure specifications and claimed savings were appropriate.

Impact Evaluation Summarized Findings

The total verified gross energy savings for the Energy Efficiency Nonprofits Program are 39,657 kWh and the demand savings are 18.31 kW. Table 6-42 below summarizes the verified gross energy and demand savings and Table 6-43 summarizes the verified net impacts for the EENP Program.

Table 6-42: Gross Energy Savings (kWh) and Peak Demand Reduction (kW) - Energy Efficiency Nonprofits Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	-	-	-	-	-	-
MO Metro	39,658	18.31	39,657	18.31	100%	100%
Total	**39,658**	**18.31**	**39,657**	**18.31**	**100%**	**100%**

Table 6-43: Verified Gross and Net Annual Energy Savings (kWh) - Energy Efficiency Nonprofits Program

Jurisdiction	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	-	-	-	-
MO Metro	0%	100%	39,657	39,657
Total	**0%**	**100%**	**39,657**	**39,657**

6.5.3 Energy-Saving Trees

The Energy-Saving Trees (EST) Program, started in 2019, is part of Evergy's Products & Services Incubator programs. The program is a collaboration between Evergy, The Arbor Day Foundation, and Bridging the Gap, and works to provide customers in the Missouri Metro jurisdiction with shade trees at no cost.

The goal of the program is to increase the overall tree canopy in the "urban core," reducing the heat island effect in urban areas and customer's energy usage. To accomplish these goals, Evergy provides eligible residential customers with trees to be planted in their yards, or at multi-family properties.

In PY3, the EST Program provided 200 trees to customers in the Kansas City area, with reported savings of 25,176 kWh. There were no projects in PY3 in Missouri West. PY3 performance metrics for the EST Program are summarized in Table 6-44.

Table 6-44: Performance Metrics – Energy Saving Trees Program

Metric	PY3 Total	MO West	MO Metro
Number of Trees Provided	200	-	200
Energy Savings (kWh)			
Targeted Energy Savings	-	-	-
Reported Energy Savings	25,176	-	25,176
Gross Verified Energy Savings	23,373	-	23,373
Net Verified Energy Savings	23,373	-	23,373
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	-	-	-
Reported Peak Demand Reduction	-	-	-
Gross Verified Peak Demand Reduction	-	-	-
Net Verified Peak Demand Reduction	-	-	-
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	-	-	-

Data Sources

For the 2022 evaluation, ADM used two primary data resources used for M&V review.

1. Program data provided by The Arbor Day Foundation, calculated using the iTree Software, containing the quantity, species, and expected planting location of the trees provided through the program, as well as the annual and cumulative savings expected from the trees after 5, 10, 15, and 20 years. These future savings, calculated using iTree design methods, "use growth rates to estimate the changing size of the tree" when calculating the savings for future years[25].

2. Program survey to a representative sample of program participants to understand their perceptions of the program, whether participants planted the trees they received, the current health of the trees, and the final location where the trees were planted.

Gross Impact Methodologies

Reported energy savings for the program were based on program averages calculated by The Arbor Day Foundation using the iTree Software.[26] ADM's evaluation consisted of: (1) verify the iTree software by comparing savings estimates provided by Arbor Day for a sample of trees to the estimates ADM calculated using the iTree software, (2) analyzing program survey results to determine that program attrition (trees that were not planted or did not survive), and (3) verifying that the final planting location for the trees aligned with the location that participants reported when they ordered their trees.

Net-to-Gross Estimation

For 2022, ADM applied a designated NTG value of 1.0. The designation as pilot program and the small overall size of the EST Program did not justify the cost for development of a net-to-gross ratio for this program.

Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified gross energy savings for the EST Program are 23,373 kWh. There are no demand savings claimed for the Trees program. Table 6-45 below summarizes the verified gross energy and demand savings and Table 6-46 summarizes the verified net impacts for the EST Program.

[25] i-Tree Design Methods, September 23, 2014, available here: https://www.itreetools.org/documents/11/iTree_Design_methods.pdf

[26] www.itreetools.org, accessed 3/19/2022

Table 6-45: Gross Energy Savings (kWh) and Peak Demand Reduction (kW) – Energy Saving Trees Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	-	-	-	-	-	-
MO Metro	25,176	0	23,373	0	93%	-
Total	**25,176**	**0**	**23,373**	**0**	**93%**	**-**

Table 6-46: Verified Gross and Net Annual Energy Savings (kWh) – Energy Saving Trees Program

Jurisdiction	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	-	-	-	-
MO Metro	0%	100%	23,373	23,373
Total	**0%**	**100%**	**23,373**	**23,373**

6.5.4 Market-Rate Multi-Family

The Market-Rate Multi-Family (MRMF) Program provides rebates for energy-efficient equipment to market-rate multi-family residences.

The goal of this pilot program is to increase the number of energy-efficient equipment in multi-family residences. To accomplish this goal, the program has two different avenues: standard rebates and mailed kits.

The standard rebates program offers rebates for various appliances and heating and cooling equipment ranging from $50 to $700. The kits program provides a kit with LED bulbs, efficient-flow kitchen and bathroom faucet aerators, efficient-flow showerheads and advanced power strips for ten dollars.

PY3 performance metrics for the MRMF Program are summarized in Table 6-47.

Table 6-47: Performance Metrics – Market Rate Multi-Family Program

Metric	PY3 Total	MO West	MO Metro
Number of Trees Provided	1,776	837	939
Energy Savings (kWh)			
Targeted Energy Savings	-	-	-
Reported Energy Savings	1,812,403	822,163	990,241
Gross Verified Energy Savings	1,046,525	461,878	584,647
Net Verified Energy Savings	1,046,525	461,878	584,647
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	-	-	-
Reported Peak Demand Reduction	196.90	86.99	109.91
Gross Verified Peak Demand Reduction	131.38	55.99	75.39
Net Verified Peak Demand Reduction	131.38	55.99	75.39
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	-	-	-

Gross Impact Methodologies

This subsection summarizes the methods used to verify measure savings and calculate gross energy savings for the MRMF Program.

The calculation of gross energy savings and demand reduction relied on energy savings values and algorithms from the Evergy TRM. The program tracking data was used as inputs to the savings algorithms as outlined in the Evergy TRM.

The gross energy savings and demand reduction algorithms are outlined in Appendix M in the Appendices Report.

Impact Evaluation Summarized Findings

Based on the impact evaluation results, the total verified gross energy savings for the MRMF Program are 1,046,525 kWh and 131.38 kW. Table 6-48 below summarizes the verified gross energy and demand savings and Table 6-49 summarizes the verified net impacts for the MRMF Program.

Table 6-48: Gross Energy Savings (kWh) and Peak Demand Reduction (kW) – Market Rate Multi-Family Program

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR (kWh)	RR (kW)
MO West	822,163	86.99	461.878	55.99	56%	64%
MO Metro	990,241	109.91	584,647	75.39	59%	69%
Total	**1,812,403**	**196.90**	**1,046,525**	**131.38**	**58%**	**67%**

Table 6-49: Verified Gross and Net Annual Energy Savings (kWh) – Market Rate Multi-Family Program

Jurisdiction	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
MO West	0%	100%	461,878	461,878
MO Metro	0%	100%	584,647	584,647
Total	**0%**	**100%**	**1,046,525**	**1,046,525**

6.6 Programs with Process Evaluation Only

The following Products & Services Incubator programs did not report kWh and kW savings. Process evaluations were performed and can be found in the following appendices:

- BPI Certification: Appendix K in the Appendices Report
- Power Check: Appendix K in the Appendices Report
- Virtual Energy Management for Small Business: Appendix K in the Appendices Report