MEEIA Cycle III: Residential & Demand Response Measurement, and Verification Report
Evergy Metro and Missouri West: Appendices

Prepared for:

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Appendix A NTG Approaches by Program

A.1 Net-to-Gross: Heating Cooling & Home Comfort

This section provides a summary of the method to score the responses from the online survey of participants and trade allies for the measure-level free ridership score, project level free ridership score, and spillover score.

Questions relating to the assessment of net-to-gross (NTG) address both free ridership and spillover. Both the participant survey and trade ally survey include questions relating to program participation and free ridership. For customers who completed projects that did not include HVAC measures, the free ridership score is based entirely on responses to questions in the participant survey. For customers who completed projects that included HVAC measures and who reported that equipment information or a recommendation from their trade ally was highly influential in their decision to implement the HVAC measures, the assessment of free ridership includes information from the service provider survey. This is because program education and outreach efforts for HVAC measures may influence trade allies' selling of efficient equipment in ways that are not apparent to customers.

A.1.1 Financial Ability

Several criteria were used for determining the likelihood that a customer is a free rider. The first criterion was based on the response to a question regarding a customer's financial ability to pay for the efficient measures. Financial ability was assessed with the following question:

- PFR1: Would you have still purchased the following without the Evergy discount/rebate?

Respondents who indicated that they were not able to afford the efficiency measure without the financial support provided by the program were deemed to not be free riders. For all others, a free ridership score was assigned based on a combination of their reported prior plans to implement the measure, the reported likelihood they would have installed one without the program, and the reported effect of the program on the likely timing of the installation (as described in following subsections).

A.1.2 Prior Plans

The presence of plans prior to involvement with the program was assessed through the following questions:

- PFR2: Did you plan to purchase the following energy-efficient equipment/upgrades before learning about the discounts/rebates offered by Evergy?

- PFR3: Did you purchase and install [a more efficient/more] [MEASURE] because of the EVERGY rebate/discount?

Respondents who answered “Yes” to PFR2 and “No” to PFR3 were assigned a plans score of 1. All other respondents were assigned a plans score of 0.

Likelihood of Implementing the Measure in the Absence of the Program

The respondents’ stated likelihood of implementing the measure in the absence of the program was assessed through the following three questions:

- PFR4: How likely is it that you would have purchased the following energy-efficient equipment/upgrades without the Evergy discount/rebate?
- PFR5: How likely would you have been to install the following energy-efficient equipment/upgrades if you had not learned about Evergy’s rebates/discounts for the energy efficient equipment and upgrades from the [SOURCE]?
- PFR6: Were any of the following energy-efficient equipment and/or upgrades recommended by your contractor/energy auditor during an initial visit to your home?
- PFR7: [IF YES TO PFR6] How likely is it that you would have purchased the following energy efficient equipment and/or upgrades if your contractor/energy auditor had not recommended them?

Based on the responses to the likelihood question, the following point values were assigned to each of the responses:

1 (Not at all likely) = 0

2 = 0.25

3 = 0.5

4 = 0.75

5 (Very likely) = 1

The likelihood score was based on the lowest rating provided on questions PFR4 through PFR7.

A.1.3 Program Impact on Timing

The program effect on the timing was assessed with the following two questions:

- PFR8: Did you complete the following energy-efficient equipment/upgrades sooner than you would have because of the Evergy discount/rebate?
- PFR9: If you had not received the Evergy discount/rebate, when might you have completed the following energy-efficient equipment/upgrades?

The information provided in the response to these questions is used in the following manner:

- If the respondent stated that they would have installed the measure in more than one year, the preliminary free ridership score is multiplied by 0, resulting in a final free ridership score of 0. This is consistent with the definition of a free rider as someone who would have implemented a program measure within one year of when it was installed through a program.
- If the respondent stated that they would have installed the measure in 6 months to one year, the preliminary free ridership score is multiplied by 0.25.
- If the respondent stated that they would have installed the measure within 6 months of when it was installed, the preliminary free ridership score is multiplied by 0.5.

A.1.4 Participant Questions to Assess Service Provider Influence on HVAC Installation

A service provider free ridership score was developed for customers based on responses provided to the participant survey and a service provider survey.

Program education and outreach efforts may influence service providers selling of efficient equipment in ways that are not apparent to customers. To account for this, the assessment of free ridership included a service provider influence component. Specifically, participants were asked:

- PFR10: Were any additional energy-efficient equipment/upgrades recommended by your contractor/energy auditor or during your home energy assessment?
- PFR11: [IF YES TO PFR10] Did you complete any of the additional energy-efficient equipment/upgrades?
- PFR12: [IF YES TO PFR11] How influential was the recommendation by your contractor or home energy auditor in your decision install the additional energy efficient upgrades in your home?

A “Yes” response to PFR10 and rating of 5 for PFR12 indicates service provider influence.

A.1.5 Service Provider Free Ridership Questions

A service provider influence score was developed from service provider responses to a survey of service providers that complete projects through the program. The service provider survey included two service providers free ridership (SPFR) questions:

- SPFR1: How important was Evergy’s energy-efficiency rebate program, including the discounts/rebates and information provided through the program, in influencing

your level of marketing and selling of the energy-efficient measures to Evergy customers during 2020?

- SPFR2: Would you have recommended different equipment types, quantities, or efficiency levels to customers if the program were not available?

The responses to SPFR1 were scored as following (on a scale of 0 to 10, in numeric terms with higher values indicating higher free ridership):

0 (Not at all important) = 1

1 = 0.9

2 = 0.8

3 = 0.7

4 = 0.6

5 = 0.5

6 = 0.4

7 = 0.3

8 = 0.2

9 = 0.1

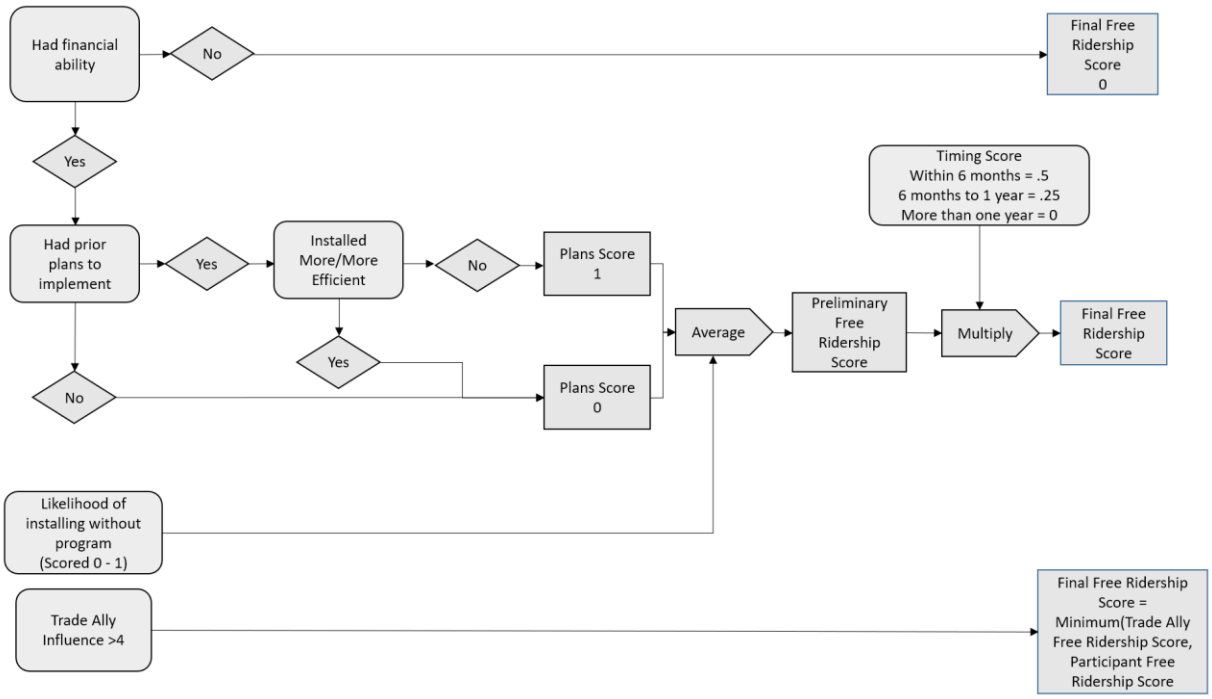
10 (Very important) = 0

If the service provider answered “Yes” to question SPFR2, the free ridership score from SPFR1 was reduced by 50%.

Participants who reported that they did not have the financial ability to pay for the efficiency improvement are assigned a free ridership score of 0. For all other participants, the free ridership score was based on the average of the plans score and the likelihood of installing the measure without the program, multiplied by the timing score. The final free ridership score may have been based on a service provider free ridership score and was dependent on if the appropriate number of service providers survey responses for each measure was met. Specifically, for participants who rated the service providers marketing material or recommendation as greater than 4, the participants free ridership score was equal to the minimum of the free ridership score developed based on the participant responses or the service provider responses. The service provider free ridership score that was used was either the free ridership score for the service provider that completed the participants project, or the average service provider free ridership score if the participants service provider did not respond to the survey. The following figure summarizes the free ridership scoring.

Figure A-1 illustrates the above process for generating the final free ridership score.

Figure A-1: Free Ridership Scoring



A.1.6 Project Level Free Ridership

ADM weighed the measure-level free ridership scores for each respondent by the kWh savings by measure, using the following approach: 1) for each respondent, first multiply the measure level free-ridership score (as noted above, a number from 0 to 1) for each installed measure by the kWh savings that measure represents; 2) sum the total measure level free-ridership kWh over the incentivized measures; 3) divide that sum by the total project kWh savings. The result is a value from 0 to 1, representing the respondent's project level free ridership score. This means that if a respondent indicated free ridership for a low kWh impact measure, but no free ridership for a high kWh impact measure, the overall free ridership score is low, as it was more heavily weighted by the free ridership score for the high kWh impact measure.

A.1.7 Participant Spillover Scoring

Participant spillover (PSO) is defined as energy efficiency measures that respondents report installing in their home without receiving additional incentives but that were installed based on program influence. Potential participant spillover respondents were identified using the question below:

- PSO1: Have you installed any additional energy-efficient equipment or home improvements in 2020, with or without receiving a discount or rebate?

Participants indicating that they purchased and installed one or more energy efficiency projects since participating in the Heating, Cooling, and Home Comfort Program were then asked two questions to determine whether the energy savings resulting from those measures attributed to the program:

- PSO2: How would you rate the importance of the discount/rebate and/or energy savings kit from Evergy in your decision to install those additional energy-efficient equipment or home improvements?
- PSO3: How likely would you have been to install those additional energy efficient equipment or home improvements if you had not received a discount/rebate and/or energy savings kit from Evergy?

The responses to PSO2 were scored as following (on a scale of 0 to 10, where higher values indicated higher spillover):

0 (Not at all important) = 1

1 = 0.9

2 = 0.8

3 = 0.7

4 = 0.6

5 = 0.5

6 = 0.4

7 = 0.3

8 = 0.2

9 = 0.1

10 (Very important) = 0

The responses to PSO3 were scored as following (on a scale of 1 to 5, where higher values indicated higher spillover):

1 (Not at all likely) = 0

2 = 0.25

3 = 0.5

4 = 0.75

5 (Very likely) = 1

Participants responding to question PSO3 with a rating of 7 or higher and responding to question PSO3 with a rating of 3 or lower were considered to have been motivated by the program to make these additional purchases, and the energy savings from these items were attributed to the program. Savings for spillover measures similar to those offered through the program was calculated and then extrapolated to the population of respondents.

A.1.8 Non-Participant Spillover Scoring

Non-participant spillover (NPSO) is defined as the additional energy savings achieved when a non-participant implements energy-efficiency measures and/or practices due to the program's influence through exposure to the program (for example, from a contractor/trade ally/energy auditor or some other source). but is not accounted for in program savings. Potential non-participant spillover respondents were identified using the question below:

- NPSO1: Do you recall purchasing any additional energy efficient items on your own without a discount or rebate in 2020?
- NPSO2: What energy efficient items did you purchase in 2020?

Non-participants indicating that they purchased and installed one or more energy efficiency projects without receiving a rebate or discount in 2020 were then asked the following question to determine whether they were aware that the Evergy offers rebates or discounts for the energy efficient equipment they purchased:

- NPSO3: Why did you not get an Evergy incentive, rebate, or discount for that energy saving equipment?

Non-participants responding to question NPSO3 with anything other than they were not aware the rebates existed or did not think the energy saving equipment qualified for a rebate were considered to have been motivated by the program to make these additional purchases, and the energy savings from these items were attributed to the program. Savings for spillover measures similar to those offered through the program was calculated and then extrapolated to the population of respondents.

A.1.9 Determination of Program Level NTG Ratio

The project level free ridership scores for each respondent were weighted by the ex-post kWh savings per project to determine the final weighted average free ridership estimate per customer in the sample. This estimate, along with the spillover estimate, was used to calculate the final net savings.

Equation A-1: Net to Gross Calculation

$$NTG=(1\text{-}Freeridership)+Spillover$$

A.2 Net-to-Gross: Energy Savings Products

The following section details the free ridership, participant spillover, and leakage estimates used to determine net savings for the PY1 Energy Saving Products program in 2020.

A.2.1 Market Effects

It is worth noting that none of the methodologies described in the remainder of this section include estimates of non-participant spillover or market effects.

Market effects refer to changes in market structure or market actor behavior due to program influence that results in non-incentivized adoption of energy efficiency measures. Non-participant spillover refers to program spillover which occurs in customers who were not program participants. In the context of a program for LED price markdowns, the following examples illustrate potential sources of market effects and non-participant spillover:

Market pricing related effects: it is possible that the program sponsored discounts for certain lighting products cause downward pressure on prices for competing products (non-program bulbs). The competing products could potentially be LEDs at participating retailers or non-participating retailers. If pricing for these competing products is lowered in response to program discounts and a corresponding increase in purchases (and installations) occurs, then there may be additional savings attributable to program influences.

Market manufacturing/stocking effects: it is possible that the program sponsored incentives caused bulb manufacturers and retailers to adjust their lighting product offerings. To the extent that the program causes lesser efficiency bulbs to be displaced with higher efficiency bulbs at the manufacturer/retailer level, there may be additional savings attributable to program influences.

Non-participant spillover: can occur if a customer notices Evergy sponsored discounts or receives educational resources from an in-store promotional event. It is possible that despite not ultimately purchase program discounted bulbs, their interaction with the program encourages them to install other (non-rebated) energy efficiency measures or change their energy usage behavior.

It is likely that some combination of these effects increases the savings attributable to the ESP lighting portion of the program. However, there is also reason to believe these effects

may be small overall. Non-participant spillover typically occurs through customer education. The ESP program component includes regular in-store promotional/educational events, but the number of customers reached relative to overall program sales is likely small. Additionally, the promotional events usually provide information designed to encourage customers to participate one of Evergy's other energy efficiency programs, which would not constitute spillover if these customers ultimately did participate and receive a rebate. The implementor's field team educates customers regarding the incentives provided in the ESP program; however, these are not explicitly quantified and therefore cannot provide reliable estimates of spillover.

Market effects may exist to some extent but disaggregating other Evergy program influences from other influences such as technological advances and other lighting discount programs across the country is difficult. The current ESP program component covers a substantial share of the bulbs sold in the Missouri service territory, with no immediate plans for discontinuing the price markdowns.

Overall, it should be noted that non-participant spillover and market effects likely remain a minor factor, and the net-to-gross estimate developed in this evaluation should be considered with these omitted effects in mind.

A.2.2 Survey Determined Free Ridership

The survey-based effort for calculating free ridership was conducted using emails from a sample of randomly selected residential customers. ADM's general population survey of Evergy customers was conducted using email invitations, an online survey platform, and small gift card incentive to those who completed the questionnaire.

The strength of a survey-based approach is the ability to obtain a random and relatively large sample size cost-effectively. It also allows for further questioning regarding the quantity and location of installed bulbs and the motivation behind bulb purchases. The biggest drawback to the approach is the potential for respondent recall bias. For example, it may be difficult to get accurate responses to questions about the number of bulbs the respondent recently purchased and whether they were discounted through the program. This problem is particularly prominent in upstream programs where the respondents may not be aware that the bulbs they purchased were discounted.

Survey respondents were asked a series of questions to elicit feedback regarding influences on their light bulb purchasing decisions. Each respondent was then assigned a free ridership score based on a consistent free ridership scoring algorithm. The free ridership scoring algorithm developed for the survey instruments is shown on the following page on Figure A-2.

The "behavior without discount" scoring is the primary determinant of respondents' free ridership scores. This section asked whether the respondent would have purchased the

same light bulbs if they had cost the regular retail price. This may be a question that is particularly prone to social desirability bias – the tendency to respond in a manner that might be viewed favorably by others. For this reason, a consistency check was performed. In the survey, each respondent was asked to state light bulb characteristics that are important to them when choosing between available options. If a respondent lists price as the most important characteristic, but then goes on to indicate that they would have still purchased efficient options at full retail price, their response was eliminated from the data population.

When responses from the general population survey were compiled, each response had equal weight in estimating the average free ridership level for the program.

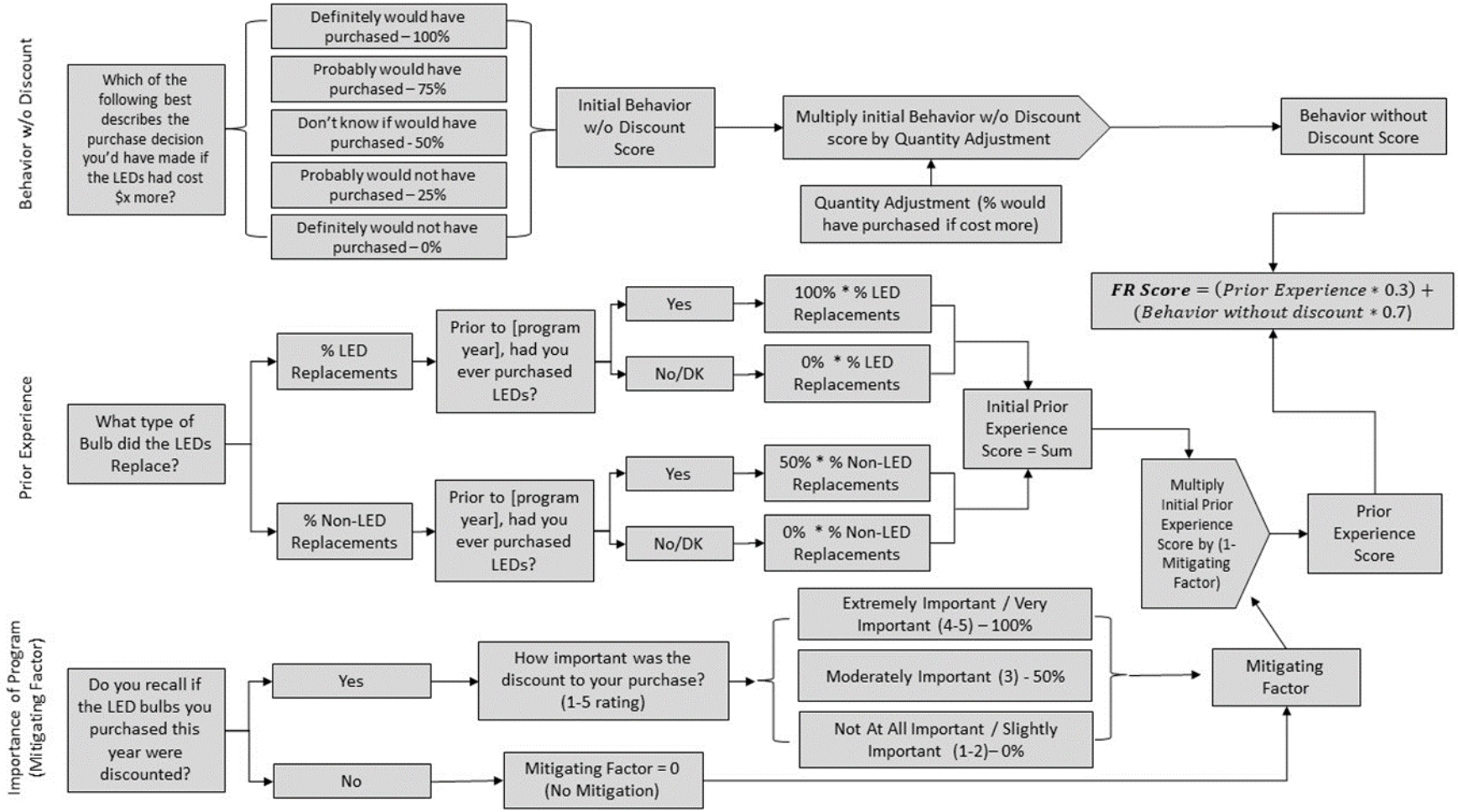
ADM evaluators analyzed survey responses from 552 Evergy customers. A total of 531 surveyed customers reporting having purchased LEDs from participating retailers within the program year. Of these, 310 verified responses were used to calculate free ridership for standard LEDs, and 112 verified responses were used to calculate free ridership for specialty LEDs. Verified responses are fewer than total responses as some customers were eliminated if they did not answer relevant questions or failed the consistency check outlined above. Calculated scores from the survey responses are presented below in Table A-1.

Table A-1: General Population Survey Free Ridership Estimate

Year	Bulb Type	N	Prior Experience Score	Behavior without Program Score	Free Ridership Estimate
2020	Standard LED	112	0.42	0.54	0.51
2020	Specialty LED	310	0.25	0.54	0.45

For program LEDs distributed through budget-retailers Dollar Tree, True Value, Habitat Restores, and Goodwill, ADM applied an assumed Net-To-Gross Ratio of 1.0 as these retailers would likely not stock ENERGY STAR® LEDs in the absence of the program.

Figure A-2: Free Ridership Scoring for LEDs



A.2.3 Participant Spillover

Spillover refers to savings that occur because of program influences on customers but for which an incentive or rebate is not given. For example, in the context of a program for LED price markdowns, participant spillover may result from a customer who purchases program discounted bulbs and is influenced to install additional (non-rebated) energy efficiency measures or change their energy usage behavior because of their program experience.

ADM conducted a benchmarking study of 6 recent evaluations of upstream lighting programs to determine a participant spillover rate. The average participant spillover across the benchmarked studies was 7%, with a range from 2 to 11%. ADM used the average participant spillover from this benchmarking study for the evaluation of the Energy Saving Products program.

A.2.4 Leakage Adjustments

ADM conducted an analysis of leakage out of territory for the Energy Savings Products (ESP) program in Program Year 2020. Cross-territory sales, or "leakage," occurs when program-incented efficient products are installed outside of the Evergy Missouri (MO) service territory. When this occurs, the energy and demand savings from the incentivized product are not realized within the territory that paid for, and is claiming savings for, the unit. Upstream programs are vulnerable to leakage as the rebate recipient is unknown and sales are not restricted based on utility.

Estimates of leakage were assessed using an approach that combined responses from the general population survey with a geo-mapping analysis using the following methodology:

- First, ADM developed a mapping of concentric circles (drive times) surrounding each participating retailer. The initial modeling assumed the "reach" of a retailer is a 60-minute drive, which is then modified by the presence of an alternative sponsoring retailer (i.e., if a customer is within a 60-minute drive of two sponsoring retailers, it is assumed they purchased from the closest one). Non-participating retailers are also included as directly competing alternative retailers with the construction of the drive times.
- Second, ADM used 2010 Census block data from Environmental System Research Institute (ESRI) to determine the proportion of the population that falls within each drive time circle (from Step 1), as well as the proportion of the population that falls within the Evergy territory and within the state of Missouri. Thus, for each drive time circle for each retail location, the Evaluators determined the proportion of the

population within the Evergy MO territory, outside of Evergy MO territory, and outside of the state of Missouri.

- Third, a general population survey was used assess the shopping habits of customers within the radius of participating retailers. This was used to assess the total and maximum drive time that Evergy consumers would accept when shopping for products incentivized by the program. This was used in modifying the initial 60-minute drive assumption established in the first step. This approach uses a log transformation of the drive times to smooth the survey data and estimates the cumulative percent via a second order polynomial regression.
- Fourth, for each drive time, the propensity to drive is calculated based on the predicted cumulative percent. The propensity to drive is equal to 1 minus the predicted cumulative percent, such that customers with shorter drive times have a high propensity to drive (because cumulative percent from the survey is lower for shorter drive times), while customers with longer drive times have lower propensity to drive (because predicted cumulative percent is higher for longer drive times). Customers with a propensity to drive represent the estimated population for a given drive time (i.e. estimated population willing to drive = propensity to drive(%)*total population).
- Lastly, the percentage of bulbs that leaked out of the Evergy service territory (but still within MO) and the percent that leaked out of state were calculated.

Leakage was estimated for Mass Merchants (Big Box retailers), DIY stores, and Member channels (e.g. Costco). Together, these three program channels represented 95% program savings. A savings-weighted leakage rate was applied to the remaining retailer types. ADM found that Evergy's overall leakage rate was 1.6%. Given the large and contiguous size of Evergy's territory, the low leakage rate is to be expected.

A.2.5 Final Net-to-Gross Ratio

The measure level net-to-gross ratio for discounted LEDs are calculated as

Equation A-2: Net-to-Gross Ratio

$$NTGR = 1 - Free\ Ridership + Participant\ Spillover.$$

Using this formula, ADM calculated final net-to-gross ratios for each LED type in the 2020 program as well as for the program overall. The results are shown in Table A-2 below.

Table A-2 Verified Gross and Net Impacts - ESP Program

Measure	Free Ridership Score	Participant Spillover	Net-to-Gross Ratio	Program Leakage
LED - Standard	51%	7%	56%	1.6%
LED - Specialty	45%	7%	62%	1.6%
Budget Locations*	-		100%	1.6%
Total	**47%**	**7%**	**60%**	**1.6%**

***** For program LEDs distributed through budget-retailers Dollar Tree, True Value, Habitat Restores, and Goodwill, ADM applied an assumed a NTGR of 100%.

A.3 Income Eligible Multifamily

The Net-To-Gross Ratio (NTGR) for the Income-Eligible Multi-Family 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 NTGR from stipulated values.

A.4 Home Energy Report & Online Energy Audit

Home Energy Reports directly estimates net impacts through a billing analysis that utilizes controls. No savings were claimed for Home Energy Audit

A.5 Demand Response: Custom Business & Smart Thermostats

These programs directly estimate net impacts through a billing analysis that utilizes controls.

Appendix B Missouri Requirements for Impact Evaluation

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 MO West and Evergy Metro, has contracted with ADM Associates to evaluate, measure, and verify the information tracked by Evergy MO West and Evergy Metro for its portfolio of Seven Residential programs and 3 Demand Response programs for the 3-year program cycle beginning January 1, 2020 through December 31, 2022. Specific Evergy programs covered by this evaluation include:

Residential Programs:

- Heating Cooling & Home Comfort
- Energy Savings Products
- Income-Eligible Multifamily
- Home Energy Report
- Online Home Energy Audit
- Products & Services Incubator
- PAYS

Demand Response Programs

- Business Demand Response
- Residential Demand Response
- Business Smart Thermostat

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.

Method 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:*

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

Method 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:*

- Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or
- Audit and survey data on appliance and equipment type, size and efficiency levels, household characteristics, or energy-related building characteristics.

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

Table B-1: MO 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
	Low Income Multifamily	1A	2B
	Home Energy Reports	1B	2A
	Online Audits	NA	NA
	Incubator Programs & PAYS	NA	NA
	Residential Smart Thermostat	1B	2B
Demand Response	Business Custom Demand Response	1A	2A
	Business Smart Thermostat	1B	2B

Appendix C Heating, Cooling and Home Comfort Program-Specific Methodologies

C.1 Program Overview

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 three primary components: 1) Energy Savings Kit, 2) Insulation and Air Sealing, and 3) HVAC as show in Table C-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 PY1, customers could receive the following eligible equipment upgrades:

Table C-1: Program Equipment Offered

Program Component	Measure
Energy Savings Kit	LED Lightbulbs
	Faucet Aerators
	Low Flow Showerheads
	Pipe Insulation
	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

PY1 performance metrics are summarized in Table C-2. Overall, gross verified energy savings were close to the targeted value, while the gross verified peak demand savings exceeded the targeted value.

Table C-2: Program Performance Metrics

Metric	PY1 Total	West	Metro
Number of Participants*	4,640		
Energy Savings (kWh)			
Targeted Energy Savings	10,582,901	7,236,542	3,346,358
Reported Energy Savings	9,559,135	5,937,819	3,621,316
Gross Verified Energy Savings	9,133,038	5,496,808	3,636,230
Net Verified Energy Savings	6,786,008	3,963,157	2,822,852
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	4,740.07	3,133.38	1,606.69
Reported Peak Demand Reduction	5,639.02	3,328.37	2,310.65
Gross Verified Peak Demand Reduction	5,959.62	3,451.32	2,508.30
Net Verified Peak Demand Reduction	4,407.13	2,524.83	1,882.30
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	1.04	1.02	1.07
*Represents the number of unique account numbers in the program			

C.2 EM&V Methodology

This section provides an overview of the gross and net impact evaluation of the Heating, Cooling, and Home Comfort Program. Data collection included participant surveys, trade ally surveys, and in-depth interviews with program staff. Additional sources of data to inform the impact evaluation were a census of program tracking data from the program implementor's tracking and reporting system, along with requested project documentation. Program tracking data included customer contact information and descriptions of the measures installed.

C.2.1 Sampling Plan

Table C-3 summarizes the sample size for each primary data collection activity. The random sample for verification was designed to achieve ±10% relative precision or better at the 90% confidence interval.

Table C-3: Sample Sizes for Data Collection Efforts

Data Collection Activity	Achieved Sample Size
Participant Surveys Completed	143
Trade Ally Surveys Completed	29
In-Depth Interviews with Program Staff	5

For the calculation of sample size for survey completes, a coefficient of variation of 0.5 was assumed. With this assumption, a minimum sample size of 68 participants per jurisdiction was needed, as shown in Equation C-1.

Equation C-1: Minimum Sample Size Formula for 90 Percent Confidence Level

$$n_0 = \left(\frac{Z * CV}{RP}\right)^2 = \left(\frac{1.645 * 0.5}{0.10}\right)^2 = 68$$

Where:

n_0 = *minimum sample size*

Z = *Z-statistic value (1.645 for the 90% confidence level)*

CV = *Coefficient of Variation (assumed to be 0.5)*

RP = *Relative Precision (0.10)*

C.2.2 Data Collection

Participant Survey

Contact information from all PY1 program participants was pulled from the tracking data and included in the survey sample list. Any participant with a valid email address was sent the online participant survey in February 2021. A total of 2,520 participants were sent the online survey, which resulted in a total of 143 completed participant surveys (70 completes from Missouri West and 73 completes from Missouri Metro).

Trade Ally Survey

An online survey consisting of a small sample of highly active trade allies was administered to assess program impacts on recommendations made to customers and collect additional feedback on the program. Contact information from all trade allies was pulled from the tracking data and included in the survey sample list. Any trade ally with a

valid email address was sent the online trade ally survey in February 2021. A total of 208 trade allies were sent the online survey, which resulted in 29 survey completes.

Program Staff Interviews

In January 2021, program staff members from PSO and the implementation contractor (ICF) were interviewed to obtain the program administrator's perspective on program processes and operations for the Heating, Cooling, and Home Comfort Program in PY1.

C.2.3 Gross Impact Methodologies

The method used to calculate and verify energy savings (kWh) and 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 180 HVAC units (70 central ACs, 40 air source heat pumps, and 17 ductless mini-split heat pumps) 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.
- HVAC early replacement verification. A sample of 100 HVAC units (70 central ACs and 30 air source heat pumps) from the program were pulled. The project documentation from those units was requested from the program implementer (ICF) and then reviewed to ensure the sampled HVAC units listed as early replacements in the tracking data were verified to be replaced before burnout.
- 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 listed in the Illinois Technical Reference Manual (IL TRM) as outlined in the Evergy TRM.

LED Lightbulbs

ADM calculated energy savings and demand reductions using prescriptive algorithms from the Evergy TRM, Illinois Technical Reference Manual (IL TRM), and other relevant program sources, as necessary, with adjusted baseline hours of use. Additionally, HVAC interactive effects were accounted for using algorithms from the Evergy TRM dependent upon heating and cooling systems serving areas where lighting systems were installed. Savings algorithms for omni-directional LED lightbulbs were taken from the Evergy TRM. The kWh savings and kW demand reductions from the installation of LED bulbs were determined using Equation C-2 through Equation C-3 below:

Equation C-2: kWh Energy Savings from LED Bulbs

$$\Delta kWh = (W\_base - W\_ee)/1000 \times HOU \times 〖WHF〗\_e \times ISR$$

Equation C-3: kW Peak Demand Reduction from LED Bulbs

$$\Delta kW = (W\_base - W\_ee)/1000 \times CF \times 〖WHF〗\_d \times ISR$$

Where:

Wbase	*= Input wattage of the existing or baseline system*
Wee	*= Actual wattage of LED purchased/installed*
HOU	*= Hours of use*
WFHe	*= Waste heat factor for energy to account for cooling energy savings from efficient lighting*
WFHd	*= Waste heat factor for demand to account for cooling savings from efficient lighting*
ISR	*= Installation rate*
CF	*= Summer Peak Coincidence Factor for measure*

Faucet Aerators

ADM utilized savings algorithms found in the Evergy TRM for all faucet aerators (kitchen and bathroom) in the program. Final savings were based on the number of faucet aerators per household, the number of faucet aerators retrofitted, and the type of water heating unit in the home. The kWh savings and kW demand reductions from the installation of faucet aerators were determined using Equation C-4 through

Equation C-5 below:

Equation C-4: kWh Energy Savings for Faucet Aerators

$$\Delta kWh = \%ElectricDHW * ((GPM\_base * L\_base - GPM\_low * L\_low) * Household * 365.25 * DF / FPH) * EPG\_electric * ISR$$

Where:

%ElectricDHW	*= proportion of water heating supplied by electric resistance heating*
GPM_base	*= Average flow rate, in gallons per minute, of the baseline faucet "as used." This includes the effect of existing low flow fixtures and therefore the free ridership rate for this measure should be 0.*
	*= Measured full throttle flow * 0.83 throttling factor*
GPM_low	*= Average flow rate, in gallons per minute, of the low-flow faucet aerator "as-used"*
	*= Rated full throttle flow * 0.95 throttling factor*
L_base	*= Average baseline daily length faucet use per capita for faucet of interest in minutes*
L_low	*= Average retrofit daily length faucet use per capita for faucet of interest in minutes*
Household	*= Average number of people per household*
DF	*= Drain Factor*
FPH	*= Faucets Per Household*
EPG_electric	*= Energy per gallon of water used by faucet supplied by electric water heater*
	= 0.0795 kWh/gal (Bath), 0.0969 kWh/gal (Kitchen), 0.0919 kWh/gal (Unknown)
WaterTemp	*= Assumed temperature of mixed water*
	= 86ºF for Bath, 93ºF for Kitchen, 91ºF for Unknown
SupplyTemp	*= Assumed temperature of water entering house*
	= 54.1ºF
RE_electric	*= Recovery efficiency of electric water heater*
	= 98%
ISR	*= In service rate of faucet aerators dependent on install method*
	= 0.95 (direct install – single family)

Equation C-5: kW Peak Demand Reduction for Faucet Aerators

$$\Delta kW = \Delta kWh / Hours * CF$$

Where:

ΔkWh	= kWh savings from faucet aerators
Hours	= Annual electric DHW recovery hours for faucet use per faucet
	= ((GPM_base * L_base) * Household/FPH * 365.25 * DF) * 0.545 / GPH
GPH	= Gallons per hour recovery of electric water heater calculated for 70.9ºF temp rise (125-54.1), 98% recovery efficiency, and typical 4.5kW electric resistance storage tank
	= 25.5
CF	= Coincidence Factor for electric load reduction
	= 0.022

Low Flow Showerheads

ADM utilized savings algorithms found in the Evergy TRM all low flow showerheads in the program. Final savings were based on the number of showerheads per household, the number of showerheads retrofitted, and the type of water heating unit in the home. The kWh savings and kW demand reductions from the installation of faucet aerators were determined using Equation C-6 through Equation C-7 below:

Equation C-6: kWh Energy Savings for Low Flow Showerheads

$$\Delta kWh = \%ElectricDHW * ((GPM\_base * L\_base - GPM\_low * L\_low) * Household * SPCD * 365.25 / SPH) * EPG\_electric * ISR$$

Where:

%ElectricDHW	= proportion of water heating supplied by electric resistance heating
GPM_base	= Flow rate of the baseline showerhead
	= 2.67
GPM_low	= As-used flow rate of the low-flow showerhead
L_base	= Shower length in minutes with baseline showerhead
	= 7.8 min

L_low	*= Shower length in minutes with low-flow showerhead*
	= 7.8 min
Household	*= Average number of people per household*
SPCD	*= Showers Per Capita Per Day*
	= 0.6
SPH	*= Showerheads per household so that per-showerhead savings fractions can be determined*
EPG_electric	*= Energy per gallon of hot water supplied by electric*
	= 0.117 kWh/gal
ShowerTemp	*= Assumed temperature of water*
	= 101ºF
SupplyTemp	*= Assumed temperature of water entering house*
	= 54.1ºF
RE_electric	*= Recovery efficiency of electric water heater*
	= 98%
ISR	*= In service rate of showerhead*

Equation C-7: kW Peak Demand Reduction for Low Flow Showerheads

$$\Delta kW = \Delta kWh/Hours * CF$$

Where:

Δ kWh	*= kWh savings from low flow showerheads*
Hours	*= Annual electric DHW recovery hours for showerhead use*
GPH	*= Gallons per hour recovery of electric water heater calculated for 65.9F temp rise (120-54.1), 98% recovery efficiency, and typical 4.5 kW electric resistance storage tank*
	= 27.51
CF	*= Coincidence Factor for electric load reduction*
	= 0.0278

Pipe Insulation

ADM utilized savings algorithms found in the Evergy TRM for all pipe insulation in the program. Final savings were based on the length of pipe that the pipe wrap insulation covers. Default savings were provided per 3ft length and were appropriate up to 6ft of the hot water pipe and 3ft of the cold. The baseline is an un-insulated hot water pipe. The kWh savings and kW demand reductions from the installation of pipe insulation were determined using Equation C-8 through Equation C-9 below:

Equation C-8: kWh Energy Savings for Pipe Insulation

$$\Delta kWh = ((1/Rexist - 1/Rnew) * (L * C) * \Delta T * 8{,}766) / \eta DHW / 3413$$

Where:

Rexist	*= Pipe heat loss coefficient of uninsulated pipe (existing)*
[(hr-°F-ft)/Btu]	
	= 1.0
Rnew	*= Pipe heat loss coefficient of insulated pipe (new) [(hr-°F-ft)/Btu]*
	= 1.0 + R value of insulation
L	*= Length of pipe from water heating source covered by pipe wrap (ft)*
C	*= Circumference of pipe (ft) (Diameter (in) * π/12)*
	= 0.5" pipe = 0.131ft, 0.75" pipe = 0.196ft
Δ T	*= Average temperature difference between supplied water and outside air temperature (°F)*
	= 60°F
η DHW	*= Recovery efficiency of electric hot water heater*
	= 0.98

Equation C-9: kW Peak Demand Reduction for Pipe Insulation

$$\Delta kW = \Delta kWh / 8766$$

Where:

Δ kWh	*= kWh savings from pipe wrap installation*

Advanced Power Strips

ADM utilized savings algorithms found in the Evergy TRM for all advanced power strips in the program. This measure characterization provided savings for a 7-plug strip. The assumed baseline was a standard power strip that does not control connected loads. The kWh savings and kW demand reductions from the installation of advanced power strips were determined using Equation C-10 through Equation C-11 below:

Equation C-10: kWh Energy Savings for Advanced Power Strips

$$\Delta kWh7\text{-}Plug = 103\ kWh$$

Equation C-11: kW Peak Demand Reduction for Advanced Power Strips

$$\Delta kW = \Delta kWh \,/\, Hours * CF$$

Where:

Hours	*= Annual number of hours during which the controlled standby loads are turned off by the advanced power strip*
	= 7,129
CF	*= Summer Peak Coincidence Factor for measure*
	= 0.8
$\Delta kW7\text{-}Plug$	$= 0.0115\ kW$

Air Sealing

Thermal shell air leaks were sealed through strategic use and location of air-tight materials. Leaks were detected and leakage rates measured with the assistance of a blower-door test. The initial and final tested leakage rates were performed in such a manner that the identified reductions can be properly discerned, particularly in situations wherein multiple building envelope measures may have been implemented simultaneously. ADM utilized savings algorithms found in the Evergy TRM for all air sealing in the program. The kWh savings and kW demand reductions from the air sealing were determined using Equation C-12 through Equation C-16:

Equation C-12: kWh Energy Savings for Air Sealing

$$\Delta kWh = \Delta kWh\_cooling + \Delta kWh\_heating$$

Where:

Δ kWh_cooling	*= If central cooling, reduction in annual cooling requirement due to air sealing*
Δ kWh_heating	*= If electric heat (resistance or heat pump), reduction in annual electric heating due to air sealing OR*
	= If gas furnace heat, kWh savings for reduction in fan run time

Equation C-13: kWh Savings for Reduction in Annual Cooling Requirement Due to Air Sealing

$$\Delta kWh_{cooling} = [(((CFM50_{existing} - CFM50_{new})/N_{cool}) * 60 * 24 * CDD * DUA * 0.018) / (1000 * \eta Cool)] * LM$$

Where:

CFM50_existing	*= Infiltration at 50 Pascals as measured by blower door before air sealing*
CFM50_new	*= Infiltration at 50 Pascals as measured by blower door after air sealing*
N_cool	*= Conversion factor from leakage at 50 Pascal to leakage at natural conditions*
CDD	*= Cooling Degree Days*
DUA	*= Discretionary Use Adjustment (reflects the fact that people do not always operate their air conditioner when conditions may call for it)*
η Cool	*= Efficiency (SEER) of air conditioning equipment (kBtu/kWh)*
LM	*= Latent multiplier to account for latent cooling demand*

Equation C-14: kWh Savings for Reduction in Annual Electric Heating Due to Air Sealing

$$\Delta kWh_{heating} = (((CFM50_{existing} - CFM50_{new})/N_{heat}) * 60 * 24 * HDD * 0.018) / (\eta Heat * 3{,}412)$$

Where:

N_heat	*= Conversion factor from leakage at 50 Pascal to leakage at natural conditions*
HDD	*= Heating Degree Days*
η Heat	*= Efficiency of heating system*

Equation C-15: kWh Savings for Reduction in Fan Run Time (Gas Furnace Heat) Due to Air Sealing

$$\Delta kWh\_heating = \Delta Therms * Fe * 29.3$$

Where:

Fe	*= Furnace fan energy consumption as a percentage of annual fuel consumption*
	= 3.14%

Equation C-16: kW Peak Demand Reduction for Air Sealing

$$\Delta kW = (\Delta kWh\_cooling / FLH\_cooling) * CF$$

Where:

FLH_cooling	*= Full load hours of air conditioning*
CF	*= Summer System Peak Coincidence Factor (during system peak hour)*
	= 68% (for Central A/Cs)
	= 72% (for Heat Pumps)

Ceiling/Attic Insulation

Insulation was added to a home's ceiling/attic. This measure required a member of the implementation staff evaluating the pre and post R-values and measure surface areas. The existing condition was evaluated by implementation staff and was likely to be little or no attic insulation. ADM utilized savings algorithms found in the Evergy TRM for all ceiling/attic insulation in the program. The kWh savings and kW demand reductions from the installation of ceiling/attic insulation were determined using Equation C-17 through Equation C-19:

Equation C-17: kWh Energy Savings for Ceiling/Attic Insulation

$$\Delta kWh = \Delta kWh\_cooling + \Delta kWh\_heating$$

Where:

Δ kWh_cooling	*= If central cooling, reduction in annual cooling requirement due to insulation*

Δ kWh_heating	*= If electric heat (resistance or heat pump), reduction in annual electric heating due to insulation*
	= If gas furnace heat, kWh savings for reduction in fan run time

Equation C-18: kWh Savings for Reduction in Annual Cooling Requirement Due to Ceiling/Attic Insulation

$$\Delta kWh\_cooling = ((((1/R\_old - 1/R\_attic) * A\_attic * (1-Framing\_factor\_attic)) * 24 * CDD * DUA) / (1000 * \eta Cool)) * ADJ\_WallAtticCool$$

Where:

R_attic	*= R-value of new attic assembly (including all layers between inside air and outside air)*
R_old	*= R-value value of existing assemble and any existing insulation (Minimum of R-5 for uninsulated assemblies)*
A_attic	*= Total area of insulated ceiling/attic (ft2)*
Framing_factor_attic	*= Adjustment to account for area of framing*
	= 7%
CDD	*= Cooling Degree Days*
DUA	*= Discretionary Use Adjustment (reflects the fact that people do not always operate their air conditioner when conditions may call for it)*
	= 0.75
η Cool	*= Seasonal Energy Efficiency Ratio of cooling system (kBtu/kWh)*
ADJWallAtticCool	*= Adjustment for cooling savings from basement wall insulation to account for prescriptive engineering algorithms overclaiming savings*
	= 80%

Equation C-19: kWh Savings for Reduction in Annual Electric Heating (Resistance or Heat Pump) Due to Ceiling/Attic Insulation

$$\Delta kWh\_heating = ((((1/R\_old - 1/R\_attic) * A\_attic * (1-Framing\_factor\_attic)) * 24 * HDD] / (\eta Heat * 3412)) * ADJ\_WallAtticHeat$$

Where:

HDD	*= Heating Degree Days*
η Heat	*= Efficiency of heating system*

ADJWallAtticHeat = *Adjustment for wall and attic insulation to account for prescriptive engineering algorithms overclaiming savings*

= *60%*

Central Air Conditioners

This measure characterizes time of sale and early replacement central air conditioners following the Evergy TRM. ADM utilized savings algorithms found in the Evergy TRM for all central air conditioners in the program. The kWh savings and kW demand reductions from the installation of central air conditioners were determined using Equation C-20 through Equation C-23 below:

Equation C-20: kWh Energy Savings for Central Air Conditioners (Time of Sale)

$$\Delta kWH = (FLHcool * Capacity * (1/(SEER\_base * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff))))/1000$$

Equation C-21: kWh Energy Savings for Central Air Conditioners (Early Replacement)

$$\Delta kWH \text{ for remaining life of existing unit (first 6 years)} = (FLHcool * Capacity * (1/(SEER\_exist * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff))))/1000$$

$$\Delta kWH \text{ for remaining measure life (next 12 years)} = (FLHcool * Capacity * (1/(SEER\_base * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff))))/1000$$

Where:

FLHcool = *Full load cooling hours*

Capacity = *Size of new equipment in Btu/hr (note 1 ton = 12,000Btu/hr)*

SEERbase = *Seasonal energy-efficiency ratio of baseline unit (kBtu/kWh)*

= *13*

SEERexist = *Seasonal energy-efficiency ratio of existing unit (kBtu/kWh)*

SEERee = *Rated seasonal energy-efficiency ratio of ENERGY STAR unit (kBtu/kWh)*

SEERadj = *Adjustment percentage to account for in-situ performance of the unit*

= *[0.805 ×(〖EER〗_ee/〖SEER〗_ee)+0.367]*

DeratingCoolEff = *Efficient central air conditioner cooling derating*

= *0% if Quality Installation is performed*

= *10% if Quality Installation is not performed or unknown*

DeratingCoolBase = *Baseline central air conditioner cooling derating*

= *10%*

Equation C-22: kW Peak Demand Reduction for Central Air Conditioners (Time of Sale)

$$\Delta kW = (Capacity * (1/(EER\_base * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff))))/1000 * CF$$

Equation C-23: kW Peak Demand Reduction for Central Air Conditioners (Early Replacement)

$$\Delta kW \text{ for remaining life of existing unit (first 6 years)} = (Capacity * (1/(EER\_exist * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff))))/1000 * CF$$

$$\Delta kW \text{ for remaining measure life (next 12 years)} = (Capacity * (1/(EER\_base * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff))))/1000 * CF$$

Where:

EERbase = *EER Efficiency of baseline unit*

= *10.5*

EERexist = *EER Efficiency of existing unit*

EERee = *EER Efficiency of ENERGY STAR unit*

CF = *Coincidence Factor for Central A/Cs (during system peak hour)*

= *68%*

Other variables as defined above.

Air Source Heat Pumps

This measure characterizes time of sale and early replacement air source heat pumps following the Evergy TRM. ADM utilized savings algorithms found in the Evergy TRM for all air source heat pumps in the program. The kWh savings and kW demand reductions from the installation of air source heat pumps were determined using

Equation C-24 through Equation C-27:

Equation C-24: kWh Energy Savings for Air Source Heat Pumps (Time of Sale)

$$\Delta kWh = ((FLH\_cooling * Capacity\_cooling * (1/(SEER\_base * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff)))) / 1000) + ((FLH\_heat * Capacity\_heating * (1/(HSPF\_base * (1 - DeratingHeat\_Base)) - 1/(HSPF\_ee * HSPF\_adj * (1 - DeratingHeat\_Eff)))) / 1000)$$

Equation C-25: kWh Energy Savings for Air Source Heat Pumps (Early Replacement)

$$\Delta kWH \text{ for remaining life of existing unit (first 6 years)} = ((FLH\_cooling * Capacity\_cooling * (1/(SEER\_exist * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff)))) / 1000) + ((FLH\_heat * Capacity\_heating * (1/(HSPF\_exist * (1 - DeratingHeat\_Base)) - 1/(HSPF\_ee * HSPF\_adj * (1 - 〖DeratingHeat〗_Eff)))) / 1000)$$

$$\Delta kWH \text{ for remaining measure life (next 12 years)} = ((FLH\_cooling * Capacity\_cooling * (1/(SEER\_base * (1 - DeratingCool\_Base)) - 1/(SEER\_ee * SEER\_adj * (1 - DeratingCool\_Eff)))) / 1000) + ((FLH\_heat * Capacity\_heating * (1/(HSPF\_base * (1 - DeratingHeat\_Base)) - 1/(HSPF\_ee * HSPF\_adj * (1 - DeratingHeat\_Eff)))) / 1000)$$

Where:

FLH_cooling	*= Full load hours of air conditioning*
Capacity_cooling	*= Cooling Capacity of Air Source Heat Pump (Btu/hr)*
SEERexist	*= Seasonal Energy Efficiency Ratio of existing cooling system (kBtu/kWh)*
SEERbase	*= Seasonal Energy Efficiency Ratio of baseline Air Source Heat Pump (kBtu/kWh)*
	= 14
SEERee	*= Rated Seasonal Energy Efficiency Ratio of ENERGY STAR unit (kBtu/kWh)*
SEERadj	*= Adjustment percentage to account for in-situ performance of the unit*
	= [0.805 ×(〖EER〗_ee/〖SEER〗_ee)+0.367]
DeratingCoolEff	*= Efficient air source heat pump cooling derating*
	= 0% if Quality Installation is performed
	= 10% if Quality Installation is not performed or unknown
DeratingCoolBase	*= Baseline Cooling derating*
	= 10%
FLH_heat	*= Full load hours of heating*

Equation C-26: kW Peak Demand Reduction for Air Source Heat Pumps (Time of Sale)

$$\Delta kW = (Capacity\_cooling * (1/(EER\_base * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff)))) / 1000 * CF$$

Equation C-27: kW Peak Demand Reduction for Air Source Heat Pumps (Early Replacement)

$$\Delta kW \text{ for remaining life of existing unit (first 6 years)} = (Capacity\_cooling * (1/(EER\_exist * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff)))) / 1000 * CF$$

$$\Delta kW \text{ for remaining measure life (next 12 years)} = (Capacity\_cooling * (1/(EER\_base * (1 - DeratingCool\_Base)) - 1/(EER\_ee * (1 - DeratingCool\_Eff)))) / 1000 * CF$$

Where:

EERexist	*= Energy Efficiency Ratio of existing cooling system (kBtu/hr / kW)*
EERbase	*= Energy Efficiency Ratio of baseline air source heat pump (kBtu/hr / kW)*
	= 11
EERee	*= Energy Efficiency Ratio of efficient air source heat pump (kBtu/hr / kW)*
CF	*= Coincidence Factor for heat pumps (during system peak hour)*
	= 72%

Other variables as defined above.

Ground Source Heat Pumps

This measure characterizes time of sale and early replacement ground source heat pumps (non-fuel switch) following the Evergy TRM. ADM utilized savings algorithms found in the Evergy TRM for all ground source heat pumps in the program. The kWh savings and kW demand reductions from the installation of ground source heat pumps were determined using Equation C-28 through Equation C-31 below:

Equation C-28: kWh Energy Savings for Ground Source Heat Pumps (Time of Sale)

$$\Delta kWh = [FLHcool * Capacity\_cooling * (1/SEER\_base - 1/EER\_PL)/1000] + [FLHheat * Capacity\_heating * (1/HSPF\_ASHP - 1/(COP\_PL * 3.412))/1000] + [ElecDHW * \%DHWDisplaced * ((1/EF\_ELEC * GPD * Household * 365.25 * \gamma Water * (T\_OUT - T\_IN) * 1.0) / 3412)]$$

Equation C-29: kWh Energy Savings for Ground Source Heat Pumps (Early Replacement)

$$\Delta \text{ kWH for remaining life of existing unit (first 8 years)} = [FLHcool * Capacity\_cooling * (1/SEER\_exist - 1/EER\_PL)/1000] + [ElecHeat * FLHheat * Capacity\_heating * (1/HSPF\_exist - 1/(COP\_PL * 3.412))/1000] + [ElecDHW * \%DHWDisplaced * ((1/ EF\_ELEC * GPD * Household * 365.25 * \gamma Water * (T\_OUT - T\_IN) * 1.0) / 3412)]$$

$$\Delta \text{ kWH for remaining measure life (next 17 years)} = [FLHcool * Capacity\_cooling * (1/SEER\_base - 1/EER\_PL)/1000] + [ElecHeat * FLHheat * Capacity\_heating * (1/HSPF\_base - (1/(COP\_PL * 3.412))/1000] + [ElecDHW * \%DHWDisplaced * ((1/ EF\_ELEC * GPD * Household * 365.25 * \gamma Water * (T\_OUT - T\_IN) * 1.0) / 3412)]$$

Where:

FLHcool	*= Full load cooling hours*
Capacity_cooling	*= Cooling Capacity of ground source heat pump (Btu/hr)*
SEERbase	*= SEER Efficiency of new replacement baseline unit*
SEERexist	*= SEER Efficiency of existing cooling unit*
EERPL	*= Part Load EER Efficiency of efficient ground source heat pump unit*
ElecHeat	*= 1 if existing building is electrically heated*
	= 0 if existing building is not electrically heated
FLHheat	*= Full load heating hours*
Capacity_heating	*= Heating Capacity of ground source heat pump (Btu/hr)*
HSPFbase	*= Heating System Performance Factor of new replacement baseline heating system (kBtu/kWh)*
HSPFexist	*= Heating System Performance Factor of existing heating system (kBtu/kWh)*
COPPL	*= Part Load Coefficient of Performance of efficient unit*
ElecDHW	*= 1 if existing DHW is electrically heated*
	= 0 if existing DHW is not electrically heated
%DHWDisplaced	*= Percentage of total DHW load that the ground source heat pump will provide*
EFELEC	*= Energy Factor (efficiency) of electric water heater*
GPD	*= Gallons Per Day of hot water use per person*
Household	*= Average number of people per household*

γ *Water*	*= Specific weight of water*
TOUT	*= Tank temperature*
	= 125°F
TIN	*= Incoming water temperature from well or municipal system*
	= 54°F

Equation C-30: kW Peak Demand Reduction for Ground Source Heat Pumps (Time of Sale)

$$\Delta kW = (Capacity\_cooling * (1/EER\_base - 1/EER\_FL))/1000 * CF$$

Equation C-31: kW Peak Demand Reduction for Ground Source Heat Pumps (Early Replacement)

$$\Delta kW \text{ for remaining life of existing unit (first 8 years)} = (Capacity\_cooling * (1/EER\_exist - 1/EER\_FL))/1000 * CF$$

$$\Delta kW \text{ for remaining measure life (next 17 years)} = (Capacity\_cooling * (1/EER\_base - 1/EER\_FL))/1000 * CF$$

Where:

EERbase	*= Energy Efficiency Ratio of new replacement baseline unit*
EERexist	*= Energy Efficiency Ratio of existing cooling unit (kBtu/hr / kW)*
EERFL	*= Full Load Energy Efficiency Ratio of ENERGY STAR ground source heat pump unit*
CF	*= Coincidence Factor for heat pumps (during system peak hour)*
	= 72%

Other variables as defined above.

Ductless Mini-Split Heat Pumps

This measure characterizes time of sale and early replacement ductless mini-split heat pumps (non-fuel switch) following the Evergy TRM. ADM utilized savings algorithms found in the Evergy TRM for all ductless mini-split heat pumps in the program. The kWh savings and kW demand reductions from the installation of ground source heat pumps were determined using Equation C-32 through Equation C-35 below:

Equation C-32: kWh Energy Savings for Ductless Mini-Spilt Heat Pumps (Time of Sale)

$$\Delta kWh = [(Elecheat * Capacity\_heat * EFLH\_heat * (1/HSPF\_Base - 1/HSPF\_ee)) / 1000] + [(Capacity\_cool * EFLH\_cool * (1/SEER\_Base - 1/SEER\_ee)) / 1000]$$

Equation C-33: kWh Energy Savings for Ductless Mini-Spilt Heat Pumps (Early Replacement)

$$\Delta kWH \text{ for remaining life of existing unit (first 6 years)} = [(Elecheat * Capacity\_heat * EFLH\_heat * (1/HSPF\_exist - 1/HSPF\_ee)) / 1000] + [(Capacity\_cool * EFLH\_cool * (1/SEER\_exist - 1/SEER\_ee)) / 1000]$$

$$\Delta kWH \text{ for remaining measure life (next 12 years)} = [(Elecheat * Capacity\_heat * EFLH\_heat * (1/HSPF\_base - 1/HSPF\_ee)) / 1000] + [(Capacity\_cool * EFLH\_cool * (1/SEER\_base - 1/SEER\_ee)) / 1000]$$

Where:

ElecHeat	*= 1 if existing building is electrically heated*
	= 0 if existing building is not electrically heated
Capacityheat	*= Heating capacity of the ductless heat pump unit in Btu/hr*
EFLHheat	*= Equivalent Full Load Hours for heating*
HSPFbase	*= Heating System Performance Factor of new replacement baseline heating system (kBtu/kWh)*
HSPFexist	*= HSPF rating of existing equipment (kbtu/kwh)*
HSPFee	*= HSPF rating of new equipment (kbtu/kwh)*
Capacitycool	*= the cooling capacity of the ductless heat pump unit in Btu/hr*
SEERbase	*= SEER rating of new replacement baseline unit*
SEERee	*= SEER rating of new equipment (kbtu/kwh)*
SEERexist	*= SEER rating of existing equipment (kbtu/kwh)*
EFLHcool	*= Equivalent Full Load Hours for cooling*

Equation C-34: kW Peak Demand Reduction for Ductless Mini-Split Heat Pumps (Time of Sale)

$$\Delta kW = (Capacitycool * (1/EERbase - 1/EERee)) / 1000) * CF$$

Equation C-35: kW Peak Demand Reduction for Ductless Mini-Split Heat Pumps (Early Replacement)

$$\Delta \text{ kW for remaining life of existing unit (first 6 years)} = (Capacity_{cool} * (1/EER_{exist} - 1/EER_{ee})) / 1000) * CF$$

$$\Delta kW \text{ for remaining measure life (next 12 years)} = (Capacity_{cool} * (1/EER_{base} - 1/EER_{ee})) / 1000) * CF$$

Where:

EERbase	*= Energy Efficiency Ratio of new replacement unit*
EERexist	*= Energy Efficiency Ratio of existing cooling system (kBtu/hr/kW)*
EERee	*= Energy Efficiency Ratio of new ductless mini-split heat pumps (kBtu/hr/kW)*
CF	*= Summer System Peak Coincidence Factor for heat pumps (during utility peak hour)*
	= 72%

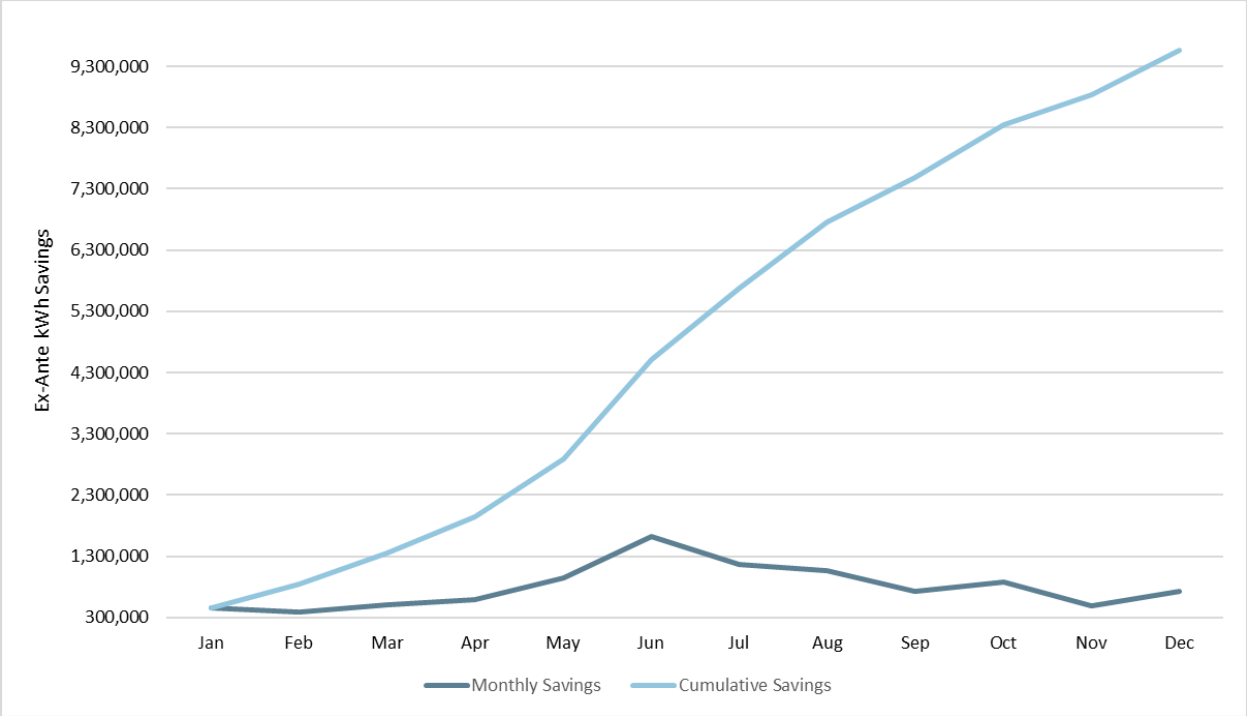
C.3 Gross Impact Evaluation Findings

This section details the level of program activity for 2020, the reported and verified gross savings that resulted from that activity.

C.3.1 Program Activity

The Heating, Cooling, and Home Comfort Program in 2020 had 6,169 total projects installed as part of the program. Final energy savings were based on a total of 29,625 energy savings measures. Figure C-1 below details the savings accumulated over the program year.

Figure C-1: Cumulative Reported Energy Savings During the Program Year



C.3.2 Gross Energy Saving and Demand Reduction

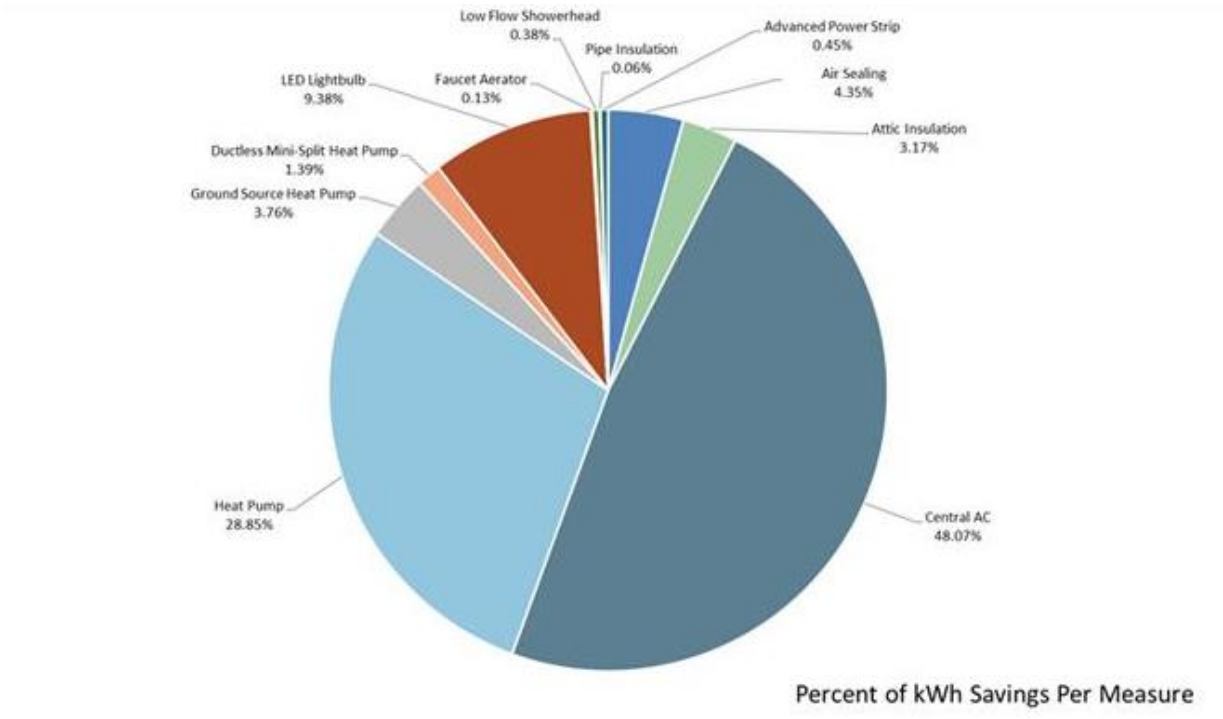
Based on the impact evaluation results, the total verified gross savings for the Heating, Cooling, and Home Comfort Program are 9,133,038 kWh, which resulted in a realization rate of 96% and 5,959.62 kW, which resulted in a realization rate of 106%. Table C-4 presents the gross verified energy and Demand Reduction and realization rates by measure.

Table C-4: Reported and Verified Gross Energy Savings & Demand Reduction

Measure	Reported Energy (kWh)	Gross Verified Energy (kWh)	Reported Demand (kW)	Gross Verified Demand (kW)	RR_{kWh}	RR_{kW}
Air Sealing	393,844	376,100	90.78	90.25	95%	99%
Attic Insulation	191,498	266,534	47.54	42.35	139%	89%
Central ACs	4,259,689	4,443,129	4,451.06	4,835.92	104%	109%
Heat Pumps	3,180,906	2,599,104	772.79	700.08	82%	91%
Ground Source Heat Pumps	421,715	389,016	146.03	119.78	92%	82%
Ductless Mini-Split Heat Pumps	136,323	125,174	7.13	57.36	92%	805%
LED Lightbulbs	878,661	842,251	106.39	97.12	96%	91%
Faucet Aerators	11,996	11,996	8.52	8.52	100%	100%
Low Flow Showerheads	34,436	34,436	3.17	3.17	100%	100%
Pipe Insulation	5,261	5,261	0.60	0.60	100%	100%
Advanced Power Strips	44,805	40,039	5.00	4.47	89%	89%
Total	**9,559,135**	**9,133,038**	**5,639.02**	**5,959.62**	**96%**	**106%**

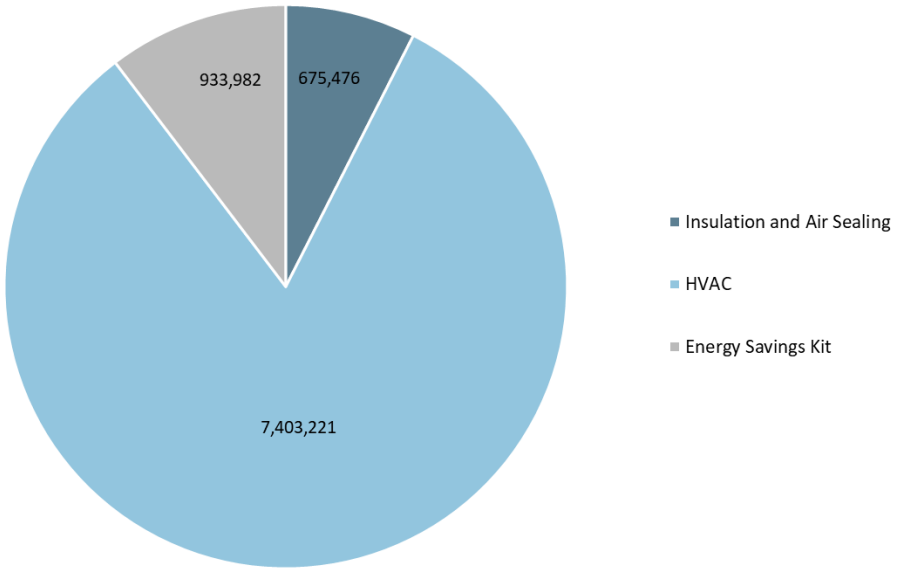
Figure C-2 shows the percentage of energy savings each measure contributed.

Figure C-2: Percent of kWh Savings Per Measure



A breakdown of the verified energy savings for the Insulation and Air Sealing, HVAC, and Energy Savings Kit sub-programs is show Figure C-3.

Figure C-3: Verified Energy Savings per Sub-Program



The gross impact analysis consisted of verifying measure installation and checking the program tracking data to ensure that savings algorithms were appropriately applied. ISRs for each measure type were developed based on the findings from the participant survey. The ISR per measure are summarized in Table C-5.

Table C-5: Measure-Level ISRs

Measure	ISR
LED Lightbulb	91%
Faucet Aerator	100%
Low Flow Showerhead	100%
Pipe Insulation	100%
Advanced Power Strip	89%
Air Sealing	100%
Attic Insulation	100%
Central AC	100%
Heat Pump	100%
Ground Source Heat Pump	100%
Ductless Mini-Split Heat Pump	100%

For each measure in the program, total gross energy savings and demand reduction were determined as a product of the number of measures installed as part of the program and the gross savings per measure. A description of verified gross findings for each measure type is included below.

LED Lightbulbs: The energy savings for LED lightbulbs have a realization rate of 96% and the demand savings had a realization rate of 91%. The difference in kWh savings between the ex-ante savings calculations and ex-post savings calculations is a result of the ex-ante savings calculations using 9W for the efficient wattages and 43W for all baseline wattages for all lightbulbs in the program, as well as the same hours of use. Ex-post calculations matched the ex-ante calculations for all 9W bulbs, but are using different baseline wattages, efficient wattages, and hours of use for the 5W, 6W, and 8W specialty bulbs as per the IL TRM. An ISR of 91% was applied to the overall energy and demand savings.

Faucet Aerators: The energy savings for faucet aerators have a realization rate of 100% and the demand savings have a realization rate of 100%. An ISR of 100% was applied to the overall energy and demand savings.

Low Flow Showerheads: The energy savings for low flow showerheads have a realization rate of 100% and the demand savings have a realization rate of 100%. An ISR of 100% was applied to the overall energy and demand savings.

Pipe Insulation: The energy savings for hot water pipe insulation have a realization rate of 100% and the demand savings have a realization rate of 100%. An ISR of 100% was applied to the overall energy and demand savings.

Advanced Power Strips: The energy savings for advanced power strips have a realization rate of 89% and the demand savings have a realization rate of 89%. An ISR of 89% was applied to the overall energy and demand savings.

Air Sealing: The energy savings for air sealing have a realization rate of 95% and the demand savings have a realization rate of 99%. The difference in kWh savings between the ex-ante savings calculations and ex-post savings calculations is a result of the ex-ante savings calculations using an average CDD and HDD based on data from all major cities in Missouri, while the ex-post calculations are using the CDD and HDD based on the closet major city. The difference in kW savings is a result of the ex-ante savings calculations using a CF of 70% (as stipulated in the Evergy TRM), while the ex-post calculations is using a CF from the IL TRM v5 of 68%. An ISR of 100% was applied to the overall energy and demand savings.

Attic/Ceiling Insulation: The energy savings for attic/ceiling insulation have a realization rate of 139% and the demand savings have a realization rate of 89%. The difference in kWh savings is a result of the ex-post calculations using the actual project SEER and HSPF values if the HVAC unit was also replaced as part of the program, while the ex-ante calculations are using default values of 14 SEER and 8.2 HSPF for all units in the program. The difference in kW savings is a result of the ex-ante savings calculations using a CF of 70% (as stipulated in the Evergy TRM), while the ex-post calculations are using a CF from the IL TRM v5 of 68%. An ISR of 100% was applied to the overall energy and demand savings.

Central Air Conditioners: The energy savings for central air conditioners have a realization rate of 104% and the demand savings have a realization rate of 109%. The difference in kW savings between the ex-ante savings calculations and ex-post savings calculations is a result of the ex-post calculations using an existing EER of 7.5 (as stipulated in the IL TRM v7) for some early replacement units in the program since the actual existing EER was unknown, while the ex-ante calculations are using an existing EER of 9.2 (as stipulated in the Evergy TRM) for all early replacement units in the program. An ISR of 100% was applied to the overall energy and demand savings.

Air Source Heat Pumps: The energy savings for air source heat pumps have a realization rate of 82% and the demand savings have a realization rate of 91%. The difference in kWh savings between the ex-ante savings calculations and ex-post savings calculations is a result of the ex-ante savings calculations using a HSPF baseline of 5.44 for some units in the program (as stipulated by the Evergy TRM), while the ex-post savings calculations are using an HSPF baseline of 8.2 for all units in the program (as stipulated by the IL TRM v7). The difference in kW savings is a result of the ex-ante

calculations using an EER baseline of 11 for some of the units in the program (as stipulated in the Evergy TRM), while the ex-post calculations are using an EER baseline of 11.8 for all of the units in the program (as stipulated in the IL TRM v7). An ISR of 100% was applied to the overall energy and demand savings.

Ground Source Heat Pumps: The energy savings for ground source heat pumps have a realization rate of 92% and the demand savings have a realization rate of 82%. The difference in kWh savings between the ex-ante savings calculations and ex-post savings calculations is a result of the ex-ante savings calculations using different existing EER and SEER values than the ex-post savings calculations. The ex-ante savings calculations are using existing EER and SEER values as stipulated in the Evergy TRM and were based on historical EER and SEER efficiencies, while the ex-post savings calculations are using existing EER and SEER values based on the existing cooling type, as stipulated in the IL TRM v7. The difference in kW savings is a result of the ex-ante calculations using an EER baseline of 11 for some of the units in the program (as stipulated in the Evergy TRM), while the ex-post calculations are using an EER baseline of 11.8 for all of the units in the program (as stipulated in the IL TRM v7). An ISR of 100% was applied to the overall energy and demand savings.

Ductless Mini-Split Heat Pumps: The realization rate for ductless mini-split heat pumps was 92% for energy savings and 805% for demand savings. The difference in kWh and kW savings between the ex-ante savings calculations and ex-post savings calculations are a result of the ex-ante calculations using two energy savings values for all units in the program, which are directly from the Evergy TRM and not based on the size/efficiency of the unit. Ex-post calculations are using savings algorithms from the IL TRM v7 based on the size/efficiency per unit. An ISR of 100% was applied to the overall energy and demand savings.

C.4 Net Savings Evaluation Findings

Survey data from a total of 143 survey participants were used to determine the NTG ratio for this program. Survey respondents were asked a series of questions aimed at determining the program influence on the purchase and installation decisions for each installed measure. The measure-level free ridership of each participant was weighted by the measure energy savings to determine the project-level free ridership score. This score was applied to the other measures where a survey response was not obtained.

The survey also included questions related to their retail purchase or contractor installation of similar products offered by the program to determine participant and nonparticipant spillover. A total of 6 program participants and 19 non-participants claimed to have installed energy-efficient equipment/upgrades without receiving additional rebates or incentives but were installed based on program influence. Savings for spillover measures similar to those offered through the program were calculated and then

extrapolated to the population of respondents, which resulted in overall spillover of 5% for participants and 2% for non-participants.

For the Energy Savings Kit sub-program (with the exception of LED lightbulbs), all faucet aerator, low flow showerhead, pipe insulation, and advanced power strip measures were assigned a free ridership score of 0 to all projects in the program. For the attic/ceiling insulation and air sealing measures, a free ridership score of 0 was also assigned to all projects in the program due to the participant survey counts being too low for those measures to validate using the calculated free ridership numbers. All LED lightbulbs and HVAC measures were assigned a free ridership score based on the actual survey responses and calculated according to Section A.1.6.

The overall free ridership score was 26%. The measure score was weighted and rolled up into the project level score and applied to the verified gross savings for the projects without a survey response. The sum of the verified net project savings over the total verified gross savings resulted in an overall NTG ratio of 74%.

C.5 Impact Evaluation: Final Savings Tables

Based on the impact evaluation results, the total verified gross savings for the Heating, Cooling, and Home Comfort Program are 9,133,038 kWh and 5,959.62 kW and the total verified net savings are 6,786,008 kWh and 4,407.13 kW. A summary of gross and net verified energy savings and demand reduction is shown in Table C-6, Table C-7 and Table C-8. The Heating, Cooling, and Home Comfort Program had an overall realization rate of 96% for energy savings and 106% for peak demand savings.

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

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR_{kWh}	RR_{kW}
Missouri West	5,937,819	3,328.37	5,496,808	3,451.32	93%	104%
Missouri Metro	3,621,316	2,310.65	3,636,230	2,508.30	100%	109%
Total	**9,559,135**	**5,639.02**	**9,133,038**	**5,959.62**	**96%**	**106%**

Table C-7: Verified Gross and Net Energy Savings (kWh)

Jurisdiction	Spillover (Participant)	Spillover (Non-Participant)	Free Ridership	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
Missouri West	5%	2%	28%	72%	5,496,808	3,963,157
Missouri Metro	5%	2%	22%	78%	3,636,230	2,822,852
Total			**26%**	**74%**	**9,133,038**	**6,786,008**

Table C-8: Verified Gross and Net Peak Demand Reduction (kW)

Jurisdiction	Spillover (Participant)	Spillover (Non-Participant)	Free Ridership	NTG Ratio	Gross Verified Demand Reduction (kW)	Net Energy Savings (kW)
Missouri West	5%	2%	27%	73%	3,451.32	2,524.83
Missouri Metro	5%	2%	25%	75%	2,508.30	1,882.30
Total			**26%**	**74%**	**5,959.62**	**4,407.13**

A breakdown of energy savings and demand by measure is included in Table C-9.

Table C-9: Gross and Net Verified Energy Savings & Demand Reduction Per Measure

Measure	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	Net Verified Energy Savings (kWh)	Net Verified Demand Reduction (kW)	NTG_{kWh}	NTG_{kW}
Air Sealing	376,100	90.25	401,495	96.34	107%	107%
Attic Insulation	266,534	42.35	284,531	45.21	107%	107%
Central ACs	4,443,129	4,835.92	3,286,476	3,576.85	74%	74%
Heat Pumps	2,599,104	700.08	1,760,233	474.09	68%	68%
Ground Source Heat Pumps	389,016	119.78	286,908	88.34	74%	74%
Ductless Mini-Split Heat Pumps	125,174	57.36	88,214	41.50	70%	72%
LED Lightbulbs	842,251	97.12	581,029	67.00	69%	69%
Faucet Aerators	11,996	8.52	12,806	9.10	107%	107%
Low Flow Showerheads	34,436	3.17	36,761	3.39	107%	107%
Pipe Insulation	5,261	0.60	5,584	0.64	106%	106%
Advanced Power Strips	40,039	4.47	41,971	4.69	105%	105%
Total	**9,133,038**	**5,959.62**	**6,786,008**	**4,407.13**	**74%**	**74%**

C.6 Process Evaluation

C.6.1 Program Operations

ADM conducted in-depth interviews with the program manager and M&V manager from Evergy and the portfolio manager, program manager, and outreach team manager from ICF. The purpose of the in-depth interviews is to gain a better understanding of the Heating, Cooling, and Home Comfort program design, operations, challenges, and future opportunities.

Roles and Responsibilities

The role and responsibilities of each program staff member are listed below:

- The Evergy program manager is responsible for managing the energy-efficient DSM team and working directly with ICF to support the Heating, Cooling, and Home Comfort Program.
- The Evergy M&V manager is responsible for ensuring the evaluation is done in accordance with Missouri rules and to achieve set DSM goals.
- The ICF portfolio manager is responsible for overseeing staff and other residential programs and ensuring client and customer satisfaction.
- The ICF program manager is responsible for managing the day-to-day operations of the Heating, Cooling, and Home Comfort Program, which includes monitoring the HVAC and insulation and air sealing portions of the program while working together with the Evergy program staff who manages the Energy Savings Kit portion of the program.
- The ICF outreach team manager is responsible for managing the HVAC and insulation and air sealing trade allies.

Program Design

The Energy Savings Kit sub-program and home energy assessments went virtual in 2020 due to pandemic restrictions. The platform used for virtual assessments is up to the customer's discretion and may continue as an option in the future. During an energy assessment, a form is filled out on the software, Readi. The form helps ICF collect data on the customer's house, and to make recommendations to the customer on improving their energy efficiency. ICF emails the customer the report from Readi before the assessment is complete so that the customer can confirm they received it. At the end of the assessment, ICF discusses which items the customer would like to have for their energy savings kit. Such items include shower heads and different types of LEDs. In the past, the assessor would have the various items with them to install in the customer's home. The kits are now dropped off at the customer's home by ICF for the customer to

install themselves. A small number of customers live outside a reasonable driving distance, and so they are mailed their kits.

A test-in and test-out assessment is required for the air sealing measure as part of the program. ICF's trade ally, the energy auditor, performs these assessments. ICF cannot be present with current pandemic restrictions during these assessments, so a picture of the test is taken and sent in a report after the improvements are made. The report also provides energy savings to the energy auditor's customers. The energy auditors use one of three software to develop these savings: Snugpro, RemDesign or Compass/Surveyor.

The rebates checks are usually (about 75% of projects) sent directly to the homeowners and are delivered within four to six weeks. The rebate can also be reassigned to the trade ally. In this case, a form is filled out and signed by the homeowner or accounting group, and the rebated amount is used as an instant discount off the customer's invoice.

Along with kWh and kW savings goals, the program also has non energy, non-peak reduction goals. These goals add stakeholder value through additional earning opportunity metrics that are in place and agreed on with the Public Service Commission: carbon emission reductions, customer satisfaction, customer equity, and a focus on low-income customers. According to Evergy, the program is well structured to meet those goals.

Program Performance

Communication between program staff remains effective due to conducting regular weekly, monthly, and quarterly meetings with program updates. The program has consistent structures in place with rebate distribution, a well-developed internal marketing team, and continued trade ally support.

The ICF outreach team oversees a group of about 250 HVAC trade allies and 6 - 8 insulation and air sealing trade allies (Energy auditors). Evergy would like to see an increase in the solidity around the structure of the trade ally network. They would like to be kept informed of what the trade allies do, when they receive program updates, and how they support the Evergy programs. ICF is interested in seeing an increase in customer marketing. They believe that trade allies are more likely to sign up if they have customers asking for the rebate.

Program Participation and Marketing

Evergy has an internal marketing staff that develops all customer facing advertising and marketing. This marketing is done digitally through social media, email campaigns, and on the Evergy website with pop-up ads and banners. ICF manages and provides the support for the trade ally outreach utilizing monthly newsletters.

Evergy provides LEDs as an added value to both community events and at their Evergy Connect Center, located in the urban core downtown of Kansas City. A community event that Evergy participated at in 2020 was held by a local police department. The department was promoting home safety by suggesting the community keep their porch lights on. Evergy provided the event with bags containing four LEDs each for members of the community to take home with them. The Evergy Connect Center is an in-person billing center where customers can come if they have questions about billing or their usage. Customers can take home two LEDs per person at this center.

Communication

Weekly action item and 4 DX meetings (four disciplines of execution to track success rates) are held by ICF staff. ICF then communicates with the manager of the program at Evergy, who in turn relays information upward to the senior director of the division. Evergy also conducts quarterly meetings with an external stakeholder.

Data Tracking and Quality Assurances and Controls (QA/QC)

Each sub-program has different requirements that have been negotiated with ICF and Evergy about the level of QA/QC. The online intake tool (OIT) is used to apply for the rebate. The OIT uploads the basic information of what was done at the project site into SightLine. The processor at ICF checks the SightLine data, and if there are no flaws to the application, the application is checked again by an automated process before a rebate is assigned.

HVAC Equipment QA/QC: Historically, ICF sends emails to participants with completed projects to solicit volunteers for inspection of their units. Once at the home, ICF also direct satisfaction feedback from the homeowner. The unit is inspected, and the model number is photographed to confirm that the unit that was installed is the unit that their system says was installed. ICF has a goal to complete 45 visits during the summer and 25 in winter. In 2020, verification visits were completed virtually due to pandemic restrictions. Customers were asked to send photographs of their model numbers.

Air sealing and Insulation QA/QC: Historically, ICF would randomly go to sites while the trade ally was present to ensure that the level of customer service was correct with the client. Currently the visits are conducted virtually. ICF receives pictures from the trade allies of the insulation installed next to an R ruler.

Energy Savings Kit QA/QC: The kits are delivered to participants directly by ICF (and in some cases, mailed to the customers[1]). Once a participant receives a kit, ICF then sends out a follow-up survey for customer service purposes.

Challenges for Program

Nexant iEnergy has been a work in progress since it was adopted in 2016. Evergy would like them to develop a process to be able to manage at the portfolio level all of the implementation, contractors and participation information. This would make it easier to track progress for programs, energy savings, demand reduction, and budgets. An additional challenge has been the ability to better assist renters. A pilot is currently being developed for market rate multi-family that will be combined with the Heating, Cooling, and Home Comfort Program.

C.6.2 Participant Survey

In February 2021, a total of 2,520 participants were sent the online survey, which resulted in a total of 143 completed participant surveys (70 completes from Missouri West and 73 completes from Missouri Metro). Participants were surveyed to verify the measures they had installed as part of the program. Participants were also surveyed on decision making, installation of additional measures, experience with the program, program satisfaction, the effects of the COVID-19 pandemic, and household demographics.

The majority of participants (59%) first learned about the rebates/discounts offered by Evergy through Evergy's website, while almost one third (29%) of participants first learned about the rebates/discounts through a contractor/Energy Auditor. A breakdown of all program awareness sources is shown in Table C-10.

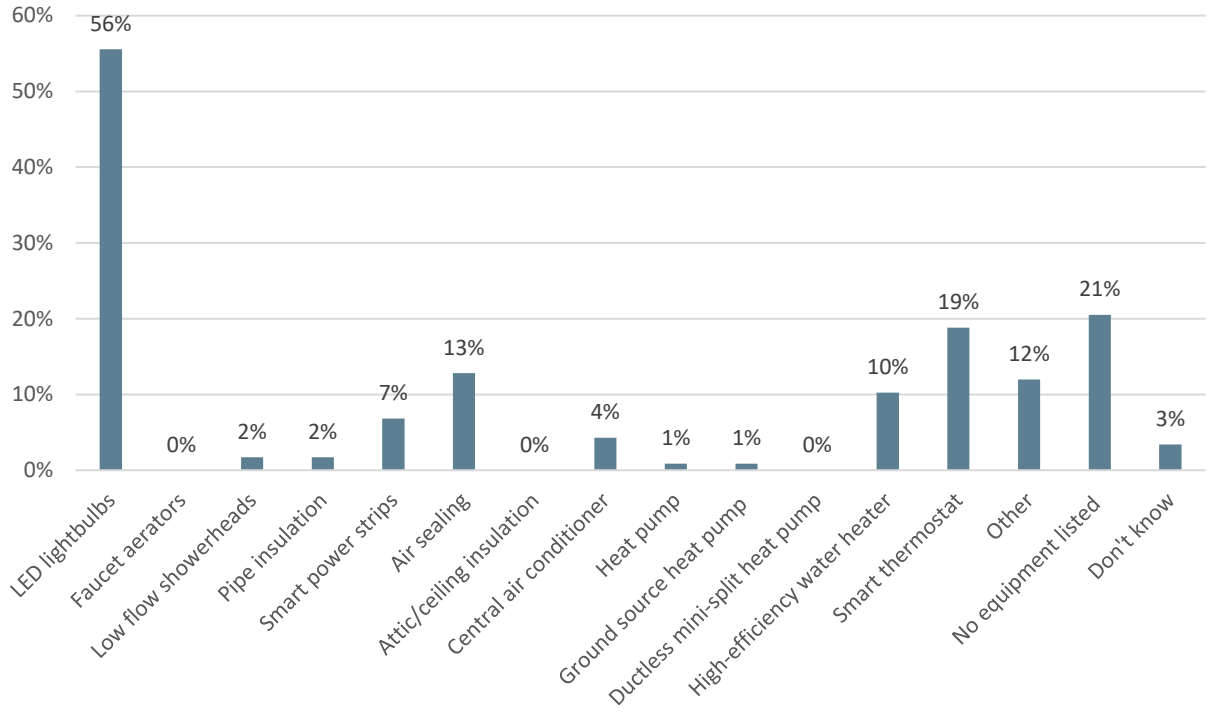
[1] When customers live outside a reasonable driving distance.

Table C-10: Program Awareness

Response	Count of Respondents (n = 143)	Percent of Responses
Contractor/Energy Auditor	41	29%
Online ad	2	1%
General online search	1	1%
Evergy website	84	59%
Spire website	1	1%
Bill insert	4	3%
Email	0	0%
Television ad	0	0%
Billboard	0	0%
Social media (i.e., Facebook)	1	1%
Family, friend, or neighbor (word-of-mouth)	6	4%
Other source	2	1%
Don’t know	1	1%

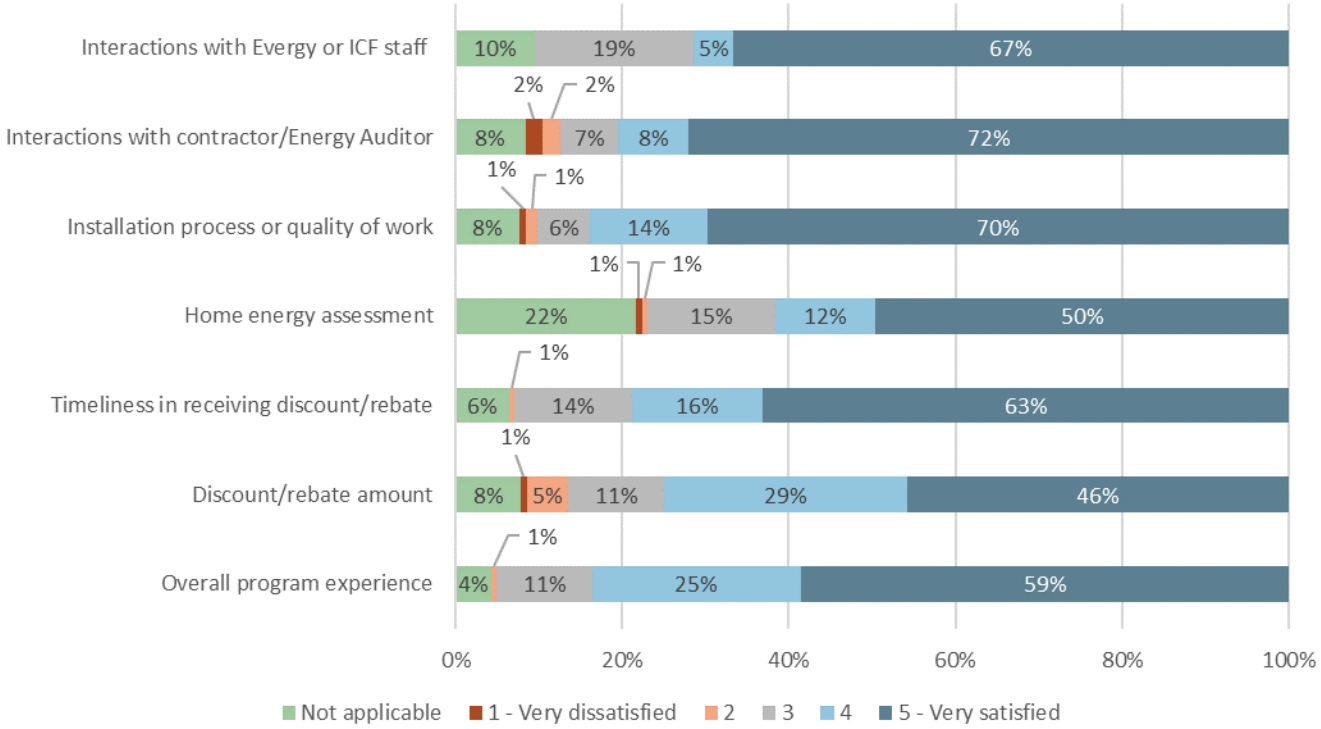
Over half of the participants (51%) reported becoming more aware of the advantages of energy efficiency because of installing the energy-efficient equipment/upgrades in their home. Almost all participants (95%) reported no issues with the energy/efficient equipment/upgrades that were installed. Participants were surveyed regarding installing additional energy-efficient equipment/upgrades. LED lightbulbs (56%) were the most commonly installed addition energy-efficient equipment, while smart thermostats (19%) were the second most commonly installed. A breakdown of all the reported installed additional energy-efficient equipment/upgrades are shown in Figure C-4.

Figure C-4: Installation of Additional Energy-Efficient Equipment/Upgrades



Participants were surveyed on their satisfaction with different aspects of the program (Figure C-5). The majority of participants reported being satisfied with the interactions (if any) they had with Evergy or ICF staff (97%) and interactions with the contractor/energy auditor (93%). The installation process and/or quality of the contractor/Energy Auditor's work was reported as satisfied by 95% of participants, while the home energy assessment was reported as satisfied by 81% of participants. When asked about their satisfaction with aspects of the rebate, 92% of participants were satisfied with the timeliness in receiving their rebate and 91% of participants were satisfied with the amount of the rebate. The Heating, Cooling, and Home Comfort Program was overall well-received by participants with an overall satisfaction of 93%.

Figure C-5: Participant Satisfaction with Different Aspects of the Program



C.6.3 Trade Ally Survey

An online survey consisting of a small sample of highly active trade allies was administered to assess program impacts on recommendations made to customers and collect additional feedback on the program. In February 2021, a total of 208 trade allies were sent the online survey, which resulted in 29 survey completes. Trade allies were surveyed on their company information, program awareness and involvement, program procedures, customer interactions, program influence, and the market.

The majority of trade allies have been participating in Evergy's energy-efficiency rebate programs for less than 10 years (65%) and almost all reported that the main reason they decided to participate in the program was to be able to pass discounts/rebates onto customers (93%). While only 38% of trade allies reported receiving training for the program in 2020, all respondents (100%) reported that the training was helpful.

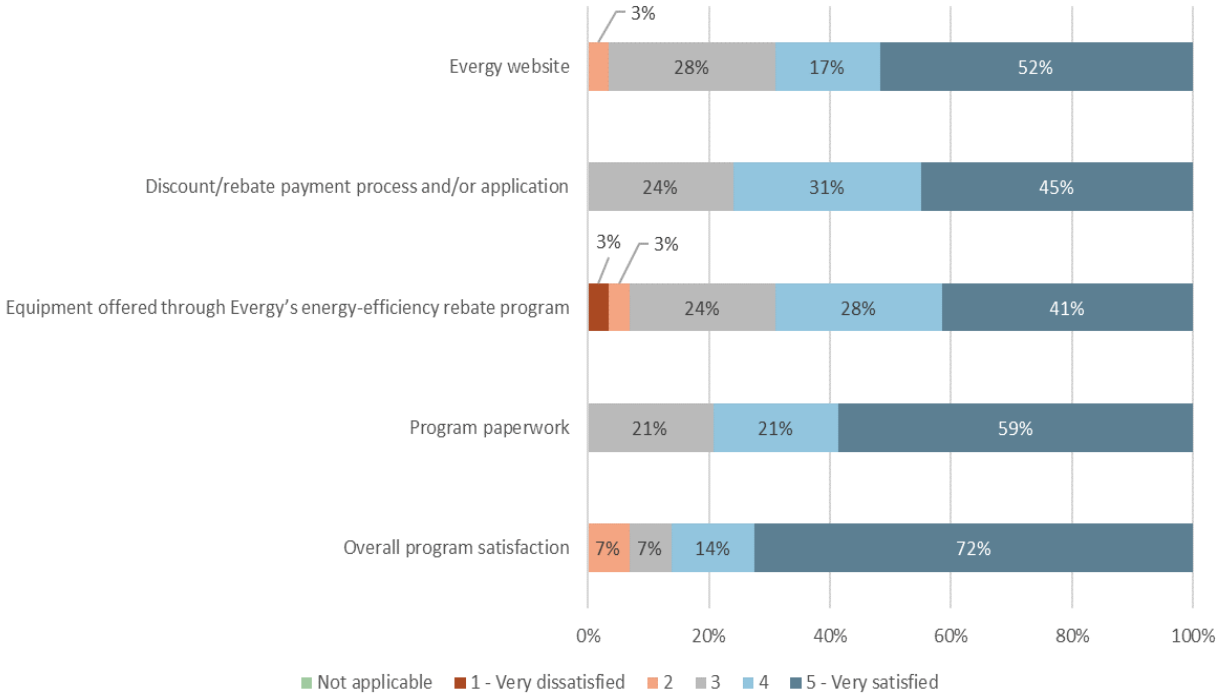
Trade allies were surveyed on their interactions with customers. The majority (76%) said that they initially present high efficiency options and equipment to customers when they first interact with them. The cost of equipment (66%) was reported as the primary barrier for customer adoption of high-efficiency options. Trade allies reported the main benefits customers receive by participating in the program as higher efficiency equipment (73%) and lower utility bills (76%). Less than half of trade allies (48%) said they would

recommend different equipment types, quantities, or efficiency levels to customers if the program were not available.

The majority of respondents (71%) reported that Evergy's energy-efficiency rebate program has somewhat or greatly increased the number of home energy-efficiency projects they complete. The two biggest challenges reported by trade allies were qualifying equipment (21%) and qualifying customers (24%). Also, some trade allies noted that they would like to see higher-SEER central air conditioners offered in the program, as well as an increase in the incentives offered for higher-efficiency HVAC models.

Trade allies were surveyed on their satisfaction with different aspects of the program (see Figure C-6). The majority (69%) report being satisfied with Evergy's website, 76% were satisfied with the discount/rebate payment process and/or application, 69% were satisfied with the equipment offered through Evergy's energy-efficiency rebate program, and 79% were satisfied with the program paperwork. The Heating, Cooling, and Home Comfort Program was overall well-received by trade allies with an overall satisfaction of 86%.

Figure C-6: Trade Ally Satisfaction with Different Aspects of the Program



C.7 Conclusions and Recommendations

The evaluation team at ADM performed a process evaluation that assessed program documentation and primary data collected from program stakeholders. The evaluation included participant surveys, trade ally surveys, completed interviews with program staff, reviewed program documentation, and analyzed the program tracking data.

The following summarizes the key findings of the process evaluation of the Heating, Cooling, and Home Comfort Program:

- The majority of survey participants first learned about the rebates/discounts offered by Evergy through the Evergy website.
- Survey participants were highly satisfied with the interactions they had with the contractor/energy auditor and the installation process/quality of work of the contractor/energy auditor's work.
- The main reason that trade allies reported that they decided to participate in the program was to be able to pass discounts/rebates onto their customers.
- The Heating, Cooling, and Home Comfort Program was overall well-received by participants and trade allies with an overall satisfaction of 93% for participants and 86% for trade allies.
- The Energy Saving Kit sub-program was halted in March 2020 and was renewed in April 2020 as a virtual program.
- The air sealing and insulation contractors performed at around 50% the volume compared to their performance in 2018 and 2019 because of the unwillingness of customers to have the trade allies in their homes.
- HVAC services were considered essential services and could continue to operate like normal. With the combination of financial hardships due to the COVID-19 pandemic and an unusually warm summer, the HVAC sub-program did not see a decline in participation and exceeded program goals.
- In PY1, communication between program staff remained effective due to conducting regular weekly, monthly, and quarterly meetings with program updates.
- The Heating, Cooling and Home Comfort Program has consistent structures in place with rebate distribution, a well-developed internal marketing team, and continued trade ally support.

The following recommendations are offered for continued improvement of the Heating, Cooling, and Home Comfort Program:

- Add fields for additional customer household characteristics information to the data collection process. Collect the number of stories of customers' homes in order to

supplement the savings calculations for the air sealing and attic insulation measures. This is needed to estimate Minimum Ventilation Rate (MVR) and would allow for program administrators to more readily examine if homes are being sealed within allowable guidelines that maximize energy savings while ensuring maintenance of indoor air quality.

- Monitor installation rates on an ongoing basis for the Energy Savings Kit sub-program. The sub-program has moved from direct install to virtual install, and this comes with trade-offs of lower administration costs but greater risk of non-installation or measure removal.
- Track installation rates and satisfaction rates along with customer demographics (age, income, etc.) to identify if there are customer sub-groups that prefer the virtual installation process to assess if this option should remain in the program long-term.
- Periodically review the incentive structure for higher-efficiency HVAC systems in the program. When examining the benefit-cost ratios for higher-efficiency HVAC systems, Evergy can assess if incentives can be or need to be revised. Metrics for this may assessment include:
- Balance between UCT and PCT ratios. If the UCT ratio exceeds the PCT ratio, Evergy can rebalance by increasing incentives.
- Percent of incremental cost covered by incentives. If incremental cost coverage is below 50%, Evergy can consider increasing incentives while remaining within boundaries of industry norms for this measure group.
- Develop a simplified and more automated application process. 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.

Appendix D Energy Saving Products Program-Specific Methodologies

This appendix describes the evaluation activities that were performed by ADM to evaluate the Energy Saving Products program.

D.1 Program Overview

The Energy Saving Products (ESP) 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. In PY1 these included a selection of LED lighting measures, including standard, specialty, and smart bulbs. In PY2021 and PY2022, the program may be expanded to include other measures such as room air conditioners, advanced power strips, smart thermostats.

The actual number of participants in the program is unknown, as upstream measure purchaser information is not tracked by participating retailers. In total, 298,501 packages of LEDs and 1,045,011 individual bulbs were discounted through participating retailers.

Table D-1 provides a summary of program metrics for the 2020 program year. Reported annual energy savings exceeded program projections. Overall, gross verified energy savings developed through ADM's impact evaluation were higher than reported savings and reported demand reduction, representing a gross realization rate over 100% for both.

Table D-1: Performance Metrics – Energy Saving Products Program

Metric	PY1 Total	West	Metro
Number of Rebated Packages	298,501	164,032	134,469
Energy Impacts (kWh)			
Targeted Energy Savings	25,191,811	13,038,632	12,153,179
Reported Energy Savings	40,448,524	21,731,835	18,716,688
Gross Verified Energy Savings	48,451,468	25,434,704	23,016,764
Net Verified Energy Savings	28,460,934	15,058,272	13,402,662
Peak Demand Impacts (kW)			
Targeted Peak Demand Reduction	1,844.24	955.17	889.07
Reported Peak Demand Reduction	5,059.31	2,725.19	2,334.12
Gross Verified Peak Demand Reduction	6,611.66	3,461.28	3,150.38
Net Verified Peak Demand Reduction	3,899.55	2,056.78	1,842.77
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	4.85	4.77	4.95

D.2 EM&V Methodologies

The following section details the methodologies ADM used to verify retail sales, estimate energy and peak demand impacts, and assess the performance for the Energy Saving Products program.

D.2.1 Data Collection

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. Tracking data contained the following information used for verification of program savings:

- Program sales
- Measure model number and description
- Measure characteristics (wattage, lumens, efficiency, lifetime)
- Retailer
- Invoice date

- Original retail price
- Evergy sponsored discounts
- Retail price, including all discounts
- Number of bulbs per package

D.2.2 Sampling Plan

Primary data collection activities included an online general population survey and interviews with program staff members. The general population survey was administered in March 2021 to a sample of Evergy customers. The final sample size for each primary data collection activity is presented in Table D-2 on the following page.

Table D-2: ESP Data Collection Activities

Data Collection Activities	N
General Population Survey	553
Program Staff Interviews	3

General Population Survey

The general population survey was sent to a randomly selected, representative sample of Evergy's residential customers. Customers were contacted via email and asked a variety of questions about recent purchases of energy efficient measures. Because customer information is not tracked for marked-down measures in the upstream program, a general population survey provides a cost-effective way of reaching many potential program participants. The survey instrument employed several screening questions to determine whether respondents had (a) purchased measures discounted through the upstream program within the program year and (b) that those purchases had been made through participating retailers.

Of the roughly 6,600 customers invited, 553 customers qualified for the survey and completed it fully. The survey collected data on program awareness and insights into energy-saving product purchases for lighting measures in addition to data regarding measure satisfaction, participant motivation, and household demographics.

Program Staff Interviews

To inform the process evaluation, ADM also conducted in-depth interviews with program staff at Evergy and the implementation contractor. These interviews provided insight into various aspects of the program and its organization and any changes to the program that occurred during 2020. Interviewees also discussed aspects of the program operations

that they considered to be successful, and the challenges faced over the course of the program year. These results are presented in the process evaluation results.

D.2.3 Gross Impact Methodology

This subsection summarizes the methods used to verify measure savings and calculate gross energy savings and gross demand reduction for each measure.

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) verifying that the per-unit impacts were applied appropriately and (3) making appropriate adjustments for in-service rates, leakage, and cross sector sales.

Tracking Data Verification

To verify the types and quantities of distributed measures, ADM reviewed the program tracking database to determine that the measures were claimed during the program year, reported measure wattage and lumens were accurate, and energy and demand impacts were correctly calculated according to the Evergy TRM algorithms for each LED type. For PY1, ADM calculated verified energy and demand impacts based on Evergy TRM but used adjusted Hours of Use, Coincident Factors, and waste heat factors as specified in the IL TRM v7 volume 3, based on the installation locations reported in the general population survey.

Reported impacts were calculated in accordance with the savings algorithms. However, there appeared to be minor adjustments to energy savings in May 2020 coinciding with the approval of the MEEIA Cycle 3 Evergy TRM (2020-05-01). The model number for each program rebated bulb was used to verify the bulb wattage and lumen output for verified savings.

In Service Rate Adjustment

ADM use survey respondent data from the General Population Survey to calculate the ISR for the ESP program.

Hours of Use and Cross-Sector Sales Adjustments

An adjustment to gross impacts was made to account for the proportion of program bulbs estimated to be installed in non-residential settings, since hours of use (HOU) and coincident factor (CF) are typically higher for commercial sockets compared to residential sockets. For each installation location, ADM used the deemed hours of use (HOU), coincident factor (CF), and waste heat factors for energy and demand (WHFe and WHFd) specified in the IL TRM v7 vol3.

ADM used responses to the general population survey to estimate the percentage of purchased bulbs that are installed in single family residential units, multi-family units, exterior location, and non-residential facilities. Surveyed customers who indicated they had purchased LEDs in 2020 were asked how many LED bulbs were installed in single-family homes, multi-family homes, outdoors, and in commercial spaces.

D.3 Gross Energy Savings and Demand Reduction

Based on the impact evaluation results, the total verified gross savings for the Energy Savings Products Program are 48,451,468 kWh, which resulted in a realization rate of 120% and 6,611.66 kW, which resulted in a realization rate of 131%. Table D-3 presents the gross verified energy and demand savings and realization rates by measure.

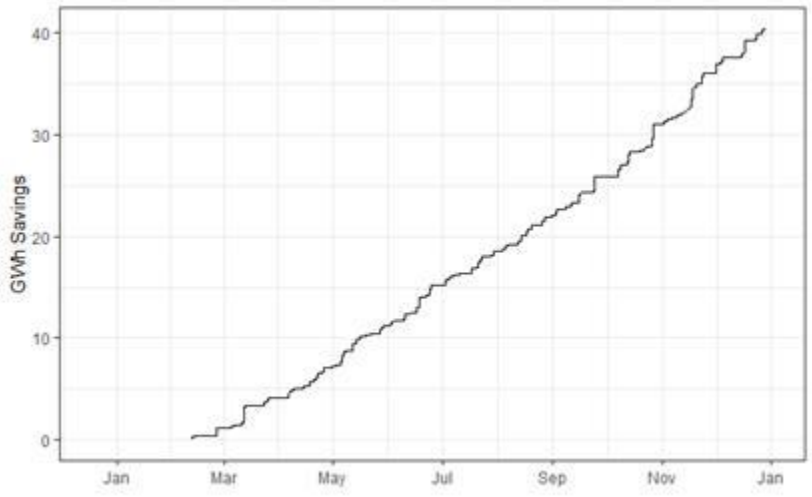
Table D-3: Reported and Verified Gross Energy Savings & Demand Reduction

Distribution Type	Measure Type	Reported kWh	Gross Verified kWh	Reported kW	Gross Verified kW	RR kWh	RR kW
Missouri Metro	Standard LED	11,791,295	13,632,154	1,432.88	1,712.01	116%	119%
	Specialty LED	6,925,393	9,384,610	901.24	1,438.37	136%	160%
Missouri West	Standard LED	13,872,435	15,788,536	1,687.54	1,982.82	114%	117%
	Specialty LED	7,859,401	9,646,168	1,037.65	1,478.46	123%	142%
Totals		**40,448,524**	**48,451,468**	**5,059.31**	**6,611.66**	**120%**	**131%**

D.3.1 Program Activity

Participation in the ESP program was mostly consistent throughout the PY1 program period. Figure D-1 below shows the reported daily kWh savings and the cumulative reported kWh savings throughout the PY1 program year.

Figure D-1 Accumulation of Reported Savings During the PY1 Program Year



The tracking data compiled by the implementor and provided for the ESP program lighting component identified a total of 298,501 packages of LEDs were discounted through participating retail stores. Table D-4 shows the reported quantities and impacts of the standard and specialty LEDs distributed in the Missouri Metro and Missouri West service territories.

Table D-4: Reported Measure Quantities and Impacts

Distribution Type	Measure Type	Package Quantity	Bulb Quantity	Reported kWh	Reported kW
Missouri Metro	Standard LED	84,737	321,052	11,791,295	1,432.88
	Specialty LED	49,732	162,647	6,925,393	901.24
Missouri West	Standard LED	102,893	378,664	13,872,435	1,687.54
	Specialty LED	61,139	182,648	7,859,401	1,037.65
Totals		**298,501**	**1,045,011**	**40,448,524**	**5,059.31**

D.3.2 Verification on Measure Wattage

ADM identified 45 LED models in the program tracking data for which the reported measure wattage or lumens differed from the verified characteristics. Adjusted measure specifications are shown in Table D-5. Differences between reported and verified measures specifications result either from changes to the reported value in the ENERGY STAR database or due to rounding in the specifications reported in the program tracking data. The total number of bulbs for which parameters were adjusted accounts for less than 5% of all program sales.

Table D-5: Parameters Adjusted for Lighting Analysis

Model Number	Manufacturer	Reported Wattage	Verified Wattage	Reported Lumens	Verified Lumens	ENERGY STAR ID
9290022058	Philips	4.5	3.3	300	300	2340684
93122480	General Electric	5	6	450	480	2272687
93122482	General Electric	5	6	450	480	2272692
9290011558	Philips	8.8	9	800	650	2284911
93122484	General Electric	8	10	800	800	2272701
93122536	General Electric	8	10	800	800	2339012
9290019317	Philips	4.5	4.5	350	300	2328807
40931	General Electric	10	10.5	650	700	2316255
41054	General Electric	10	10.5	650	700	2316254
98255	General Electric	6	5.5	450	450	2302936
98261	General Electric	6	5.5	450	450	2302936
98280	General Electric	6	5.5	450	450	2302937
98283	General Electric	6	5.5	450	450	2302937
31740	General Electric	4	4	300	320	2362151
31741	General Electric	4	4	300	320	2312784
31753	General Electric	4	4	300	320	2362152
42231	General Electric	4	4	300	320	2362155
42232	General Electric	4	4	300	320	2362170
42243	General Electric	4	4	300	320	2362168
42252	General Electric	4	4	300	320	2312786
42282	General Electric	4	4	300	320	2362151
42286	General Electric	4	4	300	320	2312784
42287	General Electric	4	4	300	320	2362152
96685	General Electric	10.5	10	800	800	2274385
96687	General Electric	10.5	10	800	800	2274385
96707	General Electric	10.5	10	800	800	2274386
27978	General Electric	10.5	10	800	800	2274385
28003	General Electric	10.5	10	800	800	2274386
4.5W/LEDX/GLOBE-D/CL	Greenlite	4.5	4.5	450	470	2304618

Model Number	Manufacturer	Reported Wattage	Verified Wattage	Reported Lumens	Verified Lumens	ENERGY STAR ID
41055	General Electric	13	13.5	1070	1070	2312886
41315	General Electric	13	13.5	1070	1070	2312887
49525	General Electric	13	13.5	900	900	2316387
49527	General Electric	13	13.5	900	900	2316388
41311	General Electric	13	13.5	1070	1070	2312886
41432	General Electric	13	13.5	900	900	2316387
41460	General Electric	13	13.5	900	900	2316388
A7A19A100WESP02	Leedarson America Ecosmart	14.5	14.5	1550	1600	2304784
41556	General Electric	4.5	4.5	350	360	2362207
41561	General Electric	4.5	4.5	350	360	2362208
41562	General Electric	4.5	4.5	350	360	2362209
42256	General Electric	4.5	4.5	350	360	2362195
42257	General Electric	4.5	4.5	350	360	2362196
42279	General Electric	4.5	4.5	350	360	2362210
42290	General Electric	4.5	4.5	350	360	2362205
15W/A19/30K	Greenlite	15	15.3	1600	1600	2332870

D.3.3 Verification of In-Service Rate

In-service rates (ISRs) were determined from the General Population survey. The in-service rate assumption for the ex-ante savings, sourced from the Evergy TRM, was 94.2%. Through analysis of survey data from the general population survey, ADM found in service rates of 87.9% for standard LEDs and 92.9% for specialty LEDs.

The ISRs per measure are summarized on the following page in Table D-6. Since survey data was not distinguished by jurisdiction, the ISRs for each measure apply to both Missouri West and Missouri Metro.

Table D-6: Measure-Level ISRs

Measure Type	ISR
Standard LED	87.9%
Specialty LED	92.9%

D.3.4 Adjustment for Cross Sector Sales

Across both standard and specialty bulbs, approximately 70% of bulbs were installed in single family homes, 16% in multi-family homes, 8% in exterior locations, and 6% in commercial spaces. Moreover, ADM found that 3% of standard bulbs and 12% of specialty bulbs were installed in commercial locations.

The estimated cross-sector adjustment derived from the general population survey is within the range of values that previous evaluations of residential lighting markdown programs have estimated. A meta-analysis conducted in 2015 of 23 evaluation reports found cross-sector sales estimates ranging from 0.0% to 18.7%, with various methodologies used. The average non-residential allocation estimate from these studies was 6.7%.

For commercial bulbs, ADM set HOU to 3,612 hours and used a CF of 0.58, the deemed HOU and CF specified for unknown commercial screw-in LEDs in the IL TRM v7 vol2. Following this method, ADM estimates that cross-sector sales increase program savings by approximately 9,000,000 kWh and similarly increased demand reduction by approximately 1,600 kW.

D.4 Net Savings Evaluation Findings

The following section details the free ridership, participant spillover, and leakage estimates used to determine net savings for the Energy Saving Products Program in PY1.

The survey-based effort for calculating free ridership was conducted using emails from a sample of randomly selected residential customers. ADM's general population survey of Evergy customers was conducted using email invitations, an online survey platform, and small gift card incentive to those who completed the questionnaire. Survey respondents were asked a series of questions to elicit feedback regarding influences on their light bulb purchasing decisions and each respondent was then assigned a free ridership score based on a consistent free ridership scoring algorithm. ADM Evaluators analyzed survey responses from 552 Evergy customers. A total of 531 surveyed customers reporting having purchased LEDs from participating retailers within the program year. Of these, 310 verified responses were used to calculate a free ridership score of 0.51 for standard LEDs, and 112 verified responses were used to calculate a free ridership score of 0.45 for specialty LEDs.

For program LEDs distributed through budget-retailers Dollar Tree, True Value, Habitat Restores, and Goodwill, ADM applied an assumed free ridership score of 0.0 as these retailers would likely not stock ENERGY STAR® LEDs in the absence of the program.

Participant spillover was derived from a benchmarking study of recent evaluation of similar lighting programs. ADM estimated the total participant spillover to be 7.0%. Typical rates of participant spillover for lighting programs were found to range from 2 to 11%.

Estimates of leakage were assessed using an approach that combined responses from the general population survey with a geo-mapping analysis. Leakage was estimated for several types of retailers: Mass Merchants (Big Box retailers), DIY stores, and Member channels (e.g. Costco). Together, these three program channels represented 95% program savings. A savings-weighted leakage rate was applied to the remaining retailer types. ADM found that Evergy's overall leakage rate was 1.6%. Given the large and contiguous size of Evergy's territory, the low leakage rate is to be expected.

D.5 Impact Evaluation: Final Savings Tables

Based on the impact evaluation results, the total verified gross energy savings for the Energy Saving Products Program are 48,451,468 kWh, and the total verified gross peak demand savings are 6,611.66 kWh. Table D-7 below summarizes the verified gross energy and demand savings for the Energy Savings Products Program.

Table D-7: Program Gross Energy Savings (kWh) and Peak Demand Reduction (kW)

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR_{kWh}	RR_{kW}
Missouri West	21,731,835	2,725.19	25,434,704	3,461.28	117%	127%
Missouri Metro	18,716,688	2,334.12	23,016,764	3,150.38	123%	135%
Totals	**40,448,524**	**5,059.31**	**48,451,468**	**6,611.66**	**120%**	**131%**

Table D-8 and Table D-9 summarize the verified net impacts of the Energy Savings Products program.

Table D-8: Verified Gross and Net Annual Energy Savings (kWh)

Jurisdiction	Spillover		Free Ridership	NTG Ratio	Leakage	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
	Participant	Non-Participant					
Missouri West	7.0%	0.0%	46%	61%	1.6%	25,434,704	15,058,272
Missouri Metro	7.0%	0.0%	47%	60%	1.6%	23,016,764	13,402,662
Total			**47%**	**60%**	**1.6%**	**48,451,469**	**28,460,934**

Table D-9: Verified Gross and Net Peak Demand Reduction (kW)

Jurisdiction	Spillover		Free Ridership	NTG Ratio	Leakage	Gross Verified Demand Reduction (kW)	Net Energy Savings (kW)
	Participant	Non-Participant					
Missouri West	7.0%	0.0%	46%	61%	1.6%	3,461.28	2,056.79
Missouri Metro	7.0%	0.0%	47%	60%	1.6%	3,150.38	1,842.77
Total			**46%**	**61%**	**1.6%**	**6,611.66**	**3,899.56**

D.6 Process Evaluation

D.6.1 Program Operations

ADM conducted in-depth interviews with Evergy's energy efficiency products and services team manager, Evergy's DSM portfolio manager, ICF's portfolio manager, and ICF's program manager for the Energy Saving Products (ESP) program. The purpose of the in-depth interviews is to gain a better understanding of ESP's program design, operations, challenges, and future opportunities.

Roles and Responsibilities

- The role and responsibilities of each program staff member are listed below.
- The Evergy program manager is responsible for managing the energy efficiency products and service team and working directly with ICF to support the ESP program.
- The Evergy DSM portfolio manager is responsible for ensuring the evaluation is done in accordance with Missouri rules and to achieve set DSM goals.
- The ICF portfolio manager is responsible for overseeing staff and other residential programs and ensuring client and customer satisfaction.
- The ICF program manager is responsible for managing the day-to-day operations of the ESP program, which include monitoring incentive levels, managing and allocating budgets, developing MOUs with retailers and partners, processing invoices, and supervising field staff.

Program Design

The ICF program manager provided a description of the ESP program. Evergy offers discounts on LED light bulbs at participating local retail stores within their Missouri territory. The LED discounts are provided at point-of-sale to customers. The LED manufacturers send an invoice with model numbers and sales amounts to the ESP

program for specific timeframes. These data are verified by ICF staff and used to calculate energy savings for the purchased LED measures.

The ICF program manager indicated the program design has remained consistent for the past four program years. The design and operations were described as successful. There were no significant changes to the retail or product mixes from the previous program year (2019). The program manager also stated that ICF works closely with retailers and manufacturers to provide instant discounts at the point-of-purchase and identify the specific measures with their respective discount. ICF works at a national level with some of these retailers and manufacturers to achieve this design.

Program Performance

The ESP program exceeded the energy saving targets for both territories (Missouri-West and Missouri-Metro). The ESP program ran a Limited Time Online campaign (LTO) in PY1. According to the program manager, Evergy extended the duration of the LTO to reach customers who would otherwise not purchase lightbulbs due to the COVID-19 pandemic. An LTO conducted in 2019 provided and streamlined the infrastructure blueprint, allowing the LTO to be launched quickly and smoothly in PY1. ICF indicated the budget had been the main constraint (e.g., added shipping costs associated with online purchases).

ICF staff indicated that most sales occurred at large retail chain stores, but they strived to meet customers where they shopped in PY1. Larger retailers typically offer more products, which allows the program to work with multiple manufacturers to ensure there is a good product mix in those stores. ICF staff indicated some large retailers maximize their sales by increasing their off-shelf product displays. ICF stated they have developed relationships with store managers to influence product display. ICF also indicated some retailers are more challenging because of their limited inventory or stocking policies (i.e., not ordering enough due to budget constraints or because they usually do not carry the item). ICF staff indicated they would like to improve or eliminate underperforming stores going forward to ensure effective program performance.

ICF staff anticipated some changes for PY2. Staff anticipated dropping some retail stores that are continuously underperforming and have issues with keeping measures stocked. It was also anticipated that the program would again launch a focused online marketplace with the potential for new measures added beyond lighting. The marketplace would run all year long.

COVID-19 Impacts

ICF staff reported the impacts that the coronavirus pandemic had on the ESP program for PY1. In the spring, field staff were pulled from working on-site but were later allowed to return to the stores. The ESP program performed well despite COVID-19 restrictions

because of solid sales throughout the year. While field staff has returned to stores, they are still not conducting in-person displays or demonstrations. ICF staff indicated that the lack of in-person displays and demonstrations hampers customer education efforts, but these were halted due to the evident risks of customers congregating around the field staff and their displays. ICF staff stated that the educational component to the ESP program is especially important in rural communities. There are no flyers or handouts available for in-store display, but the program does have tear pads with information about LED lighting.

Program Participation and Marketing

ICF staff reported that program participation has been adequate for PY1. They believed that an increase in home improvement projects contributed to a successful program year. ICF staff also indicated that point-of-purchase generates the most customer awareness of the program. They stated that each store has various requirements of how much can be displayed. In-store displays include the Evergy logo and information about the discount and purchase limits. The in-store displays are in English and Spanish.

Evergy indicated their marketing efforts are customer-centered, have a universal message, and use tracking data (global positioning systems) to target specific customers. The ESP program utilized location specific Facebook marketing to reach out to target markets. Evergy also sent printed mailers and emails promoting the LTO campaign for PY1. The utility is responsible for creating most of the customer-focused marketing. The ESP program also did some billboard advertising earlier in the year.

Communication

ICF and Evergy indicated they meet once per week to discuss the ESP program and have ad-hoc meetings when needed. ICF staff has meetings with their national team to discuss various components of the ESP program (e.g., store lists, program information and requirements, MOUs, etc.). ICF staff also has monthly meetings with their retail and manufacturing partners. Meetings were mostly virtual during PY1.

Data Tracking and Quality Assurances and Controls (QA/QC)

Program activity data is tracked through invoices which are processed by ICF's national process center. A tool uploads the invoices which contain data for program tracking. The data is processed and sent to a reporting system that is available to Evergy staff. ICF staff indicated the ESP program data system is streamlined and reliable, with very few errors.

ICF staff stated that many of the QA/QC procedures occur through monitoring program data. Field QA/QC procedures are primarily performed by the dedicated field staff. ICF staff go on-site to ensure the quality of the audits, engage with store managers and take pictures to document points-of-sale.

Challenges for ESP Program

ICF staff discussed that the main challenges for the ESP program are customer education and market saturation. ICF stated there is misinformation about energy efficiency and that adequate customer education can help to mitigate this issue. They also stated that measuring market saturation in the Evergy territory has been challenging as most data is from the east coast, which is not accurately comparable to their market.

Focusing on low-income customers has also been a challenge for the ESP program. This requires working with specific stores that have had difficulty partnering with the ESP program. ICF staff believed the online marketplace could help to target income-based customers with additional discounts. They hope to expand the marketplace to include non-lighting measures.

D.6.2 General Population Survey

The Evaluators surveyed Evergy customers through a general population survey to learn about energy efficiency purchases program in PY1. Evergy sent an email to more than 6,000 active customers via email to complete an online survey administered by the Evaluators. Customers were offered a $10 incentive if they qualified to complete the survey (i.e., respondents indicated they were an Evergy customer and purchased LED light bulbs from a qualifying retailer in PY1). A total of 531 Evergy customers completed the online survey.

LED Purchases

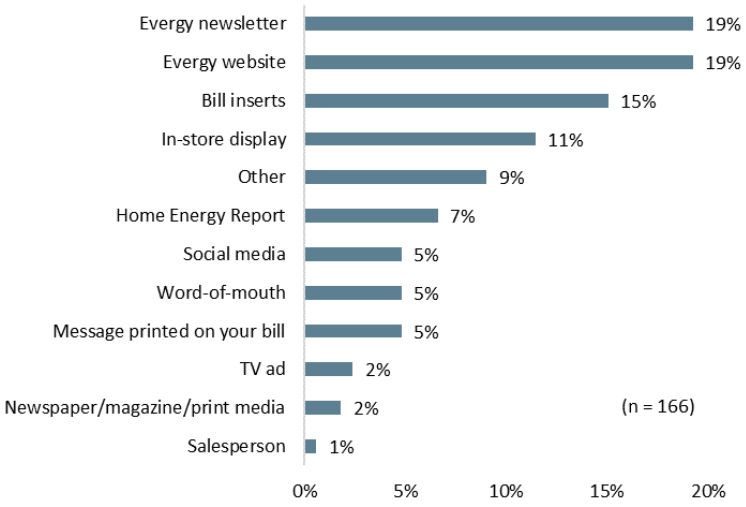
A significant proportion (93%) of survey respondents indicated they purchased standard LED bulbs in PY1, followed by 32% who reported they purchased specialty bulbs (see Table D-10).

Table D-10: Type of LED Light Bulb Purchased in PY1

Response	Percent of Responses (n = 498)
Standard LED bulbs	93%
Specialty LED bulbs	32%
Other	4%
Don’t know	1%
Respondents had the option of choosing more than one option for this question.	

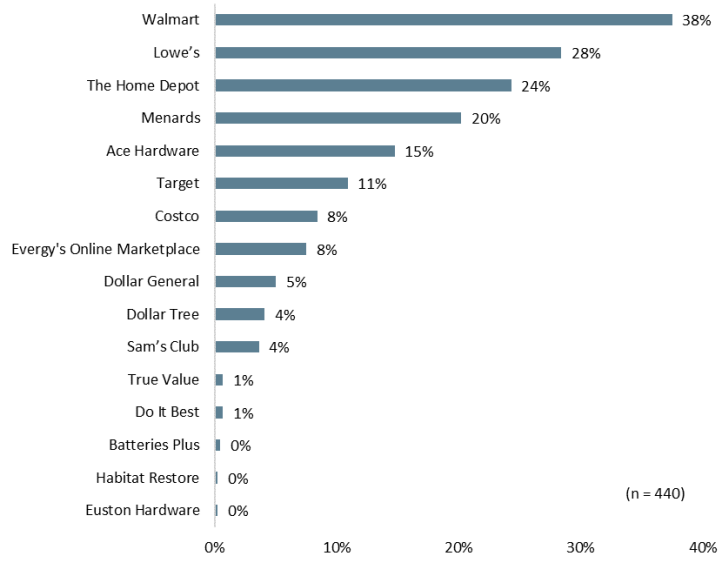
Half of survey respondents were not aware that Evergy provided a lighting discount. Among those who were aware of the lighting discount, 19% first learned of it through the Evergy newsletter and another 19% from the Evergy website (see Figure D-2).

Figure D-2: Where Participants First Learned of Evergy's Lighting Discount



The most common retail locations for LED light purchases in PY1 were Walmart, Lowe's, and The Home Depot. Another eight percent of survey respondents reported purchasing bulbs through the Evergy Online Marketplace (LTO).

Figure D-3: Retail Location of LED Purchase in PY1[2]



[2] Respondents had the option of choosing more than one option for this question

Standard LED Purchases

On average, customers purchased 11 standard LED light bulbs and installed ten, with purchases ranging from zero to 100. Fifty percent of survey participants indicated they replaced a traditional incandescent or halogen bulb with the LED bulb they purchased.

Table D-11: Type of Bulb Replaced with Standard LEDs

Response	Percent of Standard LED Installed Bulbs (n = 3,982*)
Traditional incandescent/halogen bulbs	50%
LEDs	21%
CFLs	13%
Installed bulbs in a fixture or socket where none was before	8%
The n represents the total number of standard LED light bulbs that were installed among all survey participants who indicated they purchased LEDs.	

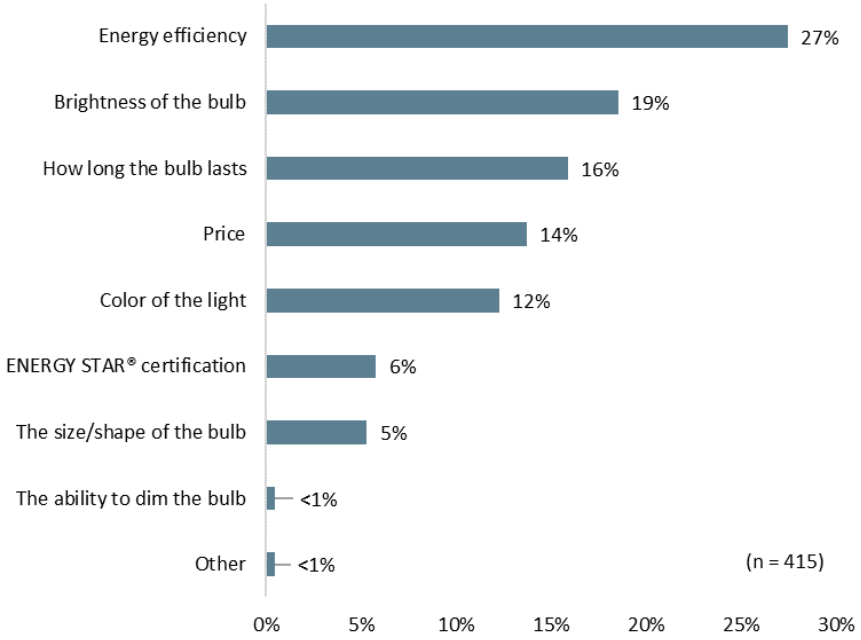
Replacing burned out bulbs was the most common reason that customers gave for their purchase of standard LED light bulbs, followed by replacing working bulbs.

Table D-12: Type of Bulb Replaced with LEDs

Response	Percent of Respondents (n = 416)
Replace burned out bulbs	77%
Replace working bulbs	27%
Install new light fixture or lamp socket	13%
Stock up	22%
Other	5%
Respondents had the option of choosing more than one option for this question.	

Evergy customers provided feedback about the most important characteristics they consider when purchasing standard LED bulbs. Twenty-seven percent of respondents rated energy efficiency as their top reason for purchasing the bulbs, followed by 19% who stated the brightness of the bulbs, and 16% who considered how long the bulbs lasts (Figure D-4).

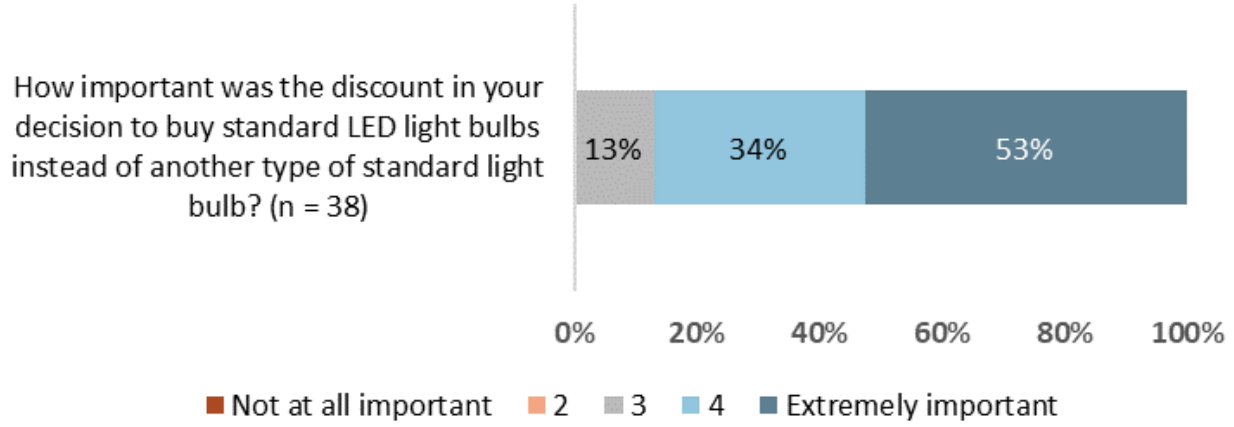
Figure D-4: Reasons for Purchasing Standard LED Bulbs[3]



Thirty percent of survey respondents indicated that the standard LED light bulbs they purchased were discounted from their normal pricing, compared to 70% who stated they were not discounted. Among those who indicated the bulbs were discounted in PY1, 31% recalled the discount was provided by Evergy. Most survey participants who recalled the lighting discount reported that it was important in their decision to purchase standard LED light bulbs instead of another type of standard bulb (see Figure D-5). Most (76%) reported purchasing standard LED light bulbs before PY1 and among those, 12% recalled the bulbs being discounted by Evergy.

[3] Respondents had the option of choosing more than one option for this question

Figure D-5: Importance of Evergy Discount on Purchasing Standard LED Light Bulbs



Specialty LED Purchases

On average, customers indicated they purchased and installed nine specialty light bulbs, ranging from zero to 140. Thirty-nine percent of survey participants indicated they replaced a traditional incandescent or halogen bulb with the specialty LED bulb they purchased (see Table D-13).

Table D-13: Type of Bulb Replaced with Specialty LEDs

Response	Percent of Specialty LED Installed Bulbs (n = 1,186*)
Traditional incandescent/halogen bulbs	39%
LEDs	21%
CFLs	7%
Installed bulbs in a fixture or socket where none was before	7%
The n represents the total number of specialty LED light bulbs that were installed among all survey participants who indicated they purchased LEDs.	

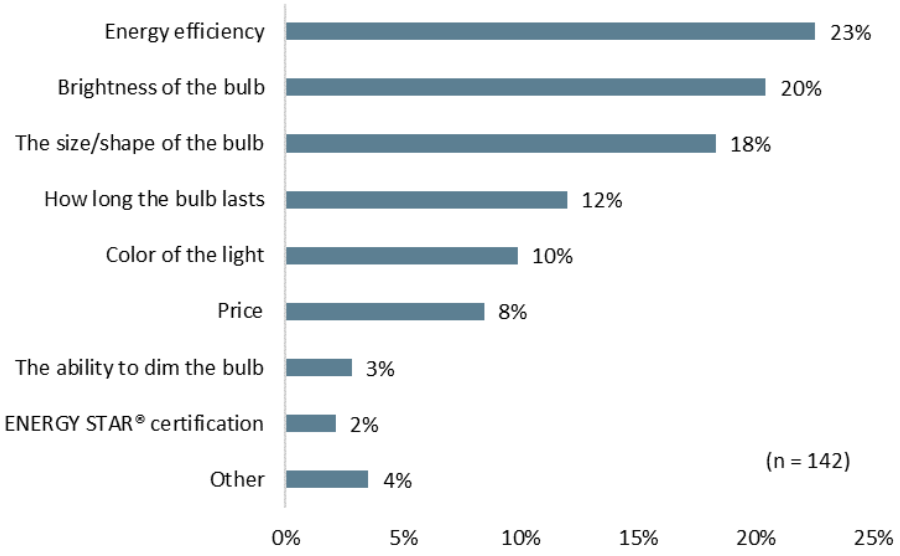
Replacing burned out bulbs was the most common reason that customers gave for why they purchased specialty LED light bulbs, followed by replacing working bulbs (see Table D-14).

Table D-14: Type of Bulb Replaced with Specialty LEDs

Response	Percent of Respondents (n = 142)
Replace burned out bulbs	61%
Replace working bulbs	30%
Install new light fixture or lamp socket	24%
Stock up	15%
Other	8%
Respondents had the option of choosing more than one option for this question.	

Evergy customers provided feedback about the most important characteristics they consider when purchasing specialty LED bulbs. Twenty-three percent of respondents rated energy efficiency as their top reason for purchasing the bulbs, followed by 20% who stated the brightness of the bulbs, and 18% who considered the size and shape of the bulb (see Figure D-6).

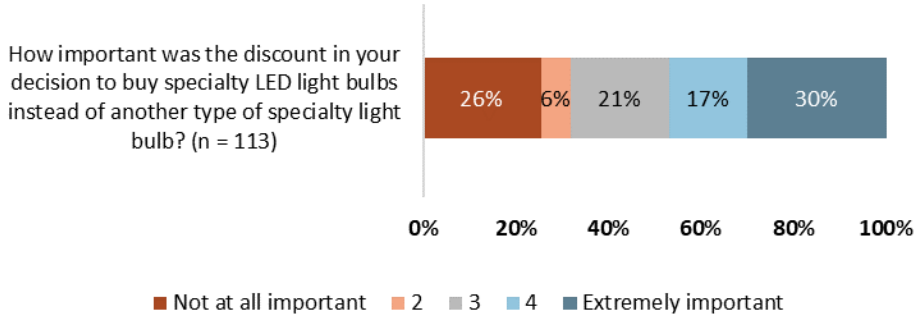
Figure D-6: Reasons for Purchasing Specialty LED Bulbs[4]



[4] Respondents had the option of choosing more than one option for this question.

Twenty-one percent of survey respondents indicated that the specialty LED light bulbs they purchased were discounted from their normal pricing compared to 79% who stated they were not discounted. Among those who indicated the bulbs were discounted in PY1, 10% recalled a discount provided by Evergy. Forty-seven reported that the discount was important in their decision to purchase specialty LED light bulbs instead of another type of specialty bulb (see Figure D-7). Most (58%) reported purchasing standard LED light bulbs before PY1 and among those, 7% recalled them being discounted by Evergy.

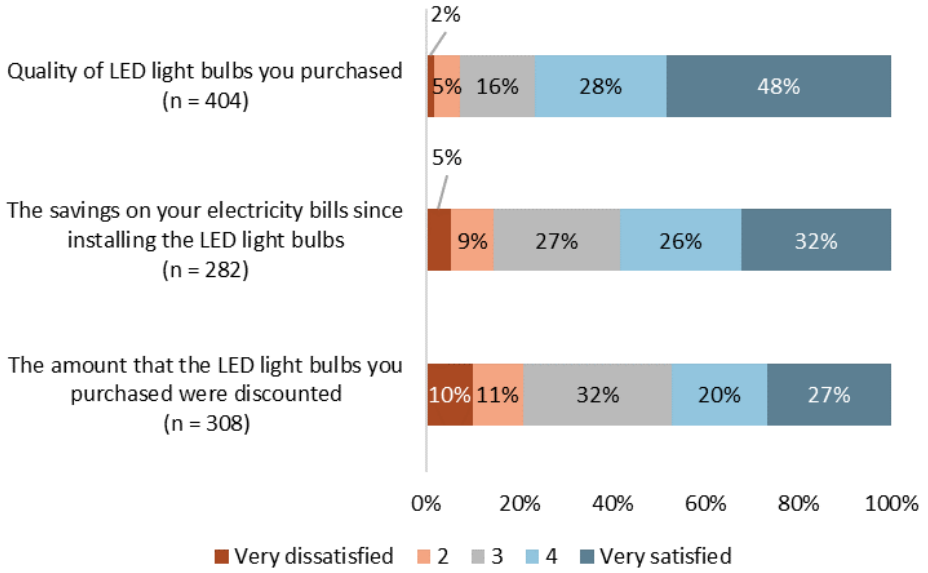
Figure D-7: Importance of Evergy Discount on Purchasing Specialty LED Light Bulbs



D.6.3 Satisfaction

Most survey respondents (77%) were satisfied with the quality of LED light bulbs that they purchased, followed by 58% were satisfied with the savings on their electricity bills, and 47% who were satisfied with the discount amount (see Figure D-8).

Figure D-8: Satisfaction with Quality of LED Bulbs, Savings on Bills, and Discount Amount



D.7 Conclusions and Recommendations

The following summarizes the key findings from the process evaluation activities for the Energy Saving Products program for PY1.

- ESP program design has remained consistent from prior program years. The design and operations were described as successful, and there were no significant changes to the retail or product mixes from 2019. The program manager stated that ICF works closely with retailers and manufacturers to provide instant discounts at the point-of-purchase and identify the specific measures with their respective discount. ICF also works at a national level with some of these retailers and manufacturers to achieve the program design.
- ESP program will meet or exceed the energy saving goals for both territories (Missouri-West and Missouri-Metro). The ESP program ran a Limited Time Online campaign (LTO) in PY1. According to the program manager, Evergy extended the duration of the LTO to reach customers who would otherwise not purchase lightbulbs due to the COVID-19 pandemic. An LTO conducted in 2019 provided and streamlined the infrastructure blueprint, allowing the LTO to be launched quickly and smoothly in PY1. ICF indicated the budget had been the main constraint (e.g., added shipping costs associated with online purchases).
- Program participation has been adequate for PY1. ICF staff believed that an increase in home improvement projects contributed to a successful program year. ICF staff also indicated that point-of-purchase generates the most customer awareness of the program. They stated that each store has various requirements of how much can be displayed. In-store displays include the Evergy logo, with information about the discount and purchase limits. The in-store displays are in English and Spanish.
- Customer education and market saturation are challenges for the ESP program. ICF stated there is misinformation about energy efficiency and that adequate customer education can help to mitigate this issue. They also stated that measuring market saturation in the Evergy territory has been challenging as most data is from the east coast, which is not accurately comparable to their market.
- Standard LED light bulbs were commonly purchased among survey participants but awareness of Evergy discount was low. Half of survey respondents were not aware that Evergy provided a lighting discount. Among those who were aware of the lighting discount, the Evergy newsletter and Evergy website were the most common channels of awareness. Walmart, Lowe's, and The Home Depot were the most common retail locations for LED light purchases in PY1.
- Most survey respondents indicated that they increased the time spent at home in PY1 due to COVID-19. Less than half of surveyed customers noticed a change in their electricity bill due to COVID-19. Among those who noticed a change, 80% indicated

their utility bill has increased by $10 or more per month. Sixty-three percent of survey participant reported not changing how they save energy in their home due to the pandemic and 38% reported that the pandemic did not at all affect their ability to participate in Evergy's energy efficiency programs.

- Surveyed customers highly satisfied with the quality of LED light bulbs and less satisfied with discount amount. Most survey respondents were satisfied with the quality of LED light bulbs that they purchased and the savings on their electricity bills. Less than half were satisfied with the discount amount.

The following are recommendations for overall program performance:

- Continue to build on the success of the online marketplace. Program staff indicated that the online marketplace was successful in PY1 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 contributed to the program success in PY1.

Appendix E Income-Eligible Multi-Family Program-Specific Methodologies

ADM completed an impact and process evaluation of Evergy's Income-Eligible Multifamily program. The impact evaluation consists of verification of annual energy savings and peak demand reduction. The process evaluation provides insights into program design and implementation.

E.1 Program Overview

The Income-Eligible Multi-Family (IEMF) program provides qualifying, income-eligible properties with assistance through energy assessments, program applications, technical support, and upgrade incentives. The program consists of two components. The first component provides direct install kits, including a suite of measures installed in the units and common areas to benefit occupants and property/building managers/owners. Measures may include low-flow faucet aerators and showerheads, advanced power strips, LEDs, and other measures. The second component of the program provides incentives for upgrading in-unit and common area measures in the form of prescriptive or custom rebates. The two components provide benefits to both the resident and the property manager by increasing the value of the property, reducing utility bills, and making the property more comfortable, healthier, and safer.

To qualify for the Income-Eligible Multi-Family program the property must be receiving service from Evergy and meet one of the following requirements:

- Documented participation in a Federal, State, or Local housing program
- Location in a low-income census tract
- Rent roll documentation, where at least 50% of units have rents affordable to households at or below 80% of area median income, as published annually by the Department of Housing and Urban Development (HUD).
- Documented tenant income information demonstrating at least 50% of units are rented to households either at or below 200% of the Federal poverty level, or at or below 80% of area median income.
- Documented information demonstrating the property is on the waiting list for, currently participating in, or has in the last five years participated in the Weatherization Assistance Program.

The program partners with the Low-Income Housing Tax Credit (LIHTC) program representatives and has been enhanced to allow for a longer payout period for rebates up to 12 months after the cycle ends as to better coordinate with the LIHTC.

Table E-1 provides a summary of program metrics for the PY1. Reported annual energy savings exceeded program projections. Overall, gross verified energy savings developed through ADM's impact evaluation were higher than reported savings and reported demand reduction, representing a gross realization rate over 100% for both.

Program targets and PY1 savings are shown in Table E-1.

Table E-1: Performance Metrics – Income-Eligible Multifamily

Metric	PY1	West	Metro
Number of Sites	17	8	9
Energy Impacts (kWh)			
Targeted Energy Savings	2,756,956	1,388,947	1,368,009
Reported Energy Savings	1,595,087	879,280	715,807
Gross Verified Energy Savings	1,599,653	885,014	714,639
Net Verified Energy Savings	1,599,653	885,014	714,639
Peak Demand Impacts (kW)			
Targeted Peak Demand Reduction	490.66	242.97	247.69
Reported Peak Demand Reduction	187.32	110.87	76.45
Gross Verified Peak Demand Reduction	198.70	121.78	76.92
Net Verified Peak Demand Reduction	198.70	121.78	76.92
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	0.41	0.43	0.40

E.2 EM&V Methodology

This chapter provides an overview of the data collection activities and impact calculation methodologies that ADM employed in the evaluation of the Income-Eligible Multifamily Program.

Data collection activities for the analysis consisted of a review of program materials and surveys and interviews with participating property owners/managers. Evergy uses Sightline in conjunction with Nexant reporting services as its central tracking and reporting system.

Property owner/manager surveys provided self-reported data for the impact analysis and process evaluation. A total of 9 property decision-makers (53%) completed the survey.

The process evaluation gained additional perspective from In-depth interviews with Evergy and ICF.

E.2.1 Gross Impact Methodology

ADM used the following steps to evaluate the Multifamily 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.
- Attempted a survey of a census of properties, first with emailed surveys, followed by direct calls to property contacts at each of the 17 properties in the program. A survey of tenants was not attempted as not all tenants are home when improvements are made, and ADM has found that tenant survey in low-income multifamily residences yield low responses and unreliable data.
- ADM conducted a detailed desk review for each on-site verification and data collection project scheduled. The desk review process includes a thorough examination of all available project materials, including invoices, equipment cut sheets, pre- and post-inspection reports, and estimated savings calculators. This review process informs ADM's fieldwork by identifying potential uncertainties, missing data, and sites where monitoring equipment is needed to verify critical inputs to the reported savings calculations.
- ADM then calculated verified gross savings. The sources for energy savings algorithms are the Evergy Technical Reference Manual (PY1-05-01) and Illinois TRM.

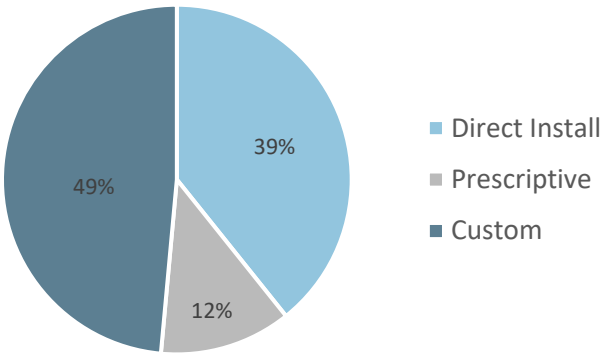
Specific Impact evaluation algorithms used to calculate energy savings and demand reductions, are detailed in Appendix C.

E.3 Gross Impact Findings

E.3.1 Program Activity

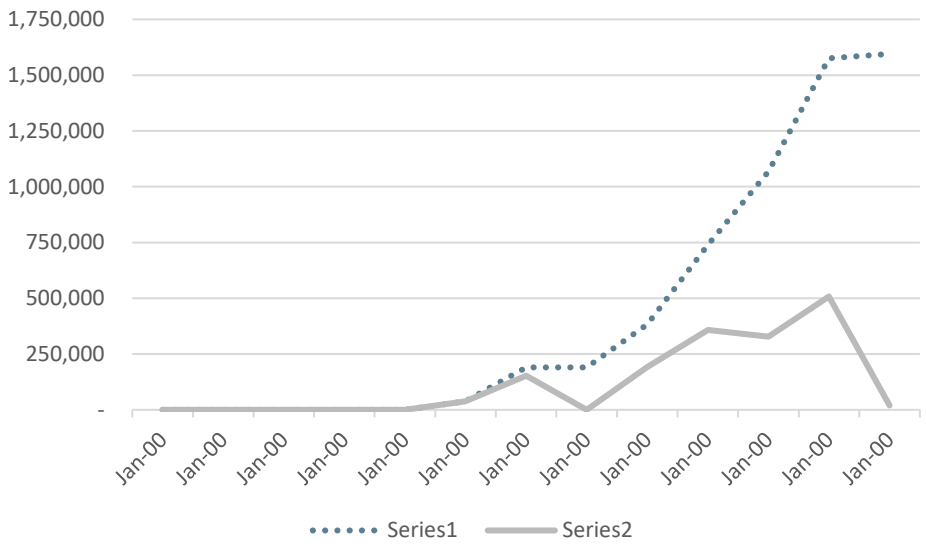
Figure E-1 summarizes IEMF Program activity by the percentage of reported savings across the Custom, Prescriptive, and Direct Install measures.

Figure E-1: Income-Eligible Multifamily Distribution of Savings by Program Channel



Participation in the Multifamily Program was mostly achieved in the second half of the year. Program Activity began in April, with participating ramping up from July through the end of the year.

Figure E-2: Accrual of Reported kWh Savings during the Program Year



A total of 17 properties participated in the program in PY1, each contributing between 1% and 12% of total program savings. Each property's contribution to total program savings is shown in Table E-2, below.

Table E-2: Property Contribution to Total Program Savings

Property Number	kWh Savings	Program Contribution
1	189,646	12%
2	173,091	11%
3	146,165	9%
4	138,736	9%
5	135,244	8%
6	122,184	8%
7	97,164	6%
8	88,191	6%
9	86,977	5%
10	85,433	5%
11	77,836	5%
12	61,721	4%
13	58,978	4%
14	57,873	4%
15	32,977	2%
16	28,876	2%
17	13,996	1%

E.3.2 Gross Energy Savings and Demand Reduction

The verified gross annual energy savings (kWh) and peak demand reduction (kW) for the Multifamily Program are summarized by measure in Table E-3. The overall realization rates for energy savings and demand reduction were 100% and 105%. Detailed descriptions of the difference in savings calculations are in the measure level findings below.

Table E-3: Verified Gross kWh and kW

		Reported		Verified		Realization Rate	
	Measure	**kWh**	**kW**	**kWh**	**kW**	**kWh**	**kW**
Direct Install	In-Unit LEDs	550,446	66.38	565,504	68.22	103%	103%
	Smart Power Strip	206	0.02	206	0.02	100%	101%
	Faucet Aerators	23,848	10.72	12,078	6.80	51%	63%
	Low-Flow Showerhead	51,709	5.80	26,206	5.80	51%	100%
Prescriptive	ASHP	152,805	46.27	123,626	40.43	81%	87%
	Programmable Thermostat	19,651	0.00	19,433	0.00	99%	-
	Bathroom Exhaust Fan	7,721	0.90	11,539	2.16	149%	240%
	Dryer	6,097	0.82	6,097	0.82	100%	100%
	Washing Machine	5,407	0.78	4,577	0.66	85%	85%
	Dishwasher	2,923	0.21	4,399	0.32	150%	152%
Custom	Interior Lighting - LED	589,497	49.62	639,154	58.85	108%	119%
	Exterior Lighting - LED	113,127	2.07	111,702	6.34	99%	306%
	LED Exit Sign	8,037	0.06	8,361	0.98	104%	1637%
	Ceiling Fan	1,232	0.00	1,232	0.36	100%	-
	In-Unit LED - Standard	20,821	0.00	21,797	2.64	105%	-
	Refrigerators	3,610	0.00	1,569	0.24	43%	-
	New Construction	37,952	3.65	37,952	3.65	111%	111%

In-Unit LEDs

Energy Savings were calculated for In-Unit LED based on the measure wattage reported in the program tracking data. Baselines wattage for 9W LEDs were specified in the Evergy TRM. For all other bulbs, baseline wattages were calculated based on the average baseline energy consumption for bulbs of similar type and wattage as found in the Evergy Energy Saving Products program. All other inputs were taken from the Evergy TRM.

Smart Power Strips

Energy Savings and demand reductions for Smart Power Strips were calculated based on algorithms from the Evergy TRM. Realization rates for demand are higher than 100% due to rounding in the reported kW demand reduction.

Low-Flow Faucet Aerators

Energy savings and demand reductions for Low-Flow Faucet aerators were calculated as specified in the Evergy TRM. Occupancy data (persons per household) were taken from the program tracking data, which were found to be lower than the value assumed in the Evergy TRM. In addition, the Evergy TRM uses the federal baseline flow rate of 2.2 gallons per minute (GPM) for energy savings calculations, and a baseline flow rate of 1.39 GPM, as specified in the IL TRM v5.0, for the hours of use calculations used for demand reductions. ADM used the federal baseline flow rate of 2.2 GPM for all calculations, resulting in a realization rate of 51% for energy and 63% for demand.

Low-Flow Showerheads

Energy savings and demand reductions for Low-Flow Showerheads were calculated as specified in the Evergy TRM. Occupancy data (persons per household) were taken from the program tracking data, which were found to be lower than the value assumed in the Evergy TRM, resulting in a realization rate of 51% for energy and 100% for demand.

Air Source Heat Pumps (ASHP)

Energy savings and demand reductions from the installation of Air Source Heat Pumps (ASHP) were calculated based on the Evergy TRM and as-found characteristics of installed measures. Measure characteristics were determined using the measure specifications reported in the program tracking database. Reported savings and demand reductions assumed two-ton and five-ton systems with a Seasonal Energy Efficiency Rating (SEER) of 17. Installed systems were found to have SEER rating of 15 and 16. The difference between assumed and actual efficiency resulted in a realization rate of 81% and 87% for energy efficiency and demand reductions, respectively.

Programmable Thermostats

Energy savings and demand reductions resulting from the installation of Programmable Thermostat in multifamily units were calculated based on the Evergy TRM. In addition, there appeared to be minor discrepancies in the application of weather zones in the Evergy TRM. These differences resulted in a kWh realization rate of 99%. No demand savings are claimed from programmable thermostats.

Bathroom Exhaust Fans

Energy savings and demand reductions from bathroom exhaust fans were calculated using the Evergy TRM. ADM used the ENERGY STAR database of energy efficient products to adjust energy savings values from the TRM based on the model number of the installed fans. For measures where no model number was provided in the additional documentation, Evergy TRM energy savings values were used. In addition, there appeared to be minor discrepancies in the deemed values of standard usage and

continuous usage exhaust fans. The verified energy savings resulted in realization rates of 149% and 240% for energy and demand, respectively.

ENERGY STAR Clothes Dryers

Energy savings and demand reductions from the installation of ENERGY STAR certified clothes dryers were calculated using the Evergy TRM. ADM used the ENERGY STAR database of energy efficient products to adjust energy savings values from the TRM based on the model number of the installed dryers. The verified energy savings resulted in realization rates of 100% for both energy and demand.

ENERGY STAR Clothes Washers

Energy savings and demand reductions from the installation of ENERGY STAR certified clothes washers were calculated using the Evergy TRM. ADM used the ENERGY STAR database of energy efficient products to adjust energy savings values from the TRM based on the model number of the installed clothes washer. The verified energy savings resulted in realization rates of 85% for both energy and demand.

ENERGY STAR Dishwashers

Energy savings and demand reductions from the installation of ENERGY STAR certified dishwashers were calculated using the Evergy TRM. ADM used the ENERGY STAR database of energy efficient products to adjust energy savings values from the TRM based on the model number of the installed dishwashers. For measures where no model number was provided in the additional documentation, deemed values were used. The verified energy savings resulted in realization rates of 150% and 152% for energy and demand, respectively.

Interior and Exterior Lighting

Energy Savings were calculated for Custom Interior and Exterior LED lighting using algorithms specified in the Evergy TRM. Baseline and efficient wattage were taken from program tracking data and verified with project documentation. Installation location and estimated hours of use were taken from lighting inventories in program tracking data. Where appropriate, as in the case of office or parking garage lighting, ADM used business standard algorithms and inputs as specified in the Evergy TRM. Verified realization rates for energy and demand were found to be 108% and 119%, respectively, for interior lighting, and 99% and 306%, respectively, for exterior lighting.

LED Exit Signs

Energy savings and demand reductions from the installation of LED exit signs in Multi-Family residences were calculated using algorithms and energy savings values from the Evergy TRM. ADM found verified realization rates of 104% for energy and 1,637% for demand. The elevated demand realization rate is due to reported demand reductions of

0 kW for some LED exit signs in the program, while verified demand reductions were calculated based on the Evergy TRM.

Energy Efficient Ceiling Fans

Energy savings and demand reductions were calculated for energy efficient ceiling fans installed in multi-family units. As there are no savings algorithms for ceiling fans in the Evergy TRM, energy savings values were taken from the IL TRM v7.0, vol3. The verified energy savings resulted in a kWh realization rates of 100%. Although no demand reductions were reported for this measure, ADM used the IL TRM demand reductions of 0.0033 kW per unit.

ENERGY STAR Refrigerators

Energy savings and demand reductions from the installation of ENERGY STAR certified refrigerators were calculated using the Evergy TRM. ADM used the ENERGY STAR database of energy efficient products to adjust energy savings values from the TRM based on the model number of the installed refrigerator. The verified energy savings resulted in a kWh realization rate of 43%. Although no demand reductions were reported for this measure, ADM used the demand reduction algorithms in the Evergy TRM for demand reductions of 0.0062 kW per unit.

New Construction

Reported savings from one new construction project conducted in the PY1 program year were calculated using an energy model. The model estimated the energy savings from the installation of low-flow plumbing fixtures, high-efficiency lighting, air sealing, and efficient HVAC systems. ADM reviewed the model and any applicable documentation for the project. There appeared to be minor inconsistencies in the baseline and efficient lighting power density used for the energy model. Correcting for these inconsistencies, ADM found realization rates of 111% for both energy savings and demand reductions.

E.4 Net Savings Evaluation Findings

The Net-To-Gross Ratio (NTGR) for the Income-Eligible Multi-Family 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 NTGR from stipulated values.

E.5 Impact Evaluation: Final Savings Tables

Based on the impact evaluation results, the total verified net energy savings for the Income Eligible Multifamily Program are 1,599,653 kWh, and the total verified net peak demand savings are 198.70 kW.

Table E-4, Table E-5 and Table E-6 below summarize the verified Net energy and demand savings for the Income Eligible Multifamily Program

Table E-4: Program Gross Energy Savings (kWh) and Peak Demand Reduction (kW)

Jurisdiction	Reported Energy Savings (kWh)	Reported Demand Reduction (kW)	Gross Verified Energy Savings (kWh)	Gross Verified Demand Reduction (kW)	RR_{kWh}	RR_{kW}
Missouri West	879,280	110.87	885,014	121.78	101%	110%
Missouri Metro	715,807	76.45	714,639	76.92	100%	101%
Total	**1,595,087**	**187.32**	**1,599,653**	**198.70**	**100%**	**106%**

Table E-5: Verified Gross and Net Annual Energy Savings (kWh)

Jurisdiction	NTG Ratio	Gross Verified Energy Savings (kWh)	Net Energy Savings (kWh)
Missouri West	100%	885,014	885,014
Missouri Metro	100%	714,639	714,639
Total	**100%**	**1,599,653**	**1,599,653**

Table E-6: Verified Gross and Net Peak Demand Reduction (kW)

Jurisdiction	NTG Ratio	Gross Verified Demand Reduction (kW)	Net Demand Reduction (kW)
Missouri West	100%	121.78	121.78
Missouri Metro	100%	76.92	76.92
Total	**100%**	**198.70**	**198.70**

E.6 Program Metrics

MEIIA Cycle 3 specifies two program metrics to be used in evaluating the performance of the Income-Eligible Multi-Family 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 values. Each Program Year, the total number of projects will be divided by the total number of kWh's saved for a project average."[5]
- 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."[6]

E.6.1 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 precent energy savings per project was found to be 16%.

E.6.2 Spend of at least 85% of Budget

The program budget, actual spending, and long-lead spending (rebates approved in PY1 but scheduled for PY2) for the PY1 program year of the Income-Eligible Multi-Family program is shown in Table E-7, below.

Table E-7: Program Budget and Spending in PY1

Service Territory	Program Budget	Program Spending	Long-Lead Program Spending	Total Program Spending (% of Budget)
MO Metro	$820,134	$611,718.49	$175,958.50	96%
MO West	$936,918	$725,765.44	$181,781.45	97%
Total	$1,757,052	$1,337,483.93	$357,739.95	96%

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

[6] Ibid.

The total program spending was therefore found to total 96% of program budget, meeting the MEEIA Cycle 3 requirement of program Spend of at least 85% of budget across both service territories.

E.7 Process Evaluation

E.7.1 Program Operations

ADM Evaluators ("the Evaluators") conducted in-depth interviews with Evergy's product manager, Evergy's DSM portfolio manager, ICF's portfolio manager, and ICF's program manager for the Income-Eligible Multi-Family (IEMF) program. The purpose of the in-depth interviews is to gain a better understanding of the IEMF program design, operations, challenges, and future opportunities.

Roles and Responsibilities

The following is a summary of the role and responsibilities of the IEMF program staff:

The Evergy product manager is responsible for supervising the program implementers and overseeing budget management.

The Evergy DSM portfolio manager is responsible for ensuring the evaluation is done in accordance with Missouri rules and achieving set DSM targets.

The ICF portfolio manager is responsible for overseeing staff and other residential programs and ensuring client and customer satisfaction.

The ICF program manager is responsible for managing the day-to-day operations of the IEMF programs, meeting program goals, adhering to the program design, delivery, and evaluations. The program manager supports additional energy efficiency programs (e.g., the energy savings kits and the services incubator).

E.7.2 Program Design and PY1 Performance

The ICF program manager provided a brief description of the program during the interview. The Income-Eligible Multi Family (IEMF) program provides different incentives designed to reach Evergy customers who traditionally are unable to participate in energy efficiency programs. Many affordable housing units and multi-family properties do not invest in energy efficient equipment or appliances due to the high upfront costs. As a result, many renters or multi-family tenants bear the economic burden of having less energy efficient equipment in their homes. The program aims to overcome the difference in cost between standard equipment and higher efficiency equipment.

Program participants can choose from different energy efficiency improvement options: direct install kits as well as in-unit upgrades and common area upgrades with a prescriptive or custom model option. The direct install kits include LED light bulbs

(specialty and standard), low-flow showerheads, low-flow faucet aerators, hot water pipe wrap, and advanced power strips (depending on the property). The prescriptive incentive list of equipment includes dish washers, washing machines, clothes dryers, HVAC, air conditioners, heat pumps, mini-splits, ENERGY STAR bathroom exhaust fans, heat pumps, air sealing, and refrigerator replacement rebates. The prescriptive option provides property owners with a clear understanding of the rebates available and increases the probability of program participation. Finally, the custom projects are usually more involved and offer larger rebates. Custom incentives include rebates for large lighting projects, HVAC systems, and additional appliances. Program staff works with participants and their properties to meet their specific needs.

Overall, the program is on track to meet its program year goals. The program manager indicated the IEMF program has achieved 50% of the kWh goal at the time of the interview and is on target to achieve the building energy savings goals. There is also a budget goal of 85% spent for the program year, which the program manager stated would be met for PY1. Projects that began in the previous program year are expected to finish during current program year and will count towards energy savings. The IEMF program often offers rebates for projects that may take longer than the duration of the program year. According to ICF staff, their main advantage that the program has been operating for four years, thus allowing it to acquire some long-term assurance and credibility within the community.

E.7.3 Program Participation and Marketing

The program manager indicated there was participation throughout the year and that participation increased during the third quarter of PY1, despite the impact of the pandemic. Many properties were able to adapt to the new circumstances, and program field staff strategized their outreach methods to maintain contact during this time. Program staff continued to address the property's needs and customize the energy efficiency options to the property's budget. In PY1, there were 1,600 kits ordered but not all were installed.

Program staff reported using a variety of channels and tools to market the IEMF program. The IEMF program utilized newsletters, emails, in-person meetings, and phone calls to potential participants to boost awareness of the program. Historically, in-person contact has been the best marketing tool, but during the pandemic program staff were able to reach property managers more readily through the phone. The program implementer plans to implement more social media marketing strategies for PY2021.

Program staff identifies electrically heated properties as a specific target market to achieve energy savings goals. In this target market, the program staff actively seek and focus on measures that normally consume more energy (e.g., providing incentives for

heating systems over cooling equipment). Program staff also identify properties with older equipment or that have renovation and upgrade plans.

E.7.4 Communication

Program staff indicated that ICF and Evergy meet weekly and review the program's progress. Overall communication is effective and productive. Any projects that are not eligible for the IEMF program are referred to other Evergy energy efficiency programs. The program manager maintained communication with contractors who install the equipment throughout PY1.

Staff communicate with other stakeholders (e.g., energy efficiency interest groups, industry watchdogs, DSM program regulations, and economic groups) about program status. The stakeholders' main concern is budget management. In general, the program has not faced issues and the stakeholders have expressed approval of program operations.

E.7.5 Data Tracking and Quality Assurances and Controls (QA/QC)

The program primarily uses a two-step process for tracking and reporting data. During the beginning stages of a project, ICF program staff develop project history report. The history report is then sent to the Sightline database to tracks the project progress. Data is processed, collected, and fulfills ICF's administrative tasks.

The ICF program manager discussed the different QA/QC procedures for the program. Direct install projects are checked during the installation, with the implementers joining the contractors during the process to check quality and accuracy of the installation. The program staff administer program participant surveys and perform desk reviews of submitted projects. A pre-installation assessment is conducted for custom or prescriptive projects. Due to the pandemic, implementers are now accepting images to follow-up on the project.

ICF follows up with tenants by sending them postage-paid survey cards; however, very few tenants respond to the surveys. ICF largely relies on feedback from the property managers who generally have insight into tenant experience. According to program staff, tenants are aware the program is sponsored by Evergy because they are left with informational worksheets in the home after finishing an installation or other marketing material on some of the measures.

E.7.6 Challenges for IEMF Program

Program staffed offered insight into program challenges. Below are the main challenges discussed during the in-depth interview.

First, the ICF program manager expressed that capital continues to be an issue, especially because affordable housing properties have very limited budgets. Direct install projects seem to be the best way of introducing and recruiting multi-family properties.

Most of these multi-family homes experience high turnover rates in their management, so constant communication and familiarizing with the program is needed.

Most of the affordable housing complexes need more energy efficient LED lighting fixtures as well as other high efficiency equipment.

According to staff, Missouri does not implement or practice energy efficiency to the same extent as other states; therefore, there is room to expand the program within the Evergy territory. Additionally, many of the structures do not meet building codes, which often results in long-term energy waste. Despite the challenges for the IEMF program, the program manager has established relationships with the properties and continues to communicate with them.

E.7.7 Income-Eligible Multi-Family Decision-Maker Survey

The Evaluators surveyed Multi-family property managers or decision-makers who participated in the Income-Eligible Multi-Family (IEMF) program in PY1. ADM contacted the participants through emails or by phone. Of the 17 decision-makers who were contacted, nine completed the survey. Survey participants varied in the number and type of upgrades received through the program.

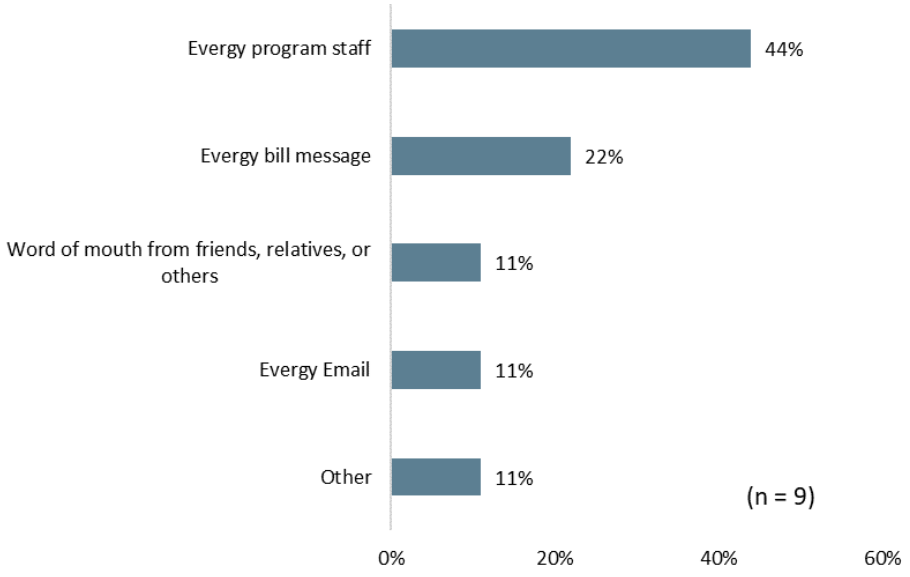
Seven of the nine properties are owned or managed by a company that also owns other properties. The total number of units in each property varied greatly, with an average of 92 units and a range between 16 and 191 units. According to survey participants, most of the properties made improvements to most or all their units during PY1 (see Table E-8). The percentage of tenants that were home during the improvements also varied according to property managers.

Table E-8: Number of Units Improved by Total Number of Units within Property

Property	Total Number of Units at Property	Number of Units with Improvements	Percent Ratio	Percentage of Units where Tenant was Home during Installation
1	16	16	100%	Did not know
2	36	36	100%	Did not know
3	47	45	96%	85%
4	76	72	95%	50%
5	92	92	100%	100%
6	93	84	90%	60%
7	137	130	95%	85%
8	144	130	90%	100%
9	191	191	100%	23%
Total	**832**	**796**	**96%**	**-**

Survey respondents stated they learned about the program through various channels. The most common way property managers learned of IEMF was through Evergy's program staff (see Figure E-3 for more details).

Figure E-3: Program Awareness



Survey participants provided feedback about the reasons they participated in the program. All property managers indicated they wanted to reduce the property's utility bills.

Eighty-nine percent said they wanted to help their tenants lower their bills and 56% stated they wanted to take advantage of the rebates and Evergy's incentives.

Table E-9: Reasons for Program Participation

Reasons	Percent (n = 9)
Reduce property utility bills	100%
Reduce tenant utility bills	89%
To take advantage of rebates/no-cost efficiency improvements	56%
To replace old or non-functioning equipment	44%
Improve tenant comfort and satisfaction	44%
To make the units more attractive to prospective tenants	33%
Respondents had the option of choosing more than one option for this question.	

Regarding the enrollment process, most respondents stated they completed the application form by themselves or with the help of others.

Table E-10: Application Process

Personnel Responsible for Completing Program Application and Paperwork	Percent (n = 9)
I completed the paperwork/program application	67%
Someone else at my company	22%
An Evergy representative	11%
Other	22%
Respondents had the option of choosing more than one option for this question.	

Measures Experience

According to data provided to ADM, all nine properties had LED measures installed. Of the nine respondents, two stated they had to remove 10 to 15 in-unit LEDs because they burned out, six stated they had not removed any bulbs, one was unsure. Other measures the respondents recalled having installed included low-flow showerheads, kitchen faucet aerators, advanced power strips, and exterior lighting.

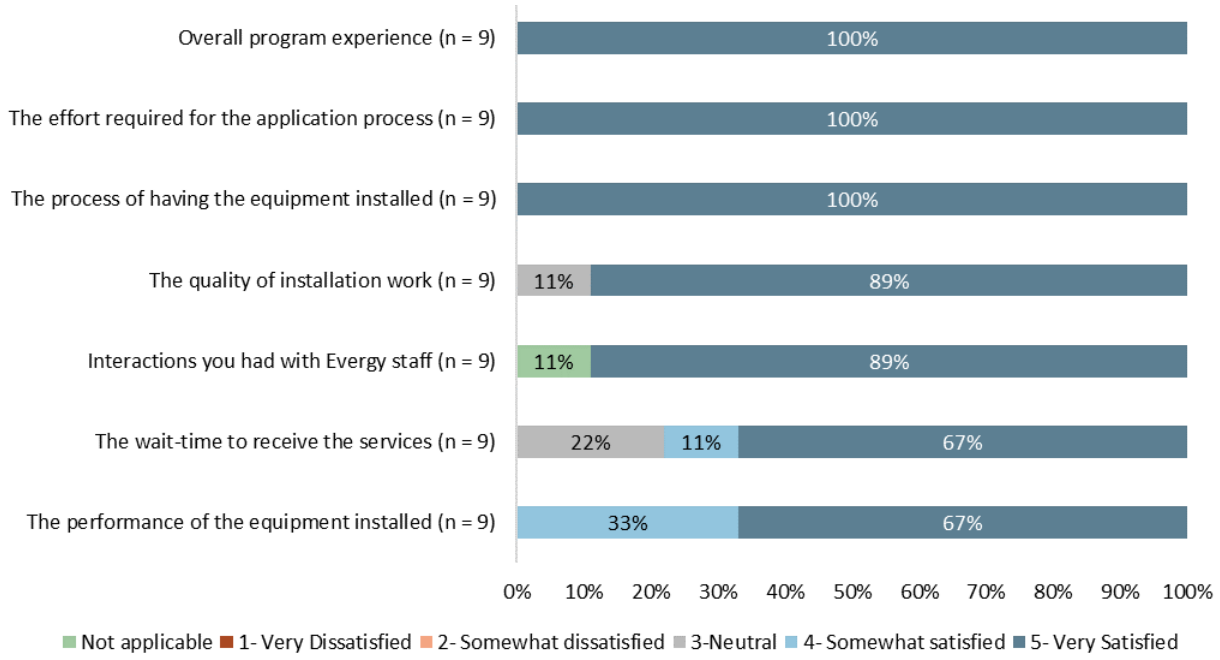
Tenant Characteristics

According to property staff, most tenants pay their own utility bills (67%), while other properties include the utilities in the rent (11%). The other two respondents stated they were either a non-profit that paid all the bills or explained how they provided all their new tenants a discount. Furthermore, eight of the nine respondents stated that a portion of the tenants receive some sort of housing assistance (e.g., housing vouchers, state, federal, etc.). For five properties, all units are provided with housing assistance.

E.7.8 Program Satisfaction

All respondents stated they were satisfied with Evergy as their service energy provider. Eight of the nine indicated they have already recommended the program to others. Figure E-4 shows how respondents rated different aspects of the program. Overall, ratings appeared to be very positive.

Figure E-4: Satisfaction with Different Aspects of the Program



Survey participants expressed their preferred method for Evergy to provide them with additional information in the future about other programs and incentives. Most property managers preferred contact through emails (57%), bill inserts (22%), community events (11%), or from an Evergy representative who is available to visit on-site (11%). Respondents additionally offered comments about the program. Below are some of their responses verbatim:

- Keep up the good work and keep providing incentives to tenants. Thank you. If you come up with new ideas let us know.

- We were just grateful for the assistance and hope others will take advantage of this program.
- We appreciate the ability to participate in this program.

E.8 Conclusions and Recommendations

The following summarizes the key findings from the process evaluation activities for the Income-Eligible Multi-Family (IEMF) program.

- The IEMF program provides different incentives designed to reach Evergy customers who traditionally are unable to participate in energy efficiency programs. Many affordable housing units and multi-family properties do not invest in energy efficient equipment or appliances due to the high upfront costs. This program aims to overcome the difference in cost between standard equipment and higher efficiency equipment. Program participants can choose from different options: direct install kits as well as in-unit upgrades and common area upgrades with a prescriptive or custom model option.
- The COVID-19 pandemic impacted the IEMF program operations. According to the program manager, program operations experienced some delays in project upgrades and financing (e.g., obtaining direct loans or community development grants). The IEMF program also experienced problems with equipment supply shortages. Many properties had to seek equipment from more than one supplier at a time. These challenges caused delays to the application process, and many direct install projects were postponed from March to August of PY1. Delays and shortages continue to present an issue.
- Program participation was consistent throughout the year despite the pandemic. The program manager reports that many properties were able to adapt to the new circumstances, and program field staff strategized their outreach methods to maintain contact during this time. Program staff also reported using a variety of channels and tools to market the IEMF program. Historically, in-person contact has been the best marketing tool, but during the pandemic program staff were able to reach property managers more readily through the phone. ICF plans to implement more social media marketing strategies for PY2021.
- Various practices and procedures are utilized for the program QA/QC. According to the program manager, direct install projects are checked during the installation, with the implementers joining the contractors during the process to check quality and accuracy of the installation. The program staff administer program participants surveys and perform desk reviews of submitted projects. A pre-installation assessment is conducted for custom or prescriptive projects. Due to the pandemic, implementers were accepting images to follow-up on the project. ICF follows up with

tenants by sending them postage-paid survey cards; however, very few tenants respond to the surveys.

- IEMF program challenges include staff turnover at properties, limited budgets, and complex project needs. The ICF program manager expressed that capital continues to be an issue, especially because affordable housing properties have very limited budgets. Direct install projects seem to be the best way of introducing and recruiting multi-family properties. Additionally, most of the multi-family properties experience high management turnover rates, so constant communication and familiarizing with the program is needed.
- Property managers learned about IEMF through various channels. The most common way property managers learned of IEMF was through Evergy's program staff. Survey participants also provided feedback about the reasons they participated in the program. All property managers indicated they wanted to reduce the property's utility bills. Eighty-nine percent said they wanted to help their tenants lower their bills and 56% stated they wanted to take advantage of the rebates and Evergy's incentives.
- Most of the measures installed at the properties were LEDs. According to data provided to ADM, all nine properties had LED measures installed. Of the nine respondents, two stated they had to remove some of the light bulbs, one was unsure, and six stated they had not removed any bulbs. Ten to 15 LEDs were removed because they burned out, according to survey respondents. Overall, reported LED removals represent a small fraction of installed bulbs. Other measures the respondents recalled having installed included low-flow showerheads, kitchen faucet aerators, advanced power strips, and exterior lighting.
- Program participants were satisfied with IEMF and Evergy as their service energy provider. Eight of the nine indicated they have already recommended the program to others. Overall, ratings appeared to be very positive. Survey participants also expressed their preferred method for Evergy to provide them with additional information in the future about other programs and incentives.

The following are recommendations for overall program performance:

- Create short interactive surveys for tenants and property managers. During the installation process, offer the tenant or manager the option to complete a survey using a tablet or a link sent to their phones to encourage immediate feedback. Have automatic reminders set-up a week after in case the survey has not been completed.
- Create an infographic or report of IEMF program success and post on social media. Report year energy goal savings every year and highlight major projects on social media platforms. Use these numbers to increase project leads and increase program credibility within the service territory.

Appendix F Home Energy Reports

F.1 Program Overview

The Home Energy Report Program began providing Home Energy Reports (HERs) in 2013 to a portion of single-family residential customers. The program is designed to provide information to residential customers 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 is composed of several modules of information to help customers understand and manage their energy use. The household receives personalized information about their own kWh consumption and comparison to household energy usage information with similar types of customers, or "neighbors". Also included on the reports is information on other Evergy energy efficiency programs to encourage additional home improvements towards reduced energy usage. This normative information on electric usage and targeted tips on energy saving behaviors is aimed to reduce the participant household's energy consumption.

Since its launch, the program had expanded to implementing eleven waves. One of the cohorts, launched in 2014, consisted of income-eligible customers. This single cohort defines the Income-Eligible Home Energy Report Program. The Evaluators applied the same methodology detailed in this EM&V Plan for all cohorts, including the income-eligible cohort. The program uses a third-party implementation contractor, Opower. All waves have experimental design using randomized controlled trials (RCT), which randomly assign a subset of Evergy's residential customers into a treatment or control group.

Table F-1 provides a summary of program metrics for the PY1.

Table F-1: Performance Metrics – Home Energy Report Program

Metric	PY1 Total	West	Metro	Metro Low-Income
Number of Participants*	233,112	147,711	76,758	8,644
Energy Savings (kWh)				
Targeted Energy Savings	29,934,000	20,355,000	9,579,000	2,928,146
Reported Energy Savings	34,352,064	19,340,629	14,637,019	374,416
Gross Verified Energy Savings	39,330,143	24,864,459	13,523,117	942,567
Net Verified Energy Savings	39,330,143	24,864,459	13,523,117	942,567
Peak Demand Reduction (kW)				
Targeted Peak Demand Reduction	4,116.02	2,550.00	1,200.00	366.00
Reported Peak Demand Reduction	7,718.00	4,037.81	3,641.06	39.58
Gross Verified Peak Demand Reduction	6,702.00	3,453.00	3,017.00	232.00
Net Verified Peak Demand Reduction	6,702.00	3,453.00	3,017.00	232.00
Benefit / Cost Ratios				
Total Resource Cost Test Ratio (HER)	1.22	1.23	1.20	
Total Resource Cost Test (Income-Eligible HER)	0.29	N/A		0.29

Table F-2 summarizes the cohorts implemented in the Home Energy Report program within the Evergy service area.

Table F-2: Summary of Evergy Home Energy Report Program Participation

Territory	Cohort	Treatment Start Date	Treatment Group Size		Control Group Size	
			Number in Cohort	Number at EOY 2019	Number in Cohort	Number at EOY 2019
Missouri West	201308_E	September 2013	59,298	29,337	29,763	14,749
	201503_E_GMO	March 2015	13,238	8,246	9,660	5,988
	201604_E_GMO	April 2016	77,434	45,541	9,705	5,736
	201706_E_GMO	June 2017	25,003	14,629	11,597	6,823
	201904_E_GMO	April 2019	59,873	32,616	23,505	12,854
	PY102_E_GMO	March 2020	9,998	4,930	3,926	1,953
Missouri Metro	201407_E_High_Users	April 2014	91,354	50,144	12,207	6,700
	201503_E_KMO	May 2015	12,213	3,256	9,684	2,539
	201607_E	June 2016	17,320	7,084	11,099	4,546
	202002_E_KMO	July 2020	19,989	14,411	9,991	7,146
Missouri Metro: Low-Income	201407_E_Low_Income	August 2014	20,381	8,468	12,221	5,162
Total			**406,101**	**218,662**	**143,358**	**74,196**

The Evaluators estimated savings for Home Energy Report Program using the previously designated randomized control trials (RCT) developed by Oracle. The Evaluators analyzed each of the cohorts treated during the PY1 program year. Table F-3 displays the impact evaluation findings for the Home Energy Report.

Table F-3: Home Energy Report Program Impact Evaluation Results

Wave	Ex-Ante kWh Savings (kWh)	Ex-Ante Demand Reduction (kW)	Verified kWh Savings (kWh)	Verified Demand Reduction (kW)	Verified kWh Realization Rate	Verified kW Realization Rate
kcpl_201309_e	6,707,539	1,068.23	8,315,900	979.23	123.98%	91.67%
kcpl_201503_e_gmo	2,246,308	432.27	2,766,753	361.39	123.17%	83.60%
kcpl_201604_E_gmo	4,633,486	1,055.63	5,460,203	766.60	117.84%	72.62%
kcpl_her_201706_e_gmo	1,666,987	470.27	2,090,151	348.60	125.38%	74.13%
kcpl_her_201904_e_gmo	3,835,393	957.41	4,791,719	877.35	124.93%	91.64%
kcpl_her_202002_e_gmo	250,916	54	1,439,733	120.04	573.79%	223.91%
kcpl_201407_e_high_users	12,274,496	3,242.01	9,060,748	2276.38	73.82%	70.22%
kcpl_201503_e_kmo	816,666	45.96	632,929	68.27	77.50%	148.55%
kcpl_201607_e	1,586,226	228.09	2,742,333	312.04	172.88%	136.80%
kcpl_her_202002_e_kmo	-40,369	125	1,087,107	360.59	-2692.93%	287.81%
kcpl_201407_e_low_income	374,416	39.58	942,567	231.77	251.74%	585.62%
Total	**34,352,064**	**7,718**	**39,330,143**	**6702.28**	**114.49%**	**86.84%**

The Evaluators found the Home Energy Report Program verified savings to be 39,330,143 kWh with an average annual household savings value of 169 kWh. The Evaluators provided further impact evaluation results in the sections below.

F.2 EM&V Methodology

This section describes the gross impact evaluation of the Home Energy Report program. The Evaluators analyzed each of the cohorts treated during the PY1 program year.

The Evaluators used participant and control group billing data in the pre-period (before the household starts receiving home energy reports) and in the post-period (after household starts receiving home energy reports) to estimate program impact for each wave as part of the Evaluator's impact evaluation for the Home Energy Report Program, as detailed in the Uniform Methods Project (UMP) behavioral chapter by the National Renewable Energy Laboratory. In addition, the Evaluators estimated joint savings from other downstream energy efficiency programs offered to Evergy residential and low-income customers.

F.2.1 Gross Impact Evaluation Methodologies

The work effort was divided into six distinct steps:

1. Data preparation and cleaning, including true-up and calendarization
2. Validity testing of remaining treatment and control groups during the baseline period
3. Estimate monthly and annual billed consumption differences between treatment and control groups via regression modeling
4. Estimate and remove joint savings from other programs
5. Estimate demand savings
6. Estimate program attrition

The Evaluators explored several linear regression models for the impact evaluation of the Home Energy Report program. 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.

The following types of LFER models were explored during the evaluation of this program: Difference in Difference (D-in-D) with monthly controls, D-in-D with weather controls, and Post-Program Regression (PPR) models. The UMP recommended both the D-in-D and PPR model regressions. The D-in-D used data from the treatment and control groups during the pre- and post-period. The PPR model was a panel regression model that calculated the differences between treatment and control consumption in the post-program period. However, it included controls on lagged energy use for the same calendar month of the pre-program period to include in the model any small systematic differences in pre-treatment usage trends between the participant and control customers.

The Evaluators utilized both the PPR and D-in-D models to present the evaluated savings, as this combination displayed sufficient fitness and consistency across waves. This specification was recommended by the UMP to obtain precise savings estimates by comparing the treatment and control groups during the pre- and post-periods.

The Evaluators presented savings estimates in three formats for each program year:

- Daily and annual energy savings per home
- Annual percent savings per home
- Program-level savings

The percent savings per home was calculated by dividing the average annual energy savings estimated in the treatment group by the average annual energy consumption from the control group for each program year. The program-level savings were calculated by multiplying the average annual household impact estimate by the weighted number of

active program participants in the treatment group and after removing double counted savings, by program year.

Step 1: Data Preparation and Cleaning

This section describes the data cleaning steps the Evaluators performed to prepare for the billing analysis.

Data Provided

City Light provided the following data to support the analysis:

- Pre- and post-treatment monthly electric billing data for 406,101 participants and 143,358 non-participants. The data started on June 1, 2012 and ended on January 1, 2021
- Participant and nonparticipant account active and account inactive dates
- Program tracking data for participants, including date of installation and verified kWh savings for each measure installed

True-Up

Evergy used estimated meter reads in some cases. As part of the data preparation process, the Evaluators corrected for estimated reads and adjusted actual reads by using a "true-up" process. For each metered read and all estimated reads immediately preceding it, the Evaluators totaled the billed usage and number of days spanning those bills. The total billed usage for that cumulative period was then divided by the total number of days to generate an average usage per day value. This average usage per day value was then multiplied by the number of days in each individual bill to generate a corrected usage value. Because the number of estimated reads per actual read was inconsistent, the number of estimated reads prior to the first actual read in the provided dataset could not be assumed. Therefore, the first metered read and all estimated reads preceding it were excluded from the dataset. Similarly, estimated reads that did not have a corresponding actual read (generally towards the tail end of provided billing data) were also excluded from analysis. The following equation provides the means for calculating the adjusted usage for billing data after the first metered read and all prior estimated reads have been excluded:

Equation F-1: Billing Data Adjustment Calculation

$$Adjusted\ usage = \sum_{i}^{n} Billed\ usage \times \frac{Billing\ days_m}{\sum_{i}^{n} Billing\ days}$$

Where:

i	*= First estimated bill in a sequence of estimated bills leading to a metered bill.*
n	*= A metered bill providing an adjustment factor for preceding estimated bills.*
m	*= The billing month of interest.*
Billed usage	*= The total kWh billed in a monthly bill.*
Billing days	*= The total number of days in a monthly bill's billing period.*

Calendarization

Monthly billing periods for customers did not fall on consistent dates between participants. For example, one customer's June bill may have run from May 16th to June 17th while another customer's may have run from May 20th to July 5th. To make the monthly billing data consistent between participants and to represent each month accurately, the Evaluators calendarized the data into monthly bills. Calendarization is the process of correcting monthly billing data to match calendar dates. For example, if 15 days in a billing period belonged to June and 15 days belonged to July; 50% of the billed usage would be attributed to June and 50% attributed to July. The proportionated usage and number of days that fall under a given calendar month are then summed to generate a calendarized usage value and the number of billed days for that month. The following equation provides the method for calculating the monthly usage by calendar month:

Equation F-2: Monthly Billing Data Calculation

$$Monthly\ usage_m = \sum_{i}^{n} \left(Adjusted\ usage_i \times \frac{Month\ days_i}{Billing\ days_i} \right)$$

Where:

i	*= First bill containing the month of interest.*
n	*= Last bill containing the month of interest.*
m	*= The month of interest.*
$Monthly\ usage$	*= The calendarized monthly usage for a given month.*
$Month\ days$	*= The number of days belonging to the month of interest in a billing period.*
$Billing\ days$	*= The number of days in a billing period.*

Restrictions

After calendarization was completed, an average daily usage value was calculated by dividing the monthly usage by the number of billed days in a month. Additionally, data was filtered using the following criteria:

- Customer months that had less than one billed day or exceed the total number of days in that calendar month for that year were excluded from analysis—months that meet these criteria have overlapping bills and are unreliable for analysis.
- Months that were present after a customer's move out date were also excluded from analysis.
- Customer months in which average daily usage exceeded 200 kWh were excluded from analysis.
- Pre-treatment data was limited to the 12 months prior to the treatment start date for each experimental cohort.
- Customers without at least 9 of the 12 months of pre-period data, as well as at least 9 of the 12 months of post-period data were removed from the analysis.

The data provided to the Evaluators was in the form of monthly billing data.

The Evaluators identified high outliers at the threshold of average daily kWh usage over 200 kWh per day. This level of consumption was unrealistic for residential households and could reasonably be categorized as the result of a reading error rather than a valid reading from a high user. The Evaluators aimed to remove error reading rather than remove high and low users, as these subgroups contributed real behaviors to the average savings estimate.

After data preparation and cleaning, the Evaluators performed validity testing for all waves evaluated. The details of this step are provided in the next section.

Step 2: Validity Testing

The method for evaluation requires the counterfactual group remains statistically valid for each treatment group. Validity is tested by examining each billing read in the pre-treatment period for customers in each the treatment and control group. Each calendarized monthly is tested for statistically significant differences using a simple two-tailed T-test. The Evaluators performed equivalency for each month between the provided RCT treatment group and the provided RCT control group.

The Evaluators tested the validity of each RCT by completing t-tests for the average daily usage of each of the pre-period months between the remaining treatment group and remaining control.

For waves that did not pass equivalency testing, the Evaluators performed propensity score matching (PSM) to create an ad-hoc control group comprising of participants that had not received home energy reports. The control group created underwent equivalency testing to confirm it was statistically comparable to the treatment group in pre-period usage. The Evaluators noted that all waves passed equivalency testing during the evaluation of the PY1 program year and therefore the creation of an ad-hoc control group was not required.

Step 3: Linear Regression Modeling

The Evaluators explored multiple linear regression models that compared the treatment group and valid comparison group. The comparison control group used was created during the RCT design. This approach, with randomized control trial, is detailed in the UMP as a preferred method for evaluation of opt-out behavioral programs. The following sections summarize the model specification the Evaluators utilized to estimate impact savings for the program.

Post-Program Regression Model Specification

The post-program regression (PPR) model combined both cross-sectional and time series data in a panel dataset. This model used only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic differences between the participant and control customers. In particular, energy use in calendar month t of the post-program period was framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between participants and controls would be reflected in differences in their past energy use, which is highly correlated with their current energy use. The version ADM estimated included monthly fixed effects and interacted those monthly fixed effects with the pre-program energy use variable. Those interaction terms allowed pre-program usage to have a different effect on post-program usage in each calendar month.

The model specification is as follows:

Equation F-3: Post-Program Regression (PPR) Model Specification

$$ADC_{it} = \alpha_0 + \beta_1(Treatment)_i + \beta_2\,(PreUsage)_i + \beta_3(Month)_t + \beta_4(Month \times PreUsage)_{it} + \varepsilon_{it}$$

Where:

i	$=$ *the ith household*
t	$=$ *the first, second, third, etc. month of the post-treatment period*
ADC_{it}	$=$ *Average daily usage for reading t for household i during the post-treatment period*
$Treatment_i$	$=$ *Dummy variable indicating whether household i was in the treatment or control group*
$Month_t$	$=$ *Dummy variable indicating month-year of month t*
$PreUsage_i$	$=$ *Average daily usage across household i's available pre-treatment billing reads*
ε_{it}	$=$ *Customer-level random error*
α_0	$=$ *The model intercept for home i*
β_{1-4}	$=$ *Coefficients determined via regression*

The coefficient β_1 represents the average change in consumption between the pre-period and post-period for the treatment group.

In this specification, savings are calculated by:

Equation F-4: Monthly Savings Estimate

$$Savings = \sum Treatment\ Coeff \times Number\ of\ recipients\ in\ month\ i \times Number\ of\ days\ in\ month\ i$$

Difference-in-Difference Model Specification

The fixed-effects model specification contained customer-specific dummy variables to account for exogenous heterogeneity that could not be explicitly controlled for and was not relevant to the estimation of program savings. The specification of customer specific effects allowed the model to capture much of the baseline differences across customers while obtaining reliable estimates of the impact of the report.

ADM included independent variables such as Heating Degree Days (HDD) and Cooling Degree Days (CDD) for weather control and other household characteristics, where applicable, to improve model confidence. ADM fit a fixed effects panel regression model to estimate weather-dependent daily consumption differences between treatment and control households.

Equation F-5: Fixed-Effects Difference-in-Difference (D-in-D) Panel Regression Model Specification

$$ADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(HDD)_{it} + \beta_3(CDD)_{it} + \beta_4(Post \times HDD)_{it} + \beta_5(Post \times CDD)_{it} + \beta_6(Post \times Treatment)_{it} + \beta_7(Post \times HDD \times Treatment)_{it} + \beta_8(Post \times CDD \times Treatment)_{it} + \varepsilon_{it}$$

Where:

ADC_{it}	*= Estimated average daily consumption (dependent variable) in home i during period t*
$Post_{it}$	*= Dummy variable indicating whether period t was in pre- or post- retrofit*
$Treatment_i$	*= Dummy variable indicating whether household i was in treatment group or control group*
HDD_{it}	*= Average heating degree days during period t at home i*
CDD_{it}	*= Average cooling degree days during period t at home i*
ε_{it}	*= Customer-level random error*
α_0	*= The model intercept for home i*
β_{1-8}	*= Coefficients determined via regression*

The coefficients β_6 and β_7 represent the average change in daily weather-related consumption between the groups in the post-period. HDD and CDD were calculated from local weather data. HDD and CDD were estimated using a range of balance points (55- to 75-degree temperature base) and the HDD and CDD combination that yielded the greatest model R-square were used in the final analysis. This accounted for the "dead-band" in residential heating and cooling loads, as there was a range of temperatures in which a residential customer would be neither heating nor cooling.

Step 4: Double Count Savings Approach

Participants in both the treatment and control groups participated in other Evergy residential energy efficiency programs. The Evergy HER program reports may have also increased the customer's propensity to participate in other programs. This additional participation is known as uplift. The HER sent to customers included information about other Evergy incentives and programs, which may have led to customers adopting more energy efficient upgrades for their home.

When a household participates in an efficiency program because of this encouragement, the utility might count their savings twice: once in the regression-based estimate of HER program savings and again in the estimate of savings for the other energy efficiency

program. Although uplift rarely displays a statistically significant difference between the treatment and control groups, the UMP recommended removing uplift from each group at the household level.

The double counted savings, whether positive or negative, were subtracted from the wave's savings estimates from the regression analysis to get total verified savings. The approach for removal of double counted savings differed based on whether the other program was a downstream program. The following sections detail ADM's methodology for each.

Downstream

Downstream programs traditionally track installed measures at the customer level. Evergy delivered customer-level tracking data for other programs offered to residential customers. The Evaluators evaluated these programs and used the verified savings from each program to use towards downstream double counting for the HER program. The residential Evergy programs included in the double counting analysis were the Heating, Cooling, and Home Comfort Program, the Income-Eligible Multi-Family Program, and the Smart Thermostats Program.

The Evaluators corrected for cross-program participation that occurred after treatment began to the extent that the treatment group participated at a higher rate than the control group. The Evaluators estimated and subtracted savings from program uplift from the total program portfolio savings for each program year. The double count savings were calculated on a per-household level for each treatment group in each cohort as follows:

Equation F-6: Double Count Specification

$$Double\ Counting = \left(\frac{OP\ kWh}{Household_{Treatment}} - \frac{OP\ kWh}{Household_{Control}}\right) \times \#\ Accounts_{Treatment}$$

Where,

$\frac{OP\ kWh}{Household_{Treatment}}$ = *Other program kWh per household in the treatment group*

$\frac{OP\ kWh}{Household_{Control}}$ = *Other program kWh per household in the control group*

$\#\ Accounts_{Treatment}$ = *Total accounts in the treatment group*

To estimate double counted program savings from downstream program uplift, the Evaluators:

1. Matched the HER program treatment and control group customers to the utility energy efficiency program tracking data by customer ID or address

2. Calculated the savings per treatment group subject from efficiency uplift as the difference between treatment and control groups in average efficiency program savings per subject
3. Multiplied that difference by the number of subjects who were in the treatment group

The Evaluators summarized and removed program uplift for each wave and treatment status for each of the other residential program offerings.

Upstream

Estimating savings from program uplift for measures that the utility does not track at the customer level is more difficult. Because upstream programs are unable to track participation at the customer-level, the approach to estimating program uplift differs from that of downstream programs. Upstream program uplift estimation therefore required household surveys to be conducted. The extent of this evaluation did not include participant and nonparticipant household surveys.

The Evaluator elected to remove upstream program uplift during the 2021 program year, as survey results from program year 2020 were unable to provide robust responses to facilitate this analysis.

Step 5: Demand Reduction Approach

The Evaluators estimated demand savings for the program using monthly billing data provided by Evergy. Opower, the implementor of the program, calculated coincident demand savings by taking the energy savings from August and dividing it by the number of hours in August times a factor of 1.5. The Evaluators applied the same calculation to the evaluated savings from August for the estimate of program demand reductions. The Evaluators summarized demand reductions for each evaluated wave and each program year evaluated.

Step 6: Attrition Analysis Approach

The tracking of treatment and control households could be affected by either move-outs or opt-outs (known collectively as ‘attrition’). If a household’s final bill was the end of the evaluated post-period, it was considered a move out and bills occurring after moveout were removed from the analysis. Opt-outs, however, remained in the regression analysis, as the program savings estimated were the “intent-to-treat” savings. It remained useful to estimate attrition to gather information on persistence of savings.

The cumulative level of both treatment and control move outs over the program life by month, wave, and treatment/control status for each program year was summarized by the Evaluators. This information can be useful for Evergy for the potential need for future wave expansions for the HER program.

F.3 Gross Impact Evaluation Findings

This section details the level of program activity for PY1, the reported and verified gross savings that resulted from that activity.

The program-level savings were calculated by multiplying the average annual household impact estimate by the weighted number of active program participants in the treatment group, and after removing double counted savings, by program year.

The Evaluators calculated the percent savings per home by dividing the average annual energy savings estimated in the treatment group by the average annual energy consumption from the control group for each program year. That value was then adjusted for uplift from downstream measures. This methodology is presented in the UMP Chapter 17 Residential Behavior Protocol.

F.3.1 Data Preparation and Cleaning

The Evaluators prepared and cleaned billing data provided by Evergy. The following table represents the unique number of customers per wave and treatment group throughout the billing cleaning stages.

Table F-4: Missouri West Territory: Data Cleaning Counts by Wave

Restriction	201308E	201503_E	201604_E	201706_E	201904_E	202002_E
Start	59,298	13,238	77,434	25,003	59,873	9,998
After fixing acct active and inactive dates	59,298	13,238	77,434	25,003	59,873	9,998
After removing bills that occur after inactive date	59,287	13,237	77,420	24,995	59,845	9,992
After removing bills that occur before active date	59,271	13,234	77,405	24,989	59,811	9,989
After removing bills that occur before pre-period	59,268	13,234	77,405	24,989	59,808	9,989
Remove outliers (anything over 200kWh/day)	59,268	13,234	77,405	24,989	59,808	9,989
Remove bills with less than 10 or more than 90 days duration	59,262	13,232	77,394	24,986	59,783	9,986
Only keep pre-period and post-period in program year	59,226	13,223	77,332	24,958	59,718	9,986
Only keep customer with at least 9 months pre and 9 months post (except for 2020 waves)	29,337	8,246	45,541	14,629	32,616	4,930

Table F-5: Missouri Metro Territory: Data Cleaning Counts by Wave

Restriction	201407_E_High_Users	201503_E_KMO	201607_E	202002_E_KMO
Start	59,298	13,238	77,434	25,003
After fixing acct active and inactive dates	59,298	13,238	77,434	25,003
After removing bills that occur after inactive date	59,287	13,237	77,420	24,995
After removing bills that occur before active date	59,271	13,234	77,405	24,989
After removing bills that occur before pre-period	59,268	13,234	77,405	24,989
Remove outliers (anything over 200kWh/day)	59,268	13,234	77,405	24,989
Remove bills with less than 10 or more than 90 days duration	59,262	13,232	77,394	24,986
Only keep pre-period and post-period in program year	59,226	13,223	77,332	24,958
Only keep customer with at least 9 months pre and 9 months post (except for 2020 waves)	29,337	8,246	45,541	14,629

Table F-6: Missouri Metro Low-Income Territory: Data Cleaning Counts by Wave

Restriction	201407_E_Low_Income
Start	59,298
After fixing acct active and inactive dates	59,298
After removing bills that occur after inactive date	59,287
After removing bills that occur before active date	59,271
After removing bills that occur before pre-period	59,268
Remove outliers (anything over 200kWh/day)	59,268
Remove bills with less than 10 or more than 90 days duration	59,262
Only keep pre-period and post-period in program year	59,226
Only keep customer with at least 9 months pre and 9 months post (except for 2020 waves)	29,337

The Evaluators conducted true-up and calendarization adjustments for each monthly bill. The resulting dataset contained adjusted monthly bill reads with associated consumption and bill duration for each month the customer remained active.

After data preparation and cleaning, the Evaluators performed validity testing for all waves evaluated. The details of this step are provided in the next section.

F.3.2 Validity Testing Results

The remaining groups after billing preparation and cleaning were tested for statistically significant differences in usage between the treatment and control groups for each of the 12 pre-period months in each wave. Before program launch, the implementation team was given billing records of all customers to create two matched (i.e. validated) groups: a treatment group and a control group. The control groups were validated in prior evaluations of this program. However, due to natural attrition, these groups may have become no longer valid. The Evaluators first verified that the remaining treatment and control groups were still statistically valid before fitting with a linear regression model.

Table F-7 through Table F-17 detail differences and statistical significance between each wave's treatment and control groups for each of the 12 months in the pre-period, relative to each wave's intervention date.

Table F-7: Missouri West Territory: 201308_E Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	52.24	52.36	-0.1272	0.7127	-
February	49.46	49.58	-0.1193	0.7172	-
March	45.77	45.98	-0.2055	0.4796	-
April	37.97	38.08	-0.1159	0.5599	-
May	37.12	37.32	-0.1976	0.2183	-
June	47.66	48.01	-0.3514	0.0746	-
July	57.49	57.96	-0.4641	0.0496	*
August	56.29	56.70	-0.4049	0.0599	-
September	40.18	40.44	-0.2588	0.1124	-
October	33.13	33.22	-0.0848	0.5602	-
November	39.37	39.46	-0.0916	0.6479	-
December	49.06	49.16	-0.0989	0.7400	-

**statistically significant if p<0.05*

Table F-8: Missouri West Territory: 201503_E_GMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	82.81	82.81	0.0002	0.9997	-
February	80.72	81.79	-1.0700	0.5406	-
March	66.92	67.26	-0.3419	0.4481	-
April	47.82	47.91	-0.0855	0.7394	-
May	51.05	51.25	-0.2025	0.5117	-
June	61.18	61.58	-0.3938	0.3249	-
July	64.91	65.45	-0.5375	0.2043	-
August	67.05	67.73	-0.6785	0.1134	-
September	49.81	50.01	-0.2063	0.5211	-
October	42.75	42.82	-0.0703	0.7743	-
November	68.65	68.81	-0.1524	0.7442	-
December	80.24	80.43	-0.1922	0.7348	-

**statistically significant if p<0.05*

Table F-9: Missouri West Territory: 201604_E_GMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	31.54	31.59	-0.0510	0.8647	-
February	27.51	27.39	0.1183	0.6291	-
March	22.05	21.91	0.1336	0.6001	-
April	20.88	20.84	0.0433	0.7405	-
May	23.64	23.51	0.1292	0.3678	-
June	37.09	36.88	0.2085	0.3076	-
July	45.53	45.43	0.0978	0.6822	-
August	40.55	40.43	0.1259	0.5622	-
September	31.81	31.75	0.0575	0.7527	-
October	22.30	22.23	0.0775	0.5578	-
November	24.80	24.68	0.1184	0.4986	-
December	29.56	29.48	0.0861	0.7282	-

**statistically significant if p<0.05*

Table F-10: Missouri West Territory: 201706_E_GMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	27.44	27.45	-0.0074	0.9864	-
February	22.37	22.22	0.1467	0.6491	-
March	19.96	19.83	0.1356	0.6080	-
April	18.26	18.17	0.0867	0.6895	-
May	20.60	20.62	-0.0190	0.9362	-
June	27.59	28.03	-0.4361	0.4086	-
July	37.32	37.21	0.1149	0.7443	-
August	33.19	33.19	0.0009	0.9979	-
September	25.60	25.55	0.0578	0.8276	-
October	18.50	18.45	0.0483	0.8143	-
November	20.77	20.65	0.1204	0.6500	-
December	28.44	28.18	0.2603	0.5509	-

**statistically significant if p<0.05*

Table F-11: Missouri West Territory: 201904_E_GMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	40.21	40.10	0.1080	0.7538	-
February	41.32	41.33	-0.0090	0.9804	-
March	34.60	34.52	0.0831	0.7743	-
April	23.76	23.60	0.1589	0.6561	-
May	34.93	35.09	-0.1635	0.4180	-
June	46.15	46.27	-0.1211	0.6237	-
July	46.82	46.69	0.1293	0.5895	-
August	41.50	41.39	0.1093	0.6144	-
September	33.65	33.49	0.1624	0.3633	-
October	26.52	26.28	0.2383	0.1245	-
November	33.26	33.09	0.1711	0.5002	-
December	37.07	36.81	0.2615	0.3729	-

**statistically significant if p<0.05*

Table F-12: Missouri West Territory: 200200_E_GMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	60.25	60.05	0.1952	0.8337	-
February	56.64	56.24	0.3942	0.6511	-
March	44.59	44.26	0.3308	0.5628	-
April	40.54	40.24	0.2990	0.5909	-
May	38.04	37.69	0.3494	0.5312	-
June	49.75	49.50	0.2462	0.7085	-
July	56.94	56.43	0.5081	0.4268	-
August	52.20	51.81	0.3906	0.4799	-
September	46.54	46.03	0.5102	0.2860	-
October	39.69	39.68	0.0045	0.9915	-
November	49.45	49.52	-0.0627	0.9285	-
December	55.52	55.26	0.2591	0.7474	-

**statistically significant if p<0.05*

Table F-13: Missouri Metro Territory: 201407_E_High_Users Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	36.71	36.33	0.3785	0.2918	-
February	34.80	34.38	0.4205	0.2247	-
March	28.51	28.25	0.2564	0.3072	-
April	24.74	24.56	0.1836	0.3218	-
May	30.59	30.36	0.2306	0.2990	-
June	37.05	36.42	0.6342	0.0715	-
July	46.79	46.37	0.4242	0.1616	-
August	45.33	44.96	0.3664	0.2162	-
September	37.40	37.06	0.3369	0.1828	-
October	26.03	25.82	0.2089	0.2653	-
November	29.95	29.70	0.2544	0.3144	-
December	36.17	35.76	0.4119	0.2287	-

**statistically significant if p<0.05*

Table F-14: Missouri Metro Territory: 201503_E_KMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	34.67	34.67	-0.0008	0.9991	-
February	32.38	33.65	-1.2745	0.2219	-
March	27.94	28.11	-0.1734	0.7657	-
April	23.29	23.43	-0.1385	0.7343	-
May	28.20	28.14	0.0571	0.9024	-
June	36.68	36.70	-0.0166	0.9771	-
July	40.05	40.10	-0.0485	0.9363	-
August	40.98	41.14	-0.1572	0.7977	-
September	29.72	29.77	-0.0473	0.9193	-
October	23.34	23.46	-0.1136	0.7701	-
November	30.52	30.77	-0.2505	0.6826	-
December	34.85	35.31	-0.4572	0.5385	-

**statistically significant if p<0.05*

Table F-15: Missouri Metro Territory: 201607_E Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	30.10	31.06	-0.9592	0.1255	-
February	26.31	26.73	-0.4258	0.4253	-
March	20.80	20.96	-0.1627	0.6572	-
April	18.37	18.62	-0.2445	0.4107	-
May	21.43	21.67	-0.2429	0.4505	-
June	31.20	31.68	-0.4817	0.4016	-
July	35.33	35.26	0.0702	0.8832	-
August	32.11	32.09	0.0134	0.9758	-
September	24.96	24.92	0.0406	0.9119	-
October	19.14	19.26	-0.1216	0.6820	-
November	22.65	22.91	-0.2642	0.5033	-
December	28.05	28.56	-0.5082	0.3553	-

**statistically significant if p<0.05*

Table F-16: Missouri Metro Territory: 202002_E_KMO Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	53.69	53.29	0.4077	0.3703	-
February	49.57	49.41	0.1674	0.6933	-
March	40.36	40.07	0.2893	0.3049	-
April	37.12	36.73	0.3898	0.1521	-
May	36.63	36.70	-0.0681	0.7572	-
June	49.91	50.03	-0.1211	0.6816	-
July	58.50	58.70	-0.2012	0.5493	-
August	54.00	54.24	-0.2329	0.4501	-
September	47.33	47.45	-0.1212	0.6524	-
October	38.64	38.66	-0.0211	0.9231	-
November	45.58	45.40	0.1800	0.6131	-
December	50.25	50.02	0.2267	0.5729	-

**statistically significant if p<0.05*

Table F-17: Missouri Metro Low Income: 201407_E_Low_Income Wave T-Test Results

Pre-Period Month	Treatment Group Average Daily Usage (kWh/day)	Control Group Average Daily Usage (kWh/day)	Average Daily Usage Difference (kWh/day)	P-value	Statistically Significant Difference
January	53.69	53.29	0.4077	0.3703	-
February	49.57	49.41	0.1674	0.6933	-
March	40.36	40.07	0.2893	0.3049	-
April	37.12	36.73	0.3898	0.1521	-
May	36.63	36.70	-0.0681	0.7572	-
June	49.91	50.03	-0.1211	0.6816	-
July	58.50	58.70	-0.2012	0.5493	-
August	54.00	54.24	-0.2329	0.4501	-
September	47.33	47.45	-0.1212	0.6524	-
October	38.64	38.66	-0.0211	0.9231	-
November	45.58	45.40	0.1800	0.6131	-
December	50.25	50.02	0.2267	0.5729	-

**statistically significant if p<0.05*

T-tests of monthly pre period usage could yield a statistically significant difference 40% of the time for one to two months out of 12. Thus, the Evaluators set a tolerance band allowing two months out of 12 to vary in pre-period usage at the 95% confidence level. All eleven waves passed this threshold and remained balanced at the 95% confidence level in the pre-period. Therefore, the Evaluators continued to the next step and conducted linear regressions on each of the wave RCT cohorts. The Evaluators fit a D-in-D and PPR model presented in Equation F-5 to estimate daily consumption differences between homes that received home energy reports and home that did not receive home energy reports.

F.3.3 Linear Regression Modeling Results

This section details the regression results of each of the evaluated waves. All eleven waves implemented by Oracle for Evergy were evaluated with the remaining RCT groups. As discussed in the evaluation approach section, savings were determined through parameters: The coefficients β_1 for the PPR model and through the coefficients β_6, β_7, and β_8 for the D-in-D model, which are defined again in Table F-18 and Table F-19, along with all the other model parameters.

Table F-18: PPR Model Parameters

Variable	Parameter	Interpretation
Treatment	B1	Dummy variable indicating treatment status
Month	B2	Dummy variable indicating month
Avg Pre-Usage	B3	Average daily usage across household's available pre-period billing reads
Month*Avg Pre-Usage	B4	Average daily usage across household's available pre-period billing reads

Table F-19: D-in-D Model Parameters

Variable	Parameter	Interpretation
Post	B1	Average daily usage in the post-period
Avg Daily HDD	B2	Average daily heating degree days
Avg Daily CDD	B3	Average daily cooling degree days
Avg Daily HDD*Post	B4	Average daily heating degree days in the post-period
Avg Daily CDD*Post	B5	Average daily cooling degree days in the post-period
Treatment*Post	B6	Average daily usage in the post-period with treatment
Avg Daily HDD*Treatment*Post	B7	Average daily heating degree days in the post-period with treatment
Avg Daily CDD*Treatment*Post	B8	Average daily cooling degree days in the post-period with treatment

The Evaluators found all waves to display positive savings that were statistically significant, and each model portrayed a sufficient fitness to the data. The Evaluators noted that the PPR model was used for all waves except 202002_E_GMO within the Missouri West territory. For this wave, the Evaluators fit a D-in-D model to report final savings. This selection of models was the most optimal in order for the Evaluators to evaluate the waves within the program as consistently as possible, and included statistically significant savings for all waves. The Evaluators selected the PPR model for all waves in which statistical significance was achieved, and the D-in-D model for the wave that did not show statistical significance with the PPR model; however, it did yield significant results with the D-in-D model. This option of model utilization allowed the Evaluators to use the most consistent models between each wave, in order for the results to be most comparable between this year’s evaluation and future program year evaluations.

The Adjusted R-Squared value each of the regressions ranged between 0.5188 and 0.7708. Adjusted R-Squared values less than 0.7 were slightly lower than ideal, but still showed a good fit against the data. The lower-than-ideal Adjusted R-squared value may have been affected by the increased variability in usage in the post-period due to COVID19 stay-at-home orders. The behaviors in the customers within this cohort may have changed within certain demographics, representing additional variability that the model was unable to capture. However, the Evaluators note that the regression model fit the data well and displayed a statistically significant savings effect for the Home Energy Report recipients for this wave.

Per-home results and percent savings by month and by program year are presented for each of the analyzed waves. Joint savings attributable to Evergy downstream programs were calculated and removed to avoid double counting.

Missouri West Territory Results

This section describes the linear regression results, double counting adjustments, and final household and program-level savings for each wave within the Missouri West service territory.

201308_E Wave Results

This section describes the impact evaluation results for the 201308_E_ wave within the Missouri West territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-20: Missouri West Territory: 201308_E Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.75	0.05	<0.001	-0.83	-0.68
February	0.42	0.19	0.03	0.11	0.74
March	4.33	0.19	<0.001	4.01	4.65
April	3.97	0.21	<0.001	3.62	4.31
May	4.94	0.23	<0.001	4.56	5.32
June	8.74	0.24	<0.001	8.35	9.14
July	9.97	0.25	<0.001	9.56	10.38
August	6.05	0.25	<0.001	5.64	6.47
September	5.17	0.24	<0.001	4.77	5.56
October	2.95	0.23	<0.001	2.57	3.33
November	-0.22	0.21	0.30	-0.57	0.13
December	2.36	0.20	<0.001	2.03	2.69
Pre-Usage	0.81	0.00	<0.001	0.81	0.82
February*Pre-Usage	-0.02	0.00	<0.001	-0.02	-0.01
March*Pre-Usage	-0.21	0.00	<0.001	-0.21	-0.20
April*Pre-Usage	-0.18	0.00	<0.001	-0.19	-0.18
May*Pre-Usage	-0.09	0.01	<0.001	-0.10	-0.08
June*Pre-Usage	-0.02	0.00	<0.001	-0.02	-0.01
July*Pre-Usage	-0.10	0.00	<0.001	-0.11	-0.10
August*Pre-Usage	-0.15	0.00	<0.001	-0.15	-0.14
September*Pre-Usage	-0.12	0.01	<0.001	-0.13	-0.11
October*Pre-Usage	-0.07	0.01	<0.001	-0.08	-0.06
November*Pre-Usage	0.03	0.00	<0.001	0.02	0.04
December*Pre-Usage	-0.09	0.00	<0.001	-0.10	-0.09
Adjusted R-Squared: 0.5995, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.5995, which, although slightly lower than ideal, shows a good fit against the data considering the increased variability in energy usage during the program year impacted by the COVID19 pandemic, as mentioned previously.

The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-21: Missouri West Territory: 201308_E Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201308_E	274.42	242.02	306.83	-4.79	279.22	16,731.18	1.67%

Table F-22: Missouri West Territory: 201308_E Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201308_E	279.22	29,783	8,315,899.93	7,350,674.23	9,281,125.64

This wave displayed 1.67% annual household savings for PY1. Average annual household savings for treated customers in this wave was 279 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 8,315,900 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201503_E_GMO Wave Results

This section describes the impact evaluation results for the 201503_E_GMO wave within the Missouri West territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-23: Missouri West Territory: 201308_E_GMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.90	0.10	<0.001	-1.06	-0.74
February	5.82	1.02	<0.001	4.15	7.50
March	6.06	0.57	<0.001	5.12	6.99
April	5.84	0.64	<0.001	4.79	6.90
May	6.63	0.60	<0.001	5.64	7.61
June	8.27	0.58	<0.001	7.32	9.22
July	8.73	0.58	<0.001	7.78	9.69
August	5.21	0.59	<0.001	4.25	6.17
September	3.40	0.58	<0.001	2.44	4.36
October	11.67	0.62	<0.001	10.65	12.68
November	8.50	0.57	<0.001	7.57	9.43
December	3.37	0.63	<0.001	2.32	4.41
Pre-Usage	0.80	0.00	<0.001	0.79	0.80
February*Pre-Usage	-0.15	0.01	<0.001	-0.17	-0.13
March*Pre-Usage	-0.22	0.01	<0.001	-0.23	-0.21
April*Pre-Usage	-0.15	0.01	<0.001	-0.17	-0.13
May*Pre-Usage	-0.20	0.01	<0.001	-0.21	-0.18
June*Pre-Usage	-0.02	0.01	0.02	-0.03	-0.01
July*Pre-Usage	-0.02	0.01	0.02	-0.03	-0.01
August*Pre-Usage	-0.08	0.01	<0.001	-0.10	-0.07
September*Pre-Usage	-0.13	0.01	<0.001	-0.15	-0.12
October*Pre-Usage	-0.21	0.01	<0.001	-0.23	-0.19
November*Pre-Usage	-0.29	0.01	<0.001	-0.30	-0.28
December*Pre-Usage	-0.07	0.01	<0.001	-0.08	-0.06
Adjusted R-Squared: 0.5427, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.5427. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-24: Missouri West Territory: 201503_E_GMO Wave
Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201503_E_GMO	329.44	260.75	398.13	-5.42	334.86	23,411.54	1.43%

Table F-25: Missouri West Territory: 201503_E_GMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201503_E_GMO	334.86	8,263	2,766,752.50	2,199,159.75	3,334,345.25

This wave displayed 1.43% annual household savings for PY1. Average annual household savings for treated customers in this wave was 335 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 2,766,753 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201604_E_GMO Wave Results

This section describes the impact evaluation results for the 201604_E_GMO wave within the Missouri West territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-26: Missouri West Territory: 201604_E_GMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.33	0.05	<0.001	-0.41	-0.25
February	-1.89	0.13	<0.001	-2.11	-1.67
March	-1.17	0.18	<0.001	-1.46	-0.87
April	0.50	0.15	0.00	0.24	0.75
May	2.80	0.16	<0.001	2.54	3.06
June	6.05	0.17	<0.001	5.78	6.32
July	5.82	0.17	<0.001	5.54	6.10
August	4.05	0.17	<0.001	3.77	4.33
September	2.45	0.16	<0.001	2.19	2.72
October	1.30	0.16	<0.001	1.04	1.56
November	0.09	0.15	0.52	-0.15	0.33
December	0.09	0.15	0.53	-0.15	0.33
Pre-Usage	0.81	0.00	<0.001	0.81	0.82
February*Pre-Usage	0.13	0.00	<0.001	0.12	0.13
March*Pre-Usage	0.10	0.01	<0.001	0.09	0.11
April*Pre-Usage	0.04	0.01	<0.001	0.03	0.05
May*Pre-Usage	0.00	0.01	0.98	-0.01	0.01
June*Pre-Usage	0.04	0.00	<0.001	0.03	0.05
July*Pre-Usage	-0.04	0.00	<0.001	-0.05	-0.04
August*Pre-Usage	-0.03	0.00	<0.001	-0.04	-0.03
September*Pre-Usage	-0.16	0.00	<0.001	-0.17	-0.15
October*Pre-Usage	-0.01	0.01	0.04	-0.02	0.00
November*Pre-Usage	0.01	0.00	0.06	0.00	0.02
December*Pre-Usage	0.02	0.00	<0.001	0.02	0.03
Adjusted R-Squared: 0.6037, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.6037. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-27: Missouri West Territory: 201604_E_GMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201604_E_GMO	120.55	85.32	155.79	1.01	119.55	10,870.85	1.10%

Table F-28: Missouri West Territory: 201604_E_GMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201604_E_GMO	119.55	45,674	5,460,203.06	3,850,865.33	7,069,540.78

This wave displayed 1.10% annual household savings for PY1. Average annual household savings for treated customers in this wave was 119 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 5,460,203 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201706_E_GMO Wave Results

This section describes the impact evaluation results for the 201706_E_GMO wave within the Missouri West territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-29: Missouri West Territory: 201706_E_GMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.39	0.05	<0.001	-0.47	-0.31
February	-1.94	0.15	<0.001	-2.18	-1.69
March	-0.95	0.15	<0.001	-1.20	-0.70
April	-0.97	0.16	<0.001	-1.23	-0.72
May	0.53	0.16	<0.001	0.27	0.79
June	4.22	0.24	<0.001	3.82	4.62
July	1.38	0.17	<0.001	1.09	1.66
August	0.72	0.17	<0.001	0.44	1.00
September	-0.05	0.17	0.77	-0.32	0.22
October	-0.28	0.16	0.08	-0.55	-0.02
November	-0.75	0.15	<0.001	-1.01	-0.50
December	1.84	0.15	<0.001	1.59	2.09
Pre-Usage	0.91	0.00	<0.001	0.90	0.91
February*Pre-Usage	0.23	0.00	<0.001	0.23	0.24
March*Pre-Usage	0.10	0.00	<0.001	0.09	0.11
April*Pre-Usage	0.07	0.01	<0.001	0.06	0.08
May*Pre-Usage	0.02	0.01	0.00	0.01	0.03
June*Pre-Usage	0.04	0.01	<0.001	0.03	0.05
July*Pre-Usage	-0.03	0.00	<0.001	-0.04	-0.03
August*Pre-Usage	-0.04	0.00	<0.001	-0.05	-0.03
September*Pre-Usage	-0.10	0.00	<0.001	-0.11	-0.09
October*Pre-Usage	0.05	0.01	<0.001	0.04	0.06
November*Pre-Usage	0.07	0.00	<0.001	0.07	0.08
December*Pre-Usage	-0.16	0.00	<0.001	-0.17	-0.15
Adjusted R-Squared: 0.7658, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.7658, which shows a good fit against the data.

The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment

customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-30: Missouri West Territory: 201706_E_GMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201706_E_GMO	142.78	108.38	177.18	1.25	141.53	9,149.12	1.55%

Table F-31: Missouri West Territory: 201706_E_GMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201706_E_GMO	141.53	14,768	2,090,151.07	1,582,093.86	2,598,208.28

This wave displayed 1.55% annual household savings for PY1. Average annual household savings for treated customers in this wave was 142 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 1,582,094 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201904_E_GMO Wave Results

This section describes the impact evaluation results for the 201904_E_GMO wave within the Missouri West territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-32: Missouri West Territory: 201904_E_GMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.31	0.03	<0.001	-0.36	-0.25
February	1.73	0.11	<0.001	1.54	1.92
March	3.96	0.12	<0.001	3.77	4.15
April	1.15	0.25	<0.001	0.74	1.57
May	0.26	0.14	0.07	0.03	0.50
June	1.71	0.14	<0.001	1.47	1.95
July	2.22	0.14	<0.001	1.98	2.45
August	1.49	0.14	<0.001	1.26	1.73
September	-0.36	0.14	0.01	-0.59	-0.13
October	0.24	0.13	0.07	0.02	0.46
November	3.19	0.12	<0.001	2.99	3.38
December	2.12	0.12	<0.001	1.91	2.32
Pre-Usage	0.83	0.00	<0.001	0.83	0.83
February*Pre-Usage	-0.13	0.00	<0.001	-0.14	-0.13
March*Pre-Usage	-0.23	0.00	<0.001	-0.23	-0.22
April*Pre-Usage	0.08	0.01	<0.001	0.07	0.09
May*Pre-Usage	-0.10	0.00	<0.001	-0.11	-0.10
June*Pre-Usage	0.01	0.00	0.06	0.00	0.01
July*Pre-Usage	0.05	0.00	<0.001	0.05	0.06
August*Pre-Usage	0.05	0.00	<0.001	0.04	0.05
September*Pre-Usage	-0.02	0.00	<0.001	-0.03	-0.02
October*Pre-Usage	0.02	0.00	<0.001	0.02	0.03
November*Pre-Usage	-0.16	0.00	<0.001	-0.16	-0.15
December*Pre-Usage	-0.06	0.00	<0.001	-0.06	-0.05
Adjusted R-Squared: 0.7708, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.7708, which shows a good fit against the data.

The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-33: Missouri West Territory: 201904_E_GMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201904_E_GMO	112.22	87.22	137.23	-3.34	115.57	13,379.23	0.86%

Table F-34: Missouri West Territory: 201904_E_GMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201904_E_GMO	115.57	41,462	4,791,718.76	3,754,884.63	5,828,552.90

This wave displayed 0.86% annual household savings for PY1. Average annual household savings for treated customers in this wave was 115 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 4,791,719 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

202002_E_GMO Wave Results

This section describes the impact evaluation results for the 202002_E_GMO wave within the Missouri West territory. For this wave, the Evaluators elected to use a D-in-D regression model to estimate verified savings. The results from the PPR model displayed results that were not statistically significant. This may be due to increased variability for

this wave, for reasons unknown to the Evaluators. However, the D-in-D model displayed statistically significant values and is also a method employed and suggested by the UMP.

As shown in the table below, the coefficient estimates for Treatment*Post (B1), Avg Daily HDD*Treatment*Post, and Avg Daily CDD*Treatment*Post were negative, when extrapolated by typical meteorological year weather, indicate lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-35: Missouri West Territory: 202002_E_GMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Post	3.22	0.65	<0.001	2.16	4.28
Avg Daily HDD	1.25	0.01	<0.001	1.24	1.27
Avg Daily CDD	2.66	0.02	<0.001	2.62	2.70
Treatment*Post	-0.62	0.71	0.38	-1.79	0.54
Avg Daily HDD*Post	-0.18	0.03	<0.001	-0.23	-0.13
Avg Daily CDD*Post	-0.21	0.05	<0.001	-0.30	-0.12
Avg Daily HDD*Treatment*Post	0.00	0.04	0.92	-0.06	0.05
Avg Daily CDD*Treatment*Post	0.05	0.06	0.42	-0.05	0.14
Adjusted R-Squared: 0.5188, P-value: 0.0498					

The Adjusted R-Squared value for this regression was 0.5188, which, although slightly lower than ideal, shows a good fit against the data. The lower-than-ideal Adjusted R-squared value may also have been affected by the increased variability in usage in the post-period due to COVID19 stay-at-home orders. The behaviors in the customers within this cohort may have changed within certain demographics, representing additional variability that the model was unable to capture. However, the Evaluators note that the regression model fits the data well and displays a statistically significant savings effect for the Home Energy Report recipients for this wave.

Table F-36: Missouri West Territory: 202002_E_GMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
202002_E_GMO	171.26	0.12	342.40	-14.25	185.51	13,379.23	1.39%

Table F-37: Missouri West Territory: 202002_E_GMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
202002_E_GMO	185.51	7,761	1,439,733.26	111,558.08	2,767,908.43

This wave displayed 1.39% annual household savings for PY1. Average annual household savings for treated customers in this wave was 186 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 1,439,733 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

Missouri Metro Territory Results

This section describes the linear regression results, double counting adjustments, and final household and program-level savings for each wave within the Missouri Metro service territory.

201407_E_High_Users Wave Results

This section describes the impact evaluation results for the 201407_E_High_Users wave within the Missouri Metro territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-38: Missouri Metro Territory: 201407_E_High_Users Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.49	0.05	<0.001	-0.58	-0.41
February	-0.21	0.13	0.12	-0.43	0.01
March	-0.92	0.14	<0.001	-1.15	-0.69
April	-1.71	0.15	<0.001	-1.96	-1.46
May	0.68	0.15	<0.001	0.43	0.93
June	7.18	0.19	<0.001	6.88	7.49
July	5.07	0.16	<0.001	4.80	5.33
August	2.99	0.16	<0.001	2.73	3.25
September	0.00	0.16	0.99	-0.26	0.26
October	-0.75	0.15	<0.001	-1.00	-0.50
November	-0.68	0.14	<0.001	-0.92	-0.45
December	0.83	0.15	<0.001	0.59	1.08
Pre-Usage	0.69	0.00	<0.001	0.68	0.69
February*Pre-Usage	-0.01	0.00	<0.001	-0.02	-0.01
March*Pre-Usage	0.05	0.00	<0.001	0.04	0.05
April*Pre-Usage	0.12	0.00	<0.001	0.11	0.13
May*Pre-Usage	0.04	0.00	<0.001	0.04	0.05
June*Pre-Usage	0.17	0.00	<0.001	0.16	0.17
July*Pre-Usage	0.11	0.00	<0.001	0.10	0.11
August*Pre-Usage	0.05	0.00	<0.001	0.05	0.06
September*Pre-Usage	-0.04	0.00	<0.001	-0.04	-0.03
October*Pre-Usage	0.09	0.00	<0.001	0.08	0.10
November*Pre-Usage	0.03	0.00	<0.001	0.02	0.04
December*Pre-Usage	-0.04	0.00	<0.001	-0.05	-0.04
Adjusted R-Squared: 0.6074, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.6074. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-39: Missouri Metro Territory: 201407_E_High_Users Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201407_E_High_Users	180.20	142.25	218.14	-0.52	180.72	12,512.24	1.44%

Table F-40: Missouri Metro Territory: 201407_E_High_Users Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201407_E_High_Users	180.72	50,137	9,060,747.64	7,158,310.69	10,963,184.59

This wave displayed 1.44% annual household savings for PY1. Average annual household savings for treated customers in this wave was 181 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 9,060,748 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201503_E_KMO Wave Results

This section describes the impact evaluation results for the 201503_E_KMO wave within the Missouri Metro territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-41: Missouri Metro Territory: 201503_E_KMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.51	0.12	<0.001	-0.71	-0.31
February	-0.14	0.57	0.81	-1.08	0.80
March	0.62	0.46	0.18	-0.14	1.38
April	-0.79	0.49	0.11	-1.59	0.02
May	1.46	0.50	0.00	0.64	2.28
June	5.06	0.51	<0.001	4.22	5.90
July	5.48	0.52	<0.001	4.63	6.34
August	3.21	0.52	<0.001	2.35	4.07
September	0.45	0.51	0.38	-0.39	1.29
October	0.09	0.50	0.85	-0.73	0.92
November	0.99	0.47	0.03	0.22	1.76
December	1.91	0.51	<0.001	1.07	2.74
Pre-Usage	0.76	0.01	<0.001	0.75	0.77
February*Pre-Usage	-0.03	0.01	0.01	-0.05	-0.01
March*Pre-Usage	-0.08	0.01	<0.001	-0.10	-0.06
April*Pre-Usage	0.02	0.02	0.15	0.00	0.05
May*Pre-Usage	-0.04	0.01	0.01	-0.06	-0.01
June*Pre-Usage	0.13	0.01	<0.001	0.11	0.14
July*Pre-Usage	0.11	0.01	<0.001	0.09	0.13
August*Pre-Usage	0.01	0.01	0.50	-0.01	0.03
September*Pre-Usage	-0.01	0.01	0.68	-0.03	0.02
October*Pre-Usage	0.04	0.02	0.02	0.01	0.06
November*Pre-Usage	-0.12	0.01	<0.001	-0.14	-0.10
December*Pre-Usage	-0.11	0.01	<0.001	-0.12	-0.09
Adjusted R-Squared: 0.5773, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.5773. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-42: Missouri Metro Territory: 201503_E_KMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201503_E_KMO	185.80	98.27	273.32	-1.99	187.78	11,754.51	1.60%

Table F-43: Missouri Metro Territory: 201503_E_KMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201503_E_KMO	187.78	3,371	632,929.30	337,925.69	927,932.91

This wave displayed 1.60% annual household savings for PY1. Average annual household savings for treated customers in this wave was 188 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 632,929 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

201607_E Wave Results

This section describes the impact evaluation results for the 201607_E wave within the Missouri Metro territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-44: Missouri Metro Territory: 201607_E Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-1.03	0.09	<0.001	-1.17	-0.89
February	-0.85	0.28	0.00	-1.31	-0.39
March	-2.29	0.29	<0.001	-2.76	-1.81
April	-1.57	0.29	<0.001	-2.05	-1.08
May	-0.08	0.30	0.80	-0.57	0.42
June	3.57	0.37	<0.001	2.97	4.18
July	2.61	0.31	<0.001	2.09	3.12
August	1.81	0.31	<0.001	1.30	2.33
September	0.70	0.30	0.02	0.20	1.20
October	-0.50	0.30	0.10	-0.99	0.00
November	-0.80	0.29	0.01	-1.28	-0.33
December	0.68	0.30	0.03	0.18	1.18
Pre-Usage	0.87	0.00	<0.001	0.87	0.88
February*Pre-Usage	0.12	0.01	<0.001	0.11	0.13
March*Pre-Usage	0.23	0.01	<0.001	0.22	0.25
April*Pre-Usage	0.19	0.01	<0.001	0.17	0.20
May*Pre-Usage	0.07	0.01	<0.001	0.05	0.09
June*Pre-Usage	0.05	0.01	<0.001	0.04	0.07
July*Pre-Usage	0.03	0.01	<0.001	0.01	0.04
August*Pre-Usage	0.01	0.01	0.43	-0.01	0.02
September*Pre-Usage	-0.06	0.01	<0.001	-0.07	-0.04
October*Pre-Usage	0.13	0.01	<0.001	0.11	0.15
November*Pre-Usage	0.10	0.01	<0.001	0.08	0.11
December*Pre-Usage	0.00	0.01	0.71	-0.01	0.01
Adjusted R-Squared: 0.6627, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.6627. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-45: Missouri Metro Territory: 201607_E Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201607_E	375.69	313.64	437.74	0.42	375.27	9,574.10	3.92%

Table F-46: Missouri Metro Territory: 201607_E Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201607_E	375.27	7,308	2,742,333.28	2,288,899.76	3,195,766.80

This wave displayed 3.92% annual household savings for PY1. Average annual household savings for treated customers in this wave was 375 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 2,742,333 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

202002_E_KMO Wave Results

This section describes the impact evaluation results for the 202002_E_KMO wave within the Missouri Metro territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-47: Missouri Metro Territory: 202002_E_KMO Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.17	0.07	0.02	-0.28	-0.05
July	-1.48	0.34	<0.001	-2.04	-0.93
August	-1.84	0.33	<0.001	-2.39	-1.29
September	-2.34	0.33	<0.001	-2.89	-1.79
October	-0.79	0.33	0.02	-1.34	-0.24
November	2.23	0.30	<0.001	1.74	2.72
December	-1.02	0.32	0.00	-1.54	-0.50
Pre-Usage	0.97	0.00	<0.001	0.96	0.97
July*Pre-Usage	-0.07	0.01	<0.001	-0.08	-0.06
August*Pre-Usage	-0.11	0.01	<0.001	-0.12	-0.10
September*Pre-Usage	-0.28	0.01	<0.001	-0.29	-0.27
October*Pre-Usage	-0.24	0.01	<0.001	-0.25	-0.23
November*Pre-Usage	-0.32	0.01	<0.001	-0.33	-0.31
December*Pre-Usage	-0.17	0.01	<0.001	-0.18	-0.16
Adjusted R-Squared: 0.7073, P-value: 0.0179					

This wave displayed six months of post-period data due to the intervention date occurring in March 2020. The Adjusted R-Squared value for this regression was 0.7073, which shows a good fit against the data.

The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-48: Missouri Metro Territory: 202002_E_KMO Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings	5% CI Annual Unadjusted Savings	95% CI Annual Unadjusted Savings	Annual Double Counted Savings	Annual Adjusted Savings	Annual Control Group Usage Per	Annual Percent Savings

	Per Home (kWh/year)	Per Home (kWh/year)	Per Home (kWh/year)	Per Home (kWh/year)	Per Home (kWh/year)	Home (kWh/year)	Per Home
202002_E_KMO	60.88	10.48	111.29	-7.31	68.19	17,103.26	0.40%

Table F-49: Missouri Metro Territory: 202002_E_KMO Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
202002_E_KMO	68.19	15,942	1,087,107.38	283,570.08	1,890,644.67

This wave displayed 0.40% annual household savings for PY1. Average annual household savings for treated customers in this wave was 68 kWh. The household-level savings for this wave was low likely due to the short amount of time customers have been treated. Since treatment started in March 2020, the customers have not had enough time to adopt the energy-saving tips displayed in the HERs. This is typical for behavioral programs. The Evaluators note that savings should be seen to increase as time since intervention increases. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 1,087,107 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

Missouri Metro Low-Income Territory Results

This section describes the linear regression results, double counting adjustments, and final household and program-level savings for each wave within the Missouri Metro Low-Income service territory.

201407_E_Low_Income Wave Results

This section describes the impact evaluation results for the 201407_E_Low_Income wave within the Missouri Metro territory.

As shown in the table below, the coefficient estimates for Treatment (B1) was negative, indicating lower usage per month in the post-period for treatment customers. In addition, this coefficient was statically significant at the 95% level. This indicates a positive savings effect for Home Energy Report treatment at the 95% confidence interval.

Table F-50: Missouri Metro Territory: 201407_E_Low_Income Wave Regression Results

Coefficient	Estimate	Std Error	P Value	5%	95%
Treatment	-0.31	0.08	<0.001	-0.45	-0.18
February	-0.29	0.30	0.33	-0.78	0.20
March	-1.21	0.31	<0.001	-1.72	-0.70
April	-2.81	0.35	<0.001	-3.38	-2.24
May	0.21	0.37	0.57	-0.40	0.83
June	6.61	0.47	<0.001	5.83	7.39
July	5.41	0.39	<0.001	4.78	6.05
August	3.84	0.39	<0.001	3.21	4.48
September	0.41	0.39	0.29	-0.23	1.05
October	-0.96	0.36	0.01	-1.56	-0.37
November	-0.42	0.32	0.18	-0.95	0.10
December	1.42	0.33	<0.001	0.87	1.97
Pre-Usage	0.64	0.00	<0.001	0.64	0.65
February*Pre-Usage	-0.01	0.01	0.13	-0.02	0.00
March*Pre-Usage	0.02	0.01	0.00	0.01	0.03
April*Pre-Usage	0.12	0.01	<0.001	0.10	0.14
May*Pre-Usage	0.01	0.01	0.24	-0.01	0.03
June*Pre-Usage	0.13	0.01	<0.001	0.11	0.16
July*Pre-Usage	0.06	0.01	<0.001	0.05	0.08
August*Pre-Usage	0.01	0.01	0.14	0.00	0.03
September*Pre-Usage	-0.08	0.01	<0.001	-0.10	-0.07
October*Pre-Usage	0.05	0.01	<0.001	0.03	0.07
November*Pre-Usage	-0.02	0.01	0.01	-0.03	-0.01
December*Pre-Usage	-0.08	0.01	<0.001	-0.09	-0.07
Adjusted R-Squared: 0.5833, P-value: <0.001					

The Adjusted R-Squared value for this regression was 0.5833. The ex-post gross kWh savings of Home Energy Report program for this wave is summarized below by evaluation period and program year. The number of customers used to calculate total ex-post kWh savings was the number of weighted treatment customers in the post-period, which took into account the total number of treated days a customer demonstrated in the post-period.

Table F-51: Missouri Metro Territory: 201407_E_Low_Income Wave Ex-Post Annual kWh Savings

Cohort	Annual Unadjusted Savings Per Home (kWh/year)	5% CI Annual Unadjusted Savings Per Home (kWh/year)	95% CI Annual Unadjusted Savings Per Home (kWh/year)	Annual Double Counted Savings Per Home (kWh/year)	Annual Adjusted Savings Per Home (kWh/year)	Annual Control Group Usage Per Home (kWh/year)	Annual Percent Savings Per Home
201407_E_Low_Income	114.75	57.44	172.06	5.71	109.04	12,280.89	0.89%

Table F-52: Missouri Metro Territory: 201407_E_Low_Income Total Program Year Savings

Cohort	Annual Adjusted Savings Per Home (kWh)	Weighted Treatment Customers	Program Year Savings (kWh)	Program Year Savings (kWh) 5% CI	Program Year Savings (kWh) 95% CI
201407_E_Low_Income	109.04	8,644	942,566.55	447,165.19	1,437,967.90

This wave displayed 0.89% annual household savings for PY1. Average annual household savings for treated customers in this wave was 109 kWh. Household savings estimates were extrapolated using the number of weighted treatment customers active in the post-period. The Evaluators found this wave to display 942,567 kWh in savings for this evaluation period. In addition, the 95% confidence intervals are summarized for each program year and each evaluation period.

Aggregated Waves Results

The Evaluators presented positive, statistically significant savings for all waves evaluated. The Evaluators adjusted regression results with double counted savings in both downstream to arrive at the final program savings estimate. The following tables summarize each wave's annual household energy savings impact with 95% confidence intervals and its respective evaluation periods.

Table F-53: Program Savings Summary by Wave

Wave	Weighted Customers	Annual Adjusted Household Savings (kWh)	Annual Household 5% CI (kWh)	Annual Household 95% CI (kWh)	Program Savings (kWh)	Program Savings 5% CI (kWh)	Program Savings 95% CI (kWh)
201308_E	29,783	279.22	246.81	311.63	8,315,899.93	7,350,674.23	9,281,125.64
201503_E_GMO	8,263	334.86	266.16	403.55	2,766,752.50	2,199,159.75	3,334,345.25
201604_E_GMO	45,674	119.55	84.31	154.78	5,460,203.06	3,850,865.33	7,069,540.78
201706_E_GMO	14,768	141.53	107.13	175.93	2,090,151.07	1,582,093.86	2,598,208.28
201904_E_GMO	41,462	115.57	90.56	140.58	4,791,718.76	3,754,884.63	5,828,552.90
202002_E_GMO	7,761	185.51	14.37	356.65	1,439,733.26	111,558.08	2,767,908.43
201407_E_High_Users	50,137	180.72	142.77	218.66	9,060,747.64	7,158,310.69	10,963,184.59
201503_E_KMO	3,371	187.78	100.26	275.31	632,929.30	337,925.69	927,932.91
201607_E	7,308	375.27	313.22	437.32	2,742,333.28	2,288,899.76	3,195,766.80
202002_E_KMO	15,942	68.19	17.79	118.60	1,087,107.38	283,570.08	1,890,644.67
201407_E_Low_Income	8,644	109.04	51.73	166.35	942,566.55	447,165.19	1,437,967.90
Total	**233,112**	**168.72**	**125.97**	**211.47**	**39,330,142.72**	**29,365,107.30**	**49,295,178.15**

The Evaluators also summarized total program savings by territory in the following tables.

Table F-54: Missouri West Territory: Program Savings Summary by Wave

Wave	Weighted Customers	Annual Adjusted Household Savings (kWh)	Annual Household 5% CI (kWh)	Annual Household 95% CI (kWh)	Program Savings (kWh)	Program Savings 5% CI (kWh)	Program Savings 95% CI (kWh)
201308_E	29,783	279.22	246.81	311.63	8,315,899.93	7,350,674.23	9,281,125.64
201503_E_GMO	8,263	334.86	266.16	403.55	2,766,752.50	2,199,159.75	3,334,345.25
201604_E_GMO	45,674	119.55	84.31	154.78	5,460,203.06	3,850,865.33	7,069,540.78
201706_E_GMO	14,768	141.53	107.13	175.93	2,090,151.07	1,582,093.86	2,598,208.28
201904_E_GMO	41,462	115.57	90.56	140.58	4,791,718.76	3,754,884.63	5,828,552.90
202002_E_GMO	7,761	185.51	14.37	356.65	1,439,733.26	111,558.08	2,767,908.43
Total	**147,711**	**168.33**	**127.61**	**209.06**	**24,864,458.58**	**18,849,235.88**	**30,879,681.28**

Table F-55: Missouri Metro Territory: Program Savings Summary by Wave

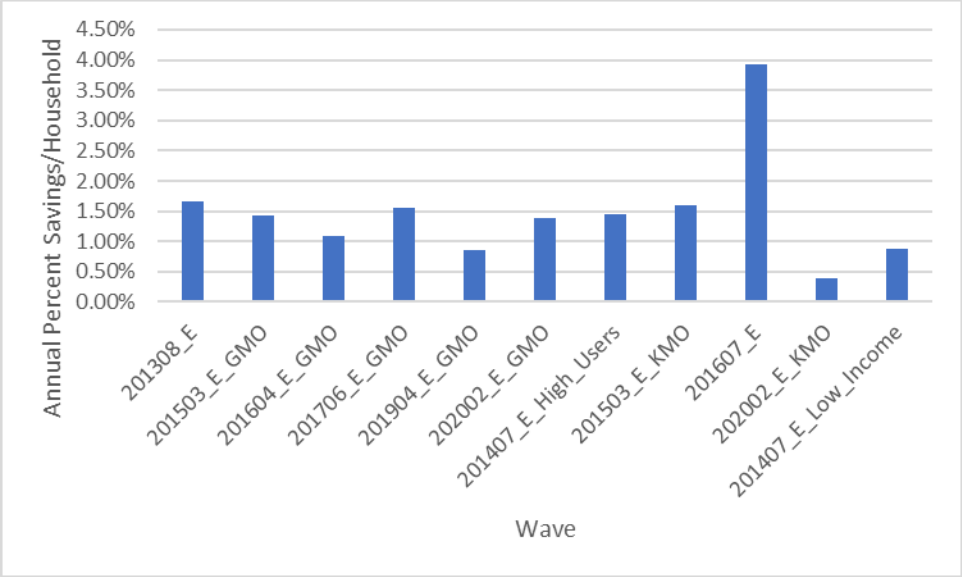
Wave	Weighted Customers	Annual Adjusted Household Savings (kWh)	Annual Household 5% CI (kWh)	Annual Household 95% CI (kWh)	Program Savings (kWh)	Program Savings 5% CI (kWh)	Program Savings 95% CI (kWh)
201407_E_High_Users	50,137	180.72	142.77	218.66	9,060,747.64	7,158,310.69	10,963,184.59
201503_E_KMO	3,371	187.78	100.26	275.31	632,929.30	337,925.69	927,932.91
201607_E	7,308	375.27	313.22	437.32	2,742,333.28	2,288,899.76	3,195,766.80
202002_E_KMO	15,942	68.19	17.79	118.60	1,087,107.38	283,570.08	1,890,644.67
Total	**76,757**	**176.18**	**131.18**	**221.18**	**13,523,117.60**	**10,068,706.23**	**16,977,528.97**

Table F-56: Missouri Metro Territory Low-Income: Program Savings Summary

Wave	Weighted Customers	Annual Adjusted Household Savings (kWh)	Annual Household 5% CI (kWh)	Annual Household 95% CI (kWh)	Program Savings (kWh)	Program Savings 5% CI (kWh)	Program Savings 95% CI (kWh)
201407_E_Low_Income	8,644	109.04	51.73	166.35	942,566.55	447,165.19	1,437,967.90

The following figure displays the percent savings for each wave during the PY1 evaluation. The waves achieved savings ranging between 0.40% and 3.92%. The lowest range of annual percent household savings came from the two newly implemented waves in March 2020 and the low-income wave (202002_E_GMO, 202002_E_KMO, and 201407_E_Low_Income). These three waves had savings at 0.86%, 0.40%, and 0.89%, whereas the remaining waves had an average annual household savings of 1.55%.

Figure F-1: Percent Savings for Each PY1 Wave



This outcome is not unexpected, as the newest waves had not accumulated enough treatment time to amount to average savings expected for a HER program. The low-income wave may have had low annual household savings due to lack of opportunities to adopt additional behavioral changes to save energy, as energy consumption is already conservative.

In addition, the low-income group were most likely users that did not reside at a household for very long. These customers' behaviors are less likely to produce large observable differences in energy usage during the customers' short stay at a residence. Home Energy Reports are known to show larger savings effects as exposure to the reports increase, and therefore the potential for observable savings for this group is low.

F.3.4 Double Counting Analysis Results

Participants in both the treatment and control groups participated in other Evergy residential energy efficiency programs. The double counted savings, defined in the methodology, whether positive or negative, were subtracted from the wave's gross savings estimates from the regression analysis to get total verified savings. This section summarizes the results of the double counting analysis for downstream programs.

Evergy delivered tracking data for the Heating, Cooling, and Home Comfort Program, the Income-Eligible Multi-Family Program, and the Smart Thermostats Program, as part of the impact evaluation conducted by the Evaluators. The Evaluators identified and summarized the average treatment customer, average control customer, and average incremental savings attributed to the three residential programs for each wave.

Table F-57 displays the verified double counting savings to be subtracted from each group's annual program savings for each program year and evaluation period.

Table F-57: Downstream Double Counting Results by Wave

Cohort	Average Treatment Household Daily Savings (kWh/day)	Average Control Household Daily Savings (kWh/day)	Average Incremental Household Daily Savings (kWh/day)	Weighted Treatment Customers	Downstream Program Double Count Savings
201308_E	0.0958	0.1089	-0.0131	29,783	-142,763
201503_E_GMO	0.1156	0.1304	-0.0148	8,263	-44,747
201604_E_GMO	0.0961	0.0934	0.0028	45,674	45,995
201706_E_GMO	0.1016	0.0981	0.0034	14,768	18,498
201904_E_GMO	0.0993	0.1085	-0.0092	41,462	-138,684
202002_E_GMO	0.0854	0.1245	-0.0390	7,761	-110,601
201407_E_High_Users	0.1114	0.1128	-0.0014	50,137	-26,186
201503_E_KMO	0.0987	0.1041	-0.0054	3,371	-6,691
201607_E	0.1011	0.0999	0.0012	7,308	3,102
202002_E_KMO	0.1122	0.1322	-0.0200	15,942	-116,545
201407_E_Low_Income	0.0719	0.0563	0.0156	8,644	49,346
Total	**-**	**-**	**-0.0055**	**233,112**	**-469,277**

The results are separated by wave. PY1 displays a total of -469,277 kWh in double counted savings. The Evaluators subtracted this value from each wave's program savings. The negative sign for this value indicates that the overall effect for removing double counted savings lead to an increase in total program savings. The downstream double counting values are parsed by wave and subtracted from the regression model results for each wave, indicated in each of the Ex-Post Annual kWh Savings table in the sections above.

F.3.5 Demand Reduction

The Evaluators estimated demand savings for each of the waves using the methodology presented in the sections above.

The Evaluators implemented the same methodology used by Opower, the implementor of the program, which calculated coincident demand savings by taking the energy savings from August and dividing it by the number of hours in August times a factor of 1.5. The following table displays the calculation of the demand savings for each wave.

Table F-58: Demand Reduction Calculations for Waves

Wave	Savings in August (kWh)	Hours in August	Multiplier	Demand Reduction per Household (kWh)	Weighted Treatment Customers	Ex-Ante Demand Reduction (kW)
kcpl_201309_e	16.31	744	1.50	-0.03	29,782.82	979.23
kcpl_201503_e_gmo	10.05	744	1.50	-0.02	3,370.56	68.27
kcpl_201604_E_gmo	8.32	744	1.50	-0.02	45,674.22	766.60
kcpl_her_201706_e_gmo	11.71	744	1.50	-0.02	14,768.41	348.60
kcpl_her_201904_e_gmo	10.50	744	1.50	-0.02	41,461.69	877.35
kcpl_her_202002_e_gmo	7.67	744	1.50	-0.02	7,760.87	120.04
kcpl_201407_e_high_users	22.52	744	1.50	-0.05	50,137.16	2,276.38
kcpl_201503_e_kmo	21.69	744	1.50	-0.04	8,262.53	361.39
kcpl_201607_e	21.18	744	1.50	-0.04	7,307.69	312.04
kcpl_her_202002_e_kmo	11.22	744	1.50	-0.02	15,941.79	360.59
kcpl_201407_e_low_income	13.30	744	1.50	-0.03	8,644.13	231.77
Total	**154.47**	**744**	**1.50**	**0.03**	**233,111.86**	**6,702.28**

The following table summarizes the verified demand savings compared to the expected demand savings for each wave in the Home Energy Report Program.

Table F-59: Verified Demand Reduction Compared to the Expected Demand Reduction

Wave	Ex-Ante Demand Reduction (kW)	Verified Demand Reduction (kW)	Verified kW Realization Rate
kcpl_201309_e	1,068.23	979.23	91.67%
kcpl_201503_e_gmo	432.27	68.27	15.79%
kcpl_201604_E_gmo	1,055.63	766.60	72.62%
kcpl_her_201706_e_gmo	470.27	348.60	74.13%
kcpl_her_201904_e_gmo	957.41	877.35	91.64%
kcpl_her_202002_e_gmo	53.61	120.04	223.91%
kcpl_201407_e_high_users	3,242.01	2,276.38	70.22%
kcpl_201503_e_kmo	45.96	361.39	786.32%
kcpl_201607_e	228.09	312.04	136.80%
kcpl_her_202002_e_kmo	125.29	360.59	287.81%
kcpl_201407_e_low_income	39.58	231.77	585.62%
Total	**7,718.34**	**6,702.28**	**86.84%**

F.3.6 Attrition Analysis Results

The Evaluators estimated the cumulative level of both treatment and control move outs over the program life by month, wave, and treatment/control status for each program year. The following table displays the total moveout rate aggregating all waves. Attrition since inception of each wave, in aggregation, equals approximately 45%. This rate is within the normal range, given the large number of years the HERS Program has been in implementation. However, attrition for the 2020 program year was approximately 7%.

Table F-60: Program Moveout Rates by Program Year

Period	Treatment Customers	Control Customers	Treatment Moveout Percent	Control Moveout Percent
2020	28,955	10,884	7.13%	7.59%
Since Inception	178,689	65,170	44.00%	45.46%

Table F-61 summarizes the moveout rates for each wave in PY1. The moveout rates for each wave ranged between 3% and 8%, except for the 201904_E_GMO, 202002_E_GMO, and 202002_E_KMO waves. The waves with the highest moveout rates displayed an average moveout rate of approximately 16%. This rate of attrition is

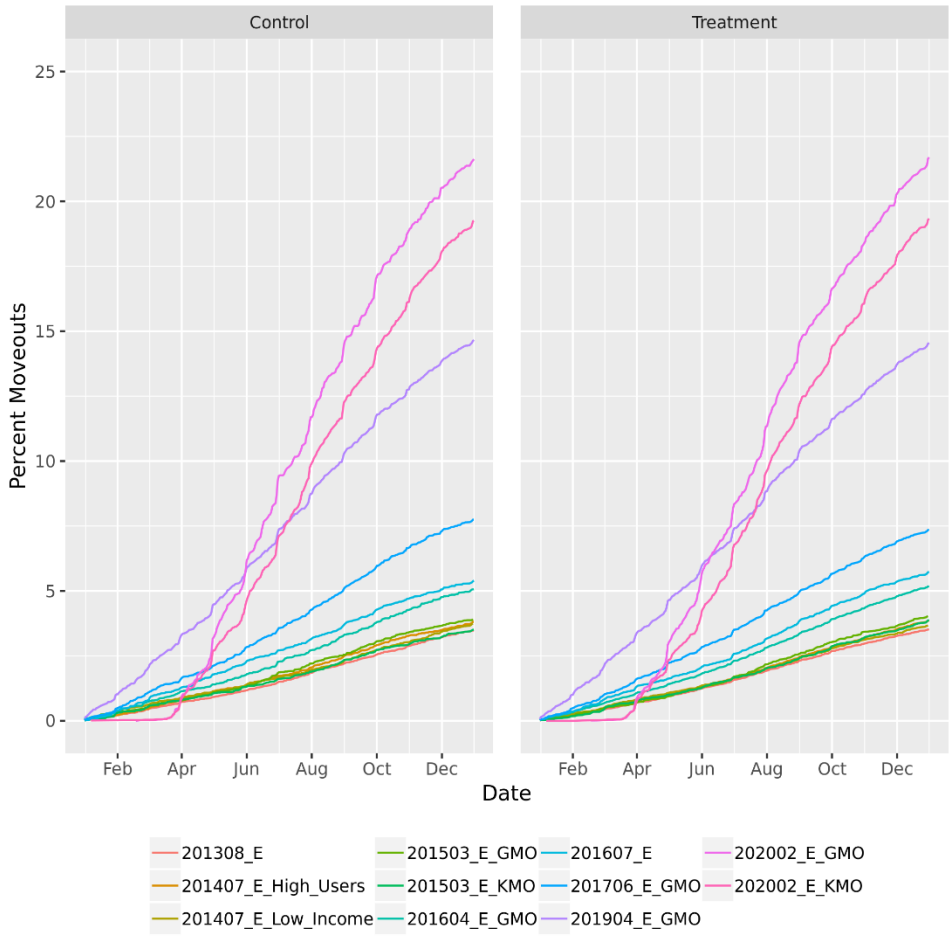
expected due to the behaviors of the targeted customers. The customers in this group tended not to reside at a household for an extended amount of time.

Table F-61: Moveout Rates by Wave

Wave	Treatment Customers	Control Customers	Treatment Moveout Customers	Control Moveout Customers	Treatment Moveout Percent	Control Moveout Percent
201308_E	59,298	29,763	2,087	1,035	3.52%	3.48%
201503_E_GMO	13,238	9,660	533	378	4.03%	3.91%
201604_E_GMO	77,434	9,705	4,012	492	5.18%	5.07%
201706_E_GMO	25,003	11,597	1,839	898	7.36%	7.74%
201904_E_GMO	59,873	23,505	8,711	3,446	14.55%	14.66%
202002_E_GMO	9,998	3,926	2,169	849	21.69%	21.63%
201407_E_High_Users	91,354	12,207	3,525	465	3.86%	3.81%
201503_E_KMO	12,213	9,684	472	340	3.86%	3.51%
201607_E	17,320	11,099	993	599	5.73%	5.40%
202002_E_KMO	19,989	9,991	3,865	1,924	19.34%	19.26%
201407_E_Low_Income	20,381	12,221	749	458	3.67%	3.75%

The following figure summarizes the cumulative moveout rates by month for each wave and each treatment group.

Figure F-2: Monthly Moveout Rates by Wave and Treatment Group



F.3.7 Additional Analysis

The Evaluators also explored additional models to investigate whether or not there were statistically significant energy savings differences between customers who had been described by Evergy as “digitally engaged” and customers who had been described as “digitally aloof”. In addition, the Evaluators explored models to investigate whether or not there were statistically significant differences between customers categorized as “email-engaged” and customers categorized as “print-engaged”. The criteria for each category was described as the following:

- Digitally-engaged:
- Digitally-aloof:
- Email-engaged: customers described as digitally-engaged and had received an emailed HER
- Print-engaged: customers described as digitally-aloof and had received a printed HER

The Evaluators employed the PPR and D-in-D models associated with each wave and adjusted the specifications to include variables indicating which category the customer was described as in the data provided by Evergy.

The Evaluators found through a range of models that digital engagement was correlated with lower savings or even negative savings. In most waves, those who received email HERs had displayed lower annual household savings than those who had received print HERs. The category of customers that tended to display the lowest amount of savings was email-engaged group, the group in which customers were both digitally-engaged and had received an emailed HER.

The Evaluators note that the COVID19 pandemic stay-at-home orders may have contributed to these findings. Customers that were more digitally-engaged or email-engaged may have been using more energy, on average, in the post-period due to working from home whereas the customers that were more digitally-aloof may have been composed of an older, retired demographic, whose habits had not been altered in the post-period due to the stay-at-home orders.

F.4 Impact Evaluation: Final Savings Tables

A summary of gross and net verified energy and demand savings is shown in Table F-63.

Table F-62 Reported Gross Energy Savings and Demand Reduction

Jurisdiction	Reported Energy (kWh)	Reported Demand (kW)	Gross Verified Energy (kWh)	Gross Verified Demand (kW)	RR_{kWh}	RR_{kW}
Missouri West	19,340,629	4,037	24,864,459	3,453	128.6%	85.5%
Missouri Metro	15,011,435	3,681	14,465,684	3,249	96.4%	88.3%
Total	**34,352,064**	**7,718**	**39,330,143**	**6,702**	**114.5%**	**86.8%**

F.5 Process Evaluation

F.5.1 Program Staff Interviews

ADM conducted an interview with Evergy's Home Energy Reports (HERs) Product Manager and EM&V manager as well as Oracle's HERs Service Delivery Manager in January 2021. The interview covered the interviewees' roles and responsibilities, program communication, program design and implementation, as well as goals and performance.

In brief, the interview revealed that communication between Evergy and Oracle is effective, that the electronic HERs have an open rate of about 50%, and that there had been no challenges to delivering the reports in 2020.

Roles and Responsibilities

Evergy's Product Manager noted that she has worked directly with Oracle's Service Delivery Manager to administer the program since December 2018. She stated that her role is to coordinate with Evergy's accounting division to report savings at the end of each month using the Nexant DSM tool: Oracle provides a monthly extract to her that has all the savings numbers and she inputs that information into the Nexant DSM tool. She stated that, beginning February 2021, this process will become automated, with Oracle directly uploading the data to the Nexant tool, but that she will continue to review the savings data each month.

Program Communication

Contacts at Evergy and Oracle noted that there is frequent and effective communication. Evergy's Product Manager said that there is a reoccurring one-hour meeting once every two weeks to discuss the HERs program and OHEA program and she contacts Oracle as needed to ask questions and to request information.

Evergy's contacts noted that there are both internal and external quarterly meetings. The contacts noted that internal Client Quarterly Meetings (CQM) were previously in person with Evergy and Oracle staff, but COVID-19 pandemic health and safety concerns have caused these meetings to shift to a virtual format. External quarterly meetings include representatives from the Missouri Public Service Commission staff, Missouri Office of Public Counsel, and other interested parties. Evergy's Product Manager mentioned that she provides a one-page slide with an update for the HERs program at each external quarterly meeting.

Program Design, Implementation, and Delivery

ADM inquired with the Evergy and Oracle contacts regarding the program's design. Oracle's contact noted that Evergy's HERs program did not differ significantly from those they implement for other utilities.

Evergy's Product Manager said that they updated wording and content of the HERs in 2020 because of the COVID-19 pandemic. The contacts noted that HERs were updated to include a FAQ and a link to Evergy's COVID-19 response webpage and to Evergy's COVID-19 pandemic response fund. The Oracle Product Manager stated that they updated the modules and tips to be in line with current health guidelines.

Evergy's Product Manager said that they chose to omit neighbor comparisons in Spring and Summer PY1 because they were seeking to be sensitive to customers and to avoid causing additional stress regarding increased energy usage.

Contacts confirmed that the HERs are delivered to customers in both email and physical form. Oracle's Service Delivery manager explained some changes made to the frequency

or report “cadence” at the beginning of 2020. Previously, all customers received four print reports each year (quarterly), and those for whom an email address was available also received a monthly eHER. Beginning in 2020, customers who have been in the program less than two years continue to receive reports on that cadence, but Oracle revised the cadence for customers that have been in the program at least two years. The redesign considers customers’ level of engagement: those that have opened at least one-quarter of the eHERs are classified as “digitally engaged,” and those that have opened fewer than one-quarter are classified as “digitally aloof.” Customers with a valid email address that were assessed to be digitally engaged receive one print report and monthly email reports (“eHERs”). Digitally aloof customers receive four print HERs and 12 eHERs. Customers without an email address receive four print reports.

The Oracle contact mentioned that they work with Evergy’s marketing team to update reports’ marketing modules with promotional information for Evergy programs such as smart thermostats, in-store discounts, and the online energy analyzer.

According to the Oracle contact there is a new version of the HER coming out and Evergy would be using this updated design in 2021, though details regarding the timeline for the change were not yet decided. The contact said that though the content would remain the same, there would be a new look and feel.

The contacts noted that in March 2021 they will add new participants or “refill” the program to account for attrition and customers that have unsubscribed, which Evergy’s Product Manager said historically occurred at a rate at or around 1%. The Oracle Service Delivery Manager noted that they do not track the reasons that customers choose to unsubscribe.

Program Goals and Performance

ADM asked how Evergy and Oracle track the program’s success. Evergy contacts noted the importance of demonstrating savings from the reports and avoiding double counting of savings that resulted from other Evergy energy efficiency programs. The contact at Oracle also acknowledged that their primary metric is energy savings, but they also track click through rates and open rates for eHERs. She stated that the open rate for their eHERs for Evergy is almost 50%, which is higher than the industry average for business-to-customer emails.

Evergy’s Product Manager observed that print reports have historically generated more savings than email reports, though she did not cite specific figures. She also said that the HERs may have been more beneficial for customers in 2020 than in other years as many were spending more time at home because of the COVID-19 pandemic.

The Oracle contact noted that their main method of evaluating customer satisfaction and their success with physical HERs is an annual survey that Oracle conducts of HER participants and a matched control group of nonparticipants (the Customer Engagement

Tracker survey) but reiterated that they are primarily contracted to achieve energy savings.

Program Challenges

When asked whether there were any challenges to delivering reports in PY1, Evergy's Product Manager stated that she was unaware of any.

F.5.2 Materials Review

ADM reviewed a copy of the print version of the home energy report. The report provides information in an engaging and generally user-friendly format. Based on participant feedback (see next section), ADM notes that the information on the basis for comparisons with other homes, as well as on how to make the report more accurate, may not be sufficient for some recipients.

F.5.3 Participant Survey

ADM collaborated with Oracle in fielding the participant survey. Each year, Oracle fields a Customer Engagement Tracker (CET) survey to assess customer engagement with HERs and with Evergy's Home Energy Analyzer ("Energy Analyzer"). This year, ADM contributed questions to the survey to address research questions specific to this process evaluation.

Oracle implemented the CET survey with four groups of customers:

- A proportional stratified random sample of 5,000 HER recipients (participants, or the treatment group).
- A proportional stratified random sample of 4,000 customers in the HER control group.
- An oversample of 1,500 HER recipients and control group customers who, within the past two years, had completed the Home Energy Audit (HEA) tool available in the Energy Analyzer (the "HEA oversample").
- A random sample of 5,000 customers in Evergy's Kansas service territory who had logged onto their Evergy web accounts since the beginning of 2020.

The strata in the two stratified random samples were the waves of program participation, and the sample was selected such that the distribution of the sample across the participation waves was proportional to the distribution of recipients across waves.

The HER participant survey sample consisted of the stratified random sample of 5,000 HER recipients and an estimated 1,050 HER recipients in the HEA oversample.

A total of 417 HER recipients completed the survey and another 15 responded to at least half the questions and were included in the analyses for a total of 432 respondents, for an overall response rate of 6.6% (Table F-63). The response rate from the HEA oversample group was twice that of the stratified random sample.

Table F-63: Survey Response Summary

HER Recipient Group	Invitations	Usable Responses1[7]	Response Rate
Recently completed the HEA	1,096	200	18.2%
Did not recently complete the HER	4,954	232	4.7%
Total - all HER recipients	6.050	432	7.1%

As detailed below, the survey revealed the following:

- Customers reported high overall satisfaction with Evergy, agreeing that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills.
- Two-thirds of respondents were somewhat to very familiar with Evergy energy efficiency or conservation programs, particularly those for smart thermostats and LED lighting.
- A high percentage of respondents confirmed receiving an Evergy HER in the past three months and generally paid at least some attention to the contents; just under half read it thoroughly.
- Respondents had generally positive attitudes toward the reports, particularly the energy efficiency tips. Those who reported liking the reports as well as those who said they did not like the reports most commonly cited the neighbor comparison as the reason, with the latter questioning the accuracy or basis of the comparison.
- Receiving the reports generally did not affect respondents' satisfaction with Evergy, nor had favorability toward the reports themselves change in the past year.
- Respondents generally tended to rate their efforts to save energy favorably. However, although nearly three-quarters said they were concerned about their household's energy costs and two-thirds said they knew of steps to take to reduce energy use, nearly half did not indicate an intention to take steps to reduce use in the next six months.

[7] Completed survey or responded to at least 50% of questions that were seen by the respondent.

- About one-third of report recipients had engaged with the Energy Analyzer, most commonly saying they did so “a few times.” They most commonly found it on the website themselves or learned about it from a bill insert. Those who had not engaged with the Energy Analyzer most commonly said it was because they were not aware of it.
- Respondents reported a variety of uses of the Energy Analyzer, most commonly reporting use of the Compare component and least commonly, the Analyze and Reports components. More than two-thirds of those expressing a view said the information on their home’s energy use was accurate. Those who disagreed most commonly said the reported use was too high or questioned the basis of the comparison with other households.
- Respondents generally reported that the Coronavirus pandemic had not affected their likelihood of taking advantage of Evergy’s energy efficient programs and services.
- Generally speaking, participant wave was not related to survey responses.

Respondent Characteristics

Respondents tended to skew older, with 61% of those providing a response saying they were at least 55 years old. By contrast, this age range constitutes 44% of householders in Evergy’s Missouri service territory (Table F-64).

Table F-64: HER Recipient Age

Q27: Which of the following categories best describes your age?	Percent	Percent of Responders	Census
18 to 24	1%	1%	22%
25 to 34	6%	6%	
35 to 44	12%	12%	17%
45 to 54	18%	19%	18%
55 to 64	24%	25%	19%
65 to 74	25%	26%	14%
75 or over	9%	10%	11%
Prefer not to answer	6%	n/a	n/a
Total	**100%**	**100%**	**100%**

Respondents also skewed toward higher education levels, with 57% reporting a four-year college degree or higher, compared to 31% of householders in Evergy's Missouri service territory (Table F-64).

Table F-65: HER Recipient Education Level

Q29: Which of the following categories best describes your highest level of education?	Percent	Percent of Responders	Census
Some high school or less	1%	1%	8%
High school graduate or GED	9%	9%	29%
Some college or trade / technical school	19%	21%	33%
Trade / technical school / two-year college graduate	11%	12%	
Four-year college graduate	21%	22%	31%
Post-graduate degree	23%	25%	
Some post-graduate work	8%	9%	
Prefer not to answer	7%	n/a	
Total	**100%**	**100%**	**100%**

Finally, a much higher percentage of survey respondents were homeowners (84%) compared to the Evergy customer population (64%).

We cannot determine whether the above differences between the survey respondents and Evergy's general customer population reflect biases for older or more educated householders to respond, a bias for such householders to be selected to receive HERs, both, or something else.

Attitudes Toward Evergy

Customers reported high overall satisfaction with Evergy. On a scale from 0 (extremely dissatisfied) to 10 (completely satisfied), 80% of respondents rated their satisfaction a 7 or higher and 50% gave a rating of 9 or 10.

Respondents generally agreed that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills (Table F-66). They also agreed, but less strongly, that Evergy provides a variety of energy efficiency programs and services and that Evergy messaging is attention-getting. Respondents were least likely – although more likely than not – to report that Evergy

helps them manage their monthly energy usage or that Evergy wants to help them save energy.

Table F-66: HER Recipient Attitudes About Evergy

Q4A: Thinking about Evergy, how much do you agree or disagree with each of the following	Disagree	Neither Agree nor Disagree	Agree
Evergy provides customers with useful tools to learn about energy usage	13%	17%	70%
Evergy provides useful suggestions on ways I can reduce my energy usage and lower my monthly bills	15%	15%	70%
Evergy provides a variety of energy efficiency programs and services	14%	26%	60%
Evergy creates messages that get my attention	16%	27%	57%
Evergy helps me manage my monthly energy usage	17%	29%	53%
Evergy wants to help me save money	21%	29%	50%

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

Awareness of Evergy Energy Efficiency Offerings

Two-thirds of respondents said that they were either somewhat (54%) or very (13%) familiar with Evergy energy efficiency or conservation programs. When asked which Evergy energy efficiency initiatives they were familiar with, more than two-thirds reported familiarity with an initiative for smart thermostats and three-fifths said they were familiar with initiatives for LED lighting (Table F-67). Fewer reported familiarity with offerings for heating and cooling or for insulation and air sealing.

Table F-67: HER Recipient Awareness of Evergy Energy Efficiency Offerings

Energy Efficiency Measure	Percent Aware of Offering
Smart Thermostat	71%
LED Lighting	60%
Heating and Cooling	43%
Insulation and Air Sealing	36%

Use of and Attitudes Toward the HER

A large majority (92%) of respondents confirmed they had received an Evergy HER in the past three months. Those respondents generally paid at least some attention to the report's contents. Of those who confirmed receiving the HER and who reported what they did with it, nearly half (47%) said they read the report thoroughly and more than one-third (35%) reported reading some of the content. Nearly all of the remaining respondents (16%) said they glanced at the pictures or graphs. Given the percentage who confirmed receiving the report, the above suggests that 43% of all report recipients read the report thoroughly, 32% read some of the content, and 15% glance at the pictures or graphs.

Respondents had generally positive attitudes toward the reports (Table F-68). About two-thirds reported they like the reports, with respondents varying somewhat in what they liked most about the reports. Respondents most commonly agreed that the reports' energy efficiency tips are useful. Somewhat fewer agreed that the reports help them make better decisions about energy or that they provide motivation to reduce energy use.

Table F-68: HER Recipient Attitudes About Reports

Q10: Thinking about the Home Energy Reports you've received, how much do you agree or disagree with each of the following statements?	Disagree	Neither Agree nor Disagree	Agree
I like the Home Energy Reports	14%	15%	69%
The energy efficiency tips in the Home Energy Report are useful	13%	22%	63%
The HERs help me make better decisions to use and save energy	18%	29%	50%
The reports motivated me to reduce my energy use	19%	27%	52%

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

What respondents reported doing with the reports was strongly related to whether or not they said they liked the reports, with more thorough review of the reports associated with greater favorability toward them (Table F-69). Reading the report thoroughly could be the cause or the effect of liking the report. Possibly, the initial attitude about the report is the effect of the initial attention paid to it, but that begins a feedback loop in which it becomes difficult to separate cause from effect. Given that these are respondents who have been receiving the report for some time, this relationship may, however, identify an established

pattern in which the thoroughness of their review reflects the opinion they have developed over time.

Table F-69: Relationship of Reported Use of Reports to Reported Liking of Reports

Q9: Thinking of the reports you've received, in general what do you do with them? Q10: Thinking about the Home Energy Reports you've received, how much do you agree or disagree with each of the following statements?	Total Count	Percent Reported Liking Reports
Read the report thoroughly	186	81%
Read some of the content	140	71%
Glanced at the pictures or graphs	64	39%

The survey offered respondents who reported they liked the reports an opportunity to say what they liked best about them. It also offered those who were neutral or did not like the reports to explain why.

A large majority of those who reported liking the reports (85%) declined the opportunity to expand on their ratings. Of 40 respondents who provided a response, two-thirds (65%) said they liked knowing how they compared to their neighbors. Four respondents commented on the feedback about their energy usage, with two of those specifically commenting on the charts and graphs; four identified the energy-saving tips are positives; and three said they like seeing how their usage compares to previous usage. One respondent each commented favorably on receiving alerts about high usage and on the readability of the reports. Four provided unspecific positive comments (e.g., "all of it," "that I receive them").

About half (49%) of those who reported being neutral or negative toward the report declined the opportunity to say why. Of the 39 respondents who gave a reason, two-thirds indicated they questioned some aspect of the comparison with other houses (Table F-70). Just over half of those provided some basis for their doubts, such as that their usage was being compared with houses that are smaller, have fewer individuals living in them, use natural gas heat, or are noncomparable in other varied ways (e.g., neighboring houses are vacant, have solar panels, are of different age). In two cases, respondents said they did not believe the reports because their neighbors also were receiving them and had been told they were using "more energy than their neighbors." Nearly half did not specify a reason for questioning the comparison other than not believing they use more energy than their neighbors.

About one-sixth of respondents (8% of those expressing neutral or adverse attitudes toward the reports) questioned the accuracy of information in the report about their energy

consumption. About two-thirds of those respondents also questioned the comparison with other homes, suggesting the two issues may be related. Of the nine respondents who cited accuracy concerns, four indicated concerns that the report did not show they were using less energy even though they had installed energy efficient equipment (LEDs, smart thermostat) or were keeping the temperature in their house low. Five were nonspecific or unclear about the reasons they believe the reports are inaccurate.

Table F-70: HER Recipient Suggestions for Improving Reports

Q14: What aspect of the Home Energy Reports should be improved?	Count	% Providing Response	% Neutral or Do Not Like Report	% Recalling Receipt of Report
No answer/no suggestion	56	n/a	49%	14%
Comparison with other houses	39	66%	34%	10%
House size	12	20%	10%	3%
Household composition	10	17%	9%	3%
Electric vs. gas	4	7%	3%	1%
Other factors	5	8%	4%	1%
Talked with neighbors	2	3%	2%	1%
Unspecified reason	15	25%	13%	4%
Questions accuracy of usage	9	15%	8%	2%
Unhappy with recommendations	5	8%	4%	1%
Prefer not to receive	2	3%	2%	1%
Prefer to receive by email	4	7%	3%	1%
Response unclear or not specific	4	7%	3%	1%
Miscellaneous	1	2%	1%	0%

Despite the generally favorable attitudes toward the reports, just over half of respondents (56%) said that receiving the reports had not affected their level of satisfaction with Evergy. To the extent that receiving the reports had an effect, however, it was largely positive: of the respondents who did not say their opinion of Evergy was unchanged, about two-thirds said that they were more satisfied (Table F-71).

Table F-71: Effect of HERs on Satisfaction with Evergy

Q11: Has receiving the reports made you more or less satisfied with Evergy or has your opinion not changed?	Percent
More satisfied	28%
Opinion unchanged	56%
Less satisfied	6%
Don't know	1%
Prefer not to answer	10%
Total	**100%**

Respondents' opinions about the reports were largely unchanged since last year (Table F-72). To the extent that their opinions had changed, though, they were more favorable.

Table F-72: Comparison of HER Favorability to Previous Year

Q12: Which of the following best describes how your opinion about the Home Energy Report changed compared to last year?	Percent
More favorable now	15%
About the same	65%
Less favorable now	5%
Don't Know	6%
Prefer not to answer	11%
Total	**100%**

Energy Conservation Knowledge and Actions

Respondents reported on their knowledge of, concerns about, and actions taken regarding energy conservation. They generally tended to rate their efforts to save energy favorably, with 60% giving themselves the highest or second-highest rating (Table F-73).

Table F-73: HER Recipient Self-Reported Efforts to Save Energy

Q24: How would you rate your household's efforts to save energy in your home in the last year?	Percent
1: I have not done anything	3%
2	5%
3	29%
4	36%
5: I have done almost everything I can	24%
Don't know	1%
Prefer not to answer	3%
Total	**100%**

More than two-thirds of respondents said they were concerned about their household's energy costs, and nearly that level said they knew of steps they could take to reduce their energy use (Table F-74). They were less likely, however, to say they intended to take steps to reduce their energy use in the next six months.

Table F-74: HER Recipient Attitudes About Energy Reduction

Q25: Please rate how much you agree or disagree with the following statements.	Disagree	Neither Agree nor Disagree	Agree
I am concerned about my household's energy costs	10%	15%	71%
I know of steps I could take to reduce my household energy use	11%	16%	67%
I intend to take steps to reduce my household's energy use in the next six months	12%	28%	53%
I don't think there is anything else I could do to reduce my household's energy use	39%	20%	36%

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

About one-third of respondents agreed there was nothing else they could do to reduce their household's energy use. However, only 14% "strongly agreed" with that statement, and only 8% both strongly agreed with that statement and earlier indicated they had done "almost everything" they could. This may be the best estimate of the percentage of customers that likely could not be convinced to make any additional efforts.

Engagement with the Energy Analyzer

A large majority (84%) of surveyed report recipients reported they had at some point logged onto their account on the Evergy website. Of those, somewhat fewer than half (44%, or 37% of all report recipients) said they had used the online Energy Analyzer tool on Evergy's website.

The most common reason given for not using the Energy Analyzer was lack of awareness of the tool, with nearly half of respondents giving this reason (Table F-75). About one-quarter of respondents gave a reason that suggested lack of motivation to use or need for the tool (not interested, do not have the time, was getting all needed information elsewhere).

Table F-75: HER Recipient Reasons for Not Using Energy Analyzer

Q23: What is the primary reason that you have not used the Energy Analyzer tool?	Percent
Was not aware of the Energy Analyzer	46%
Not interested	9%
Do not have the time	7%
Was getting all the information I needed about saving energy from other sources	7%
Other	5%
Don't know	11%
Prefer not to answer	13%
Total	**100%**

The 159 respondents who reported they had used the Energy Analyzer most commonly reported that they learned about the tool on their own by exploring the Evergy website (Table F-76). The only other frequently identified source was an Evergy bill insert. No respondent reported having learned about it from a contractor installing energy-using equipment, from social media, or from traditional media advertising.

Table F-76: HER Recipient Sources of Energy Analyzer Awareness

Q17: How did you learn about the Energy Analyzer tool?	Percent
Found on website	60%
An Evergy bill insert	33%
A friend, acquaintance, or relative	2%
Other	1%
Don't know	3%
Prefer not to answer	1%
Total	**100%**

About half of respondents reported they had used the tool "a few times" (Table F-77). Most of the rest were fairly closely split between those who had used it once and those who had used it about once a month.

Table F-77: HER Recipient Frequency of Energy Analyzer Use

Q19: How often have you used the Energy Analyzer tool?	Percent
Once	24%
A few times	50%
About once a month	18%
About once a week or more often	5%
Don't know	4%
Prefer not to answer	0%
Total	**100%**

Respondents most commonly used the tool to visualize their home's energy usage or see how their home's usage compared to that of other homes (Table F-78). They also frequently used it to learn how to save energy.

Table F-78: HER Recipient Reasons for Using Energy Analyzer

Q18: Why did you decide to use the Energy Analyzer tool?	Percent
To visualize my home's energy usage	50%
To see how my home's energy usage compared to others' homes	50%
To learn how to save energy	40%
Other	4%
Don't know	4%

Consistent with the above, respondents commonly reported using the Compare function of the tool, which compares their usage to that of similar homes (Table F-79). Respondents also frequently reported use of the Trend and Save functions.

Table F-79: HER Recipient Use of Energy Analyzer Components

Q20: Which of the following parts of the Energy Analyzer tool have you engaged with?	Percent
Compare: compares your usage to that of similar homes	68%
Trend: shows how usage and costs relate to the weather over time	58%
Save: shows energy saving tips for your home	58%
Analyze: an on-line interactive tool that disaggregates usage based on survey responses	33%
Reports: lets you opt out of Home Energy Reports or change how you get them	19%

Three-quarters of the respondents reported either that the Energy Analyzer's information on their home's energy usage was accurate or they did not know whether it was accurate (Table F-80). Excluding those who said they did not know or did not provide a response, more than two-thirds said it was accurate. Of the remaining respondents, most said the reported usage was too high.

Table F-80: HER Recipient Perceptions of Energy Analyzer Accuracy

Q22: Do you think the information about your home's energy usage in Energy Analyzer is accurate?	Percent	Percent of Responders
Yes	52%	71%
No – the usage that was reported was too high	14%	20%
No – the usage that was reported was too low	0%	0%
No – there was something else that was not correct (Specify):	7%	9%
Don't know	23%	n/a
Prefer not to answer	4%	n/a
Total	**100%**	**100%**

Of the 11 respondents who indicated the information is inaccurate for an "other" reason, eight raised issues of comparability:

- Three provided specific reasons for having greater usage than most homes: one referred to running a business out of the home and having four outbuildings as well as the main building; one noted having a larger home than most, suggesting the comparison does not equate for square footage; and one stated simply "extra building usage."
- Two noted either they had electric heat or an all-electric home, while most others use natural gas.
- One respondent suggested that the comparisons were not accurate because the "percentages for usage (lighting, appliances, etc.) aren't really very accurate." That respondent reported being an electrical engineer and had measure the usage of all lights and appliances in the home. The respondent suggested "the Energy Reports could be made more accurate if there were more options."
- Two provided nonspecific statements about the basis of the comparisons ("my neighbors are not similar").

Of the remaining three respondents, one said simply that the reported usage was "close" and two provided short and uninterpretable responses ("non encompassing" and "hourly").

Two of the respondents who said the reported usage was too high provided reasons for saying so, which may be valuable feedback despite being rare responses.56 One

commented that they live in an apartment complex and so were concerned the comparison may include empty apartments that might skew the average consumption for that comparison group. Another noted that their reported usage was artificially inflated after a two-month period during which Evergy had not been able to get a signal from their smart meter.

The fewer than 10% of respondents who explicitly identified concerns with the comparison may underestimate the percentage who are concerned. The survey did not explicitly ask about concerns with the comparison but about the accuracy of the reported energy usage. It is possible that the percentage would have been higher had the survey explicitly asked about the comparison. (See related discussion in Section I.1.2.)

Not surprisingly, engagement with the Energy Analyzer tool was associated with more favorable opinions regarding Evergy's energy-related offerings. Specifically, respondents who engaged with the Energy Analyzer were more likely than those who had not engaged with the tool to agree that Evergy…

- …wants to help them save energy (58% vs. 45%).
- …helps them manage monthly energy usage (64% vs. 48%).
- …provides customers with useful tools to learn about energy usage (79% vs. 65%).

Respondents who engaged with the Energy Analyzer also were more likely than others to report being "very familiar" with Evergy energy-saving offerings (23% vs. 6%) and were more likely to say they were familiar with initiatives for:

- Smart thermostat (84% vs. 63%).
- Heating and cooling (54% vs. 38%).
- LED lighting (73% vs. 53%).
- Insulation and air sealing (48% vs. 29%).

Those who reported engaging with the Energy Analyzer were more likely to rate their efforts to save energy highly (70% vs. 53%).

Finally, those respondents were more likely to have contacted Evergy in past 3 months, another indicator of engagement (26% vs. 18%).

COVID Effects

Three-quarters of respondents reported that the coronavirus pandemic had not affected their likelihood of engaging with Evergy's energy efficiency offerings (Table F-81). To the extent that respondents indicated an effect, it was slightly in the direction of their being more likely to engage with Evergy's offerings.

Table F-81: Effects of Coronavirus Pandemic on HER Recipients' Use of Evergy Offerings

Q7: How has the COVID-19 situation impacted your likelihood of taking advantage of Evergy's energy efficiency programs and services?	Percent
Much less likely now	2%
Less likely now	5%
No change	77%
More likely now	13%
Much more likely now	3%
Prefer not to answer	0%
Total	**100%**

F.5.4 Control Group Survey

As described in Section F.5.3, Oracle implemented the CET survey with a sample of about 4,450 HER control group customers. A total of 75 HER control group customers completed the survey and another two responded to at least half the questions and were included in the analyses for a total of 77 respondents, for an overall response rate of 1.7%.

In presenting the results of the control group survey, we identify any differences from the HER recipient respondents that are statistically significant at an alpha of .05 or less. If we do not state that any control group results differ from those of the recipients, then the difference did not achieve statistical significance.

As detailed below, the survey revealed the following:

- Customers reported high overall satisfaction with Evergy, generally agreeing (but not as strongly as report recipients) that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills.
- As with the report recipients, two-thirds of respondents were somewhat to very familiar with Evergy energy efficiency or conservation programs, particularly those for smart thermostats and LED lighting.
- Respondents generally tended to rate their efforts to save energy favorably. As with the report recipients, however, reported intention to take steps to reduce energy use was well below the reported level of concern about energy use and of knowledge of the steps they could take.

- Just over one-quarter of report recipients had engaged with the Energy Analyzer. Those who had not engaged with the Energy Analyzer most commonly said it was because they were not aware of it.
- As with the report recipients, respondents generally reported that the Coronavirus pandemic had not affected their likelihood of taking advantage of Evergy's energy efficient programs and services.

Respondent Characteristics

The control group respondents were very similar to the HER recipients in age, education level, and home ownership (Table F-82). As with the HER recipients, control respondents tended to skew older, with 68% of those providing a response saying they were at least 55 years old, compared to 44% of householders in Evergy's Missouri service territory.

Table F-82: HER Control Customer Age

Q27: Which of the following categories best describes your age?	Percent	Percent of Responders	Census
18 to 24	0%	0%	22%
25 to 34	4%	4%	
35 to 44	8%	8%	17%
45 to 54	18%	19%	18%
55 to 64	21%	22%	19%
65 to 74	38%	40%	14%
75 or over	5%	6%	11%
Prefer not to answer	6%	n/a	n/a
Total	**100%**	**100%**	**100%**

Control respondents, like HER recipients, skewed toward higher education levels, with 50% reporting a four-year college degree or higher, compared to 31% of householders in Evergy's Missouri service territory (Table F-83).

Table F-83: HER Control Customer Education Level

Q29: Which of the following categories best describes your highest level of education?	Percent	Percent of Responders	Census
Some high school or less	0%	0%	8%
High school graduate or GED	12%	13%	29%
Some college or trade / technical school	23%	26%	33%
Trade / technical school / two-year college graduate	10%	11%	
Four-year college graduate	22%	24%	31%
Post-graduate degree	17%	19%	
Some post-graduate work	6%	7%	
Prefer not to answer	9%	n/a	
Total	100%	100%	100%

Finally, a much higher percentage of survey respondents were homeowners (81%) compared to the Evergy customer population (64%).

As was the case with the HER recipient survey respondents, we cannot determine whether the above differences between the survey respondents and Evergy's general customer population reflect biases for older or more educated householders to respond, a bias for such householders to be selected to receive HERs, both, or something else.

Attitudes Toward Evergy

Customers reported high overall satisfaction with Evergy. On a scale from 0 (extremely dissatisfied) to 10 (completely satisfied), 79% of respondents rated their satisfaction a 7 or higher and 50% gave a rating of 9 or 10.

As with the HER recipients, control respondents generally agreed that Evergy provides useful suggestions and tools to help manage energy use, but they agreed somewhat less strongly that Evergy provides a variety of energy efficiency offerings and attention-getting messaging, and least strongly that Evergy helps them manage their monthly energy usage or wants to help them save energy (Table F-84).

Table F-84: HER Control Customer Attitudes About Evergy

Q4A: Thinking about Evergy, how much do you agree or disagree with each of the following	Disagree	Neither Agree nor Disagree	Agree
Evergy provides useful suggestions on ways I can reduce my energy usage and lower my monthly bills	12%	27%	60%
Evergy provides customers with useful tools to learn about energy usage	12%	30%	57%
Evergy provides a variety of energy efficiency programs and services	12%	38%	49%
Evergy creates messages that get my attention	16%	34%	49%
Evergy helps me manage my monthly energy usage	17%	42%	40%
Evergy wants to help me save money	27%	36%	35%

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

Control respondents showed less agreement than did HER recipients on several items: that Evergy provides useful tools (57% vs. 70%) that Evergy helps them manage their energy usage (40% vs. 53%), and that Evergy wants to help them save energy (35% vs. 50%). Differences approached statistical significance (alpha of .10 or less) for two additional items: Evergy provides useful suggestions for reducing energy (60% vs. 70%) and Evergy provides a variety of energy efficiency offerings (49% vs. 60%).

One possible reason for the above difference is that there were relatively more respondents who engaged with the Energy Analyzer tool among the report recipients than among the control group. Recall that the recipient sample included an oversample of customers who had completed the Home Energy Audit tool within the Energy Analyzer. A much higher percentage of recipient than control respondents reported having used the Energy Analyzer tool (37% vs. 29%). Recall that recipients who reported using the Energy Analyzer reported more favorable attitudes toward Evergy than did those who said they had not used that tool (Section 0). Therefore, it is possible that the higher rates of Energy Analyzer use among report recipients than among controls drove the differences in attitudes toward Evergy.

To address the above, we repeated the comparisons between recipients and controls, but did so separately for those who did and those did not report using the Energy Analyzer tool. Doing so removed any possible effect of using the Energy Analyzer from the

comparisons between recipients and controls. Therefore, if the above differences in attitudes toward Evergy reflected the differences in Energy Analyzer use, then we would expect to see no differences between recipients and controls, either among those who used the Energy Analyzer or among those who did not use the Energy Analyzer.

When looking at customers who reported using the Energy Analyzer, we saw no statistically significant differences between recipients and controls. The small sample of control customers who said they used the Energy Analyzer (n = 22) did not provide much statistical power, and therefore we cannot conclude with much certainty that no difference exists in the population.

When we looked at customers who said they did not use the Energy Analyzer, however, recipients indicated greater agreement than controls on nearly every item (Table F-85).

Table F-85: Comparison of HER Recipients' and Control Customers' Attitudes About Evergy – Respondents Who Did Not Use the Energy Analyzer

Q4A: Thinking about Evergy, how much do you agree or disagree with each of the following	Percent Agreement	
	Recipient (n = 230)	Control (n = 43)
Evergy provides useful suggestions on ways I can reduce my energy usage and lower my monthly bills	***69%***	***49%***
Evergy provides customers with useful tools to learn about energy usage	***65%***	***40%***
Evergy provides a variety of energy efficiency programs and services	***58%***	***35%***
Evergy creates messages that get my attention	***56%***	***37%***
Evergy helps me manage my monthly energy usage	48%	33%
Evergy wants to help me save money	***45%***	***28%***

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

Percentages in bold, italic font indicate statistically significant differences between recipients and controls. The difference for the one item not so indicated approached statistical significance (z = 1.90, p = .06).

Can we infer causality from the above – that the reports engender more favorable attitudes toward Evergy's energy-saving efforts? While we cannot conclude this with a high level of certainty, it seems to be the most straightforward interpretation of the findings. The fact that customers are randomly assigned to be HER recipients or controls

suggests that these differences did not exist in the population before customers were assigned to be recipients or controls.

An alternative possibility is that, for some reason, there was a stronger response bias toward customers with favorable attitudes toward Evergy among the recipients than among the controls. The higher response rate from report recipients than from control customers may be an indicator of generally more favorable attitudes toward Evergy among recipients than controls, but it does not necessarily suggest a stronger bias toward favorability among recipient respondents than among control respondents. The fact that the recipient and control samples were very similar demographically may suggest lack of any major response bias differences. Given no evidence for differing response biases between recipients and controls, the simplest interpretation is that the above differences reflect the effects of receiving the reports.

Awareness of Evergy Energy Efficiency Offerings

About two-thirds of respondents said that they were either somewhat (56%) or very (8%) familiar with Evergy energy efficiency or conservation programs. When asked which Evergy energy efficiency initiatives they were familiar with, two-thirds reported familiarity with an initiative for smart thermostats and half said they were familiar with initiatives for LED lighting (Table F-86). Fewer reported familiarity with offerings for heating and cooling or for insulation and air sealing.

Table F-86: HER Control Customer Awareness of Evergy Energy Efficiency Offerings

Energy Efficiency Measure	Percent Aware of Offering
Smart Thermostat	68%
LED Lighting	49%
Heating and Cooling	32%
Insulation and Air Sealing	31%

There were no statistically significant differences between recipients and controls in reported overall familiarity with Evergy offerings or with any of the individual offerings.

Energy Conservation Knowledge and Actions

Respondents reported on their knowledge of, concerns about, and actions taken regarding energy conservation. They generally tended to rate their efforts to save energy favorably, with 49% giving themselves the highest or second-highest rating (Table F-87).

Table F-87: HER Control Customer Self-Reported Efforts to Save Energy

Q24: How would you rate your household's efforts to save energy in your home in the last year?	Percent
1: I have not done anything	6%
2	4%
3	35%
4	32%
5: I have done almost everything I can	17%
Don't know	4%
Prefer not to answer	1%
Total	**100%**

Control respondents' attitudes regarding energy use were similar to those of report recipients. Two-thirds said they were concerned about their household's energy costs and said they knew of steps they could take to reduce their energy use (Table F-88). As with the recipients, they were somewhat less likely, however, to say they intended to take steps to reduce their energy use in the next six months.

Table F-88: HER Control Customer Attitudes About Energy Reduction

Q25: Please rate how much you agree or disagree with the following statements.	Disagree	Neither Agree nor Disagree	Agree
I am concerned about my household's energy costs	6%	26%	66%
I know of steps I could take to reduce my household energy use	12%	14%	69%
I intend to take steps to reduce my household's energy use in the next six months	10%	29%	57%
I don't think there is anything else I could do to reduce my household's energy use	34%	27%	36%

Agreement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

About one-third of respondents agreed there was nothing else they could do to reduce their household's energy use. The percentages that that "strongly agreed" with that statement (14%) and that both strongly agreed with that statement and earlier indicated they had done "almost everything" they could (8%) were identical to those for the recipient group and may best estimate the percentage of customers that likely could not be convinced to make any additional efforts.

Engagement with the Energy Analyzer

The percentage of control respondents that reported having at some point logged onto their account on the Evergy website (83%) was almost identical to that for the report recipients. As noted above, however, a much smaller percentage (34%, or 29% of all report recipients) said they had used the online Energy Analyzer tool on Evergy's website.

As with the report recipients, the most common reason given for not using the Energy Analyzer was lack of awareness of the tool, with about one-third of respondents giving this reason (Table F-89). Other than the above, the relative order of specific reasons differed slightly between recipients and controls, but – like recipients – about one-quarter of control respondents gave a reason that suggested lack of motivation to use or need for the tool (not interested, do not have the time, was getting all needed information elsewhere).

Table F-89: HER Control Customer Reasons for Not Using Energy Analyzer

Q23: What is the primary reason that you have not used the Energy Analyzer tool?	Percent
Was not aware of the Energy Analyzer	36%
Was getting all the information I needed about saving energy from other sources	12%
Not interested	10%
Could not find the Energy Analyzer on the website	7%
Do not have the time	5%
Other	2%
Don't know	10%
Prefer not to answer	19%
Total	**100%**

The only reason for not using the Energy Analyzer tool that showed a statistically significant difference between recipients and controls was inability to find the tool on the

website: 7% of control respondents gave this reason, compared to none of the report recipients.

As the small sample of respondents who reported they had used the Energy Analyzer is small (n = 22), the resulting responses have low precision. There was only one statistically significant difference between the report recipients and control respondents relating to any of the questions specific to the Energy Analyzer. Specifically, control respondents less frequently reported that they decided to use the tool to learn how to save energy, compared to report recipients (18% vs. 40%).

COVID Effects

Control group respondents' reported impacts of the coronavirus pandemic were very similar to those reported by report recipients. Just over three-quarters reported that the pandemic had not affected their likelihood of engaging with Evergy's energy efficiency offerings (Table F-90). Slightly more said they were more likely to engage with Evergy's offerings than less likely.

Table F-90: Effects of Coronavirus Pandemic on HER Control Customers' Use of Evergy Offerings

Q7: How has the COVID-19 situation impacted your likelihood of taking advantage of Evergy's energy efficiency programs and services?	Percent
Much less likely now	3%
Less likely now	5%
No change	81%
More likely now	6%
Much more likely now	5%
Prefer not to answer	0%
Total	**100%**

F.6 Conclusions and Recommendations

This section presents conclusions and recommendations for the Home Energy Report Program.

F.6.1 Conclusions

- The Evaluators estimated Home Energy Report Program savings for Evergy through billing analysis of RCT cohorts. The Evaluators found positive annual savings that is statistically significant savings for all waves in the calendar year evaluation. The Evaluators verified program savings of 39,330,143 kWh for PY1.
- All evaluated waves displayed average annual electric savings of between 0.4% and 4% of annual billed use. Typical behavioral programs display average annual electric savings between 1% and 3%. The Evergy program exceeds typical behavioral program savings expectations for some waves and display typical savings for most.
- The three newest waves displayed the lowest annual percent savings between 0.4% to 0.89% for PY1. The usage behaviors for this group have lower opportunity for savings due to the nature of the group. These users' annual savings are low likely because they have not had enough time to implement the behavioral changes due to the Home Energy Reports in a significant way. Home Energy Reports are known to show larger savings effects as exposure to the reports increase.
- The Evaluators estimated downstream double counted savings at -469,277 PY1. The Evaluators removed this double counted savings from the regression results, leading to an increase in program savings by 469,277 kWh.
- The Evaluators conducted attrition analysis. The total attrition for the program since inception is 44%. This number is expected to be large due to the number of years the program has been deployed. The first wave deployed, for example, has been deployed for over 8 years. The Evaluators found the individual wave attrition rates to range between 3% and 22%, with an average attrition rate of 7% across all treatment customers in PY1. The newly deployed waves display the largest amount of attrition at 14% to 22%.
- The Evaluators ran exploratory analyses and found that customers that are more digitally-engaged tend to display lower annual household savings than customers that are not digitally-engaged. The Evaluators note that the COVID19 pandemic stay-at-home orders may have contributed to these findings. Customers that are more digitally-engaged or email-engaged may be using more energy, on average, in the post-period due to working from home whereas the customers that are more digitally-aloof may be composed of an older, retired demographic, whose habits have not been altered in the post-period due to the stay-at-home orders.

The Evaluators have no recommendations from the impact evaluation of the Home Energy Report Program

F.6.2 Process Evaluation Conclusions and Recommendations

The findings from the program and implementer staff interviews, the review of program materials, and the participant and nonparticipant surveys suggest the following conclusions:

- HER participants (recipients) and nonparticipants (controls) are generally satisfied with Evergy and the tools it provides for learning about and reducing energy usage. Participants and nonparticipants believe they are doing well in saving energy, but intention to take further steps lags behind their reported level of concern about energy use and reported knowledge of steps to take. For some, this may partly result from a belief that they are already doing as much as they can to save energy.
- HER participants generally open reports and pay attention to at least some content, particularly energy saving tips and neighbor comparisons. The HER's neighbor comparison is a source of report satisfaction but also a primary source of dissatisfaction among those who question the accuracy or basis of the comparison. In particular, some customers believe the report compares their home to others that are different in size, occupancy, fuel types, or other respects. This may partly be because more than half of report recipients do not read the report thoroughly. Recall that thoroughness of report review was strongly related to favorability toward the report. If the information on the basis of the comparison is not obvious, some respondents with limited time may not look more thoroughly to find it, resulting in doubts about the comparison and an unfavorable attitude toward the report. Our review of the print version of the report suggests that the information on the basis for comparisons with other homes, as well as on how to make the report more accurate, may not be sufficient for some recipients.
- About one-third of participants and one-quarter of nonparticipants have engaged with the Energy Analyzer, most commonly having done so "a few times," after finding it on the website themselves or learning about it from a bill insert. Customers use the tool for generally the same purpose as the HERs and have the same reasons for satisfaction or dissatisfaction. One reason for dissatisfaction is the belief that the comparison with other homes does not account for differences in the home's use that are not captured by Oracle's algorithm.
- Participants and nonparticipants are generally familiar with Evergy energy efficiency or conservation programs. Familiarity with offerings for heating and cooling and for insulation and air sealing lags behind that for smart thermostats and LED lighting. This may simply reflect the greater number of customers that may be considering purchase

of those items. The levels of awareness of the heating/cooling and insulation/air sealing offerings are on a par with, or even somewhat higher, than the levels often found in program nonparticipant surveys.

Based on the above, ADM offers the following recommendations:

- Oracle should consider ways to make the information on home comparisons as well as how to provide for more accurate feedback on the home's energy usage, more obvious to HER recipients and Energy Analyzer users. Incorrect beliefs about how the comparisons are made or of the option for providing for a more accurate comparison may create frustration, leading some customers to make minimal use of the reports.
- Oracle 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.

Appendix G Online Home Energy Audit Program-Specific Methodologies

ADM conducted a process evaluation of the Online Home Energy Audit (OHEA).

G.1 Program Overview

The Online Home Energy Audit (OHEA) program was designed with three primary objectives: increasing awareness of residential customers' energy consumption in the home, expanding knowledge about energy efficiency, and developing customers' familiarity with the variety of demand side management (DSM) programs available to help them achieve their energy efficiency goals. This program provides Evergy customers with a range of online tools through its My Account portal. This set of tools includes an online Home Energy Analysis (HEA), or home audit, as well as other educational material designed to educate Evergy customers about energy consumption in their home, promote the advantages of adopting energy efficient technologies and behaviors, and provide a path towards implementing energy efficient practices through Evergy's programs.

G.2 Process Evaluation

G.2.1 Program Staff Interviews

ADM conducted an interview with the OHEA Senior Product Manager an EM&V manager at Evergy and Oracle's Energy Analyzer Service Delivery Manager in January 2021. The interview covered the interviewees' roles and responsibilities, program communication, customer awareness, program design, and metrics.

In brief, the interviewees reported that communication between Evergy and Oracle was effective, that 2020 logins had increased by 9% over 2019 logins, and the greatest challenge for the program is customer awareness and education.

G.2.2 OHEA Branded as Energy Analyzer

Evergy's Senior Product Manager noted that OHEA is the official name for the collection of related features that Evergy brands as the Evergy Energy Analyzer. Throughout the remainder of this section, we use the term Energy Analyzer instead of OHEA to avoid confusion with the specific HEA tool.

G.2.3 Roles and Responsibilities

Evergy's Senior Product Manager oversees the implementation and management of OHEA. She noted that OHEA is the official name of a collection of related features that is branded as the Evergy Energy Analyzer.

The Senior Product Manager noted that she has some direct support (an intern) and also lateral support for its implementation. Lateral support comes from several other departments including Evergy's IT, marketing, production, and contact customer support teams. The marketing department helps them design and implement a marketing plan for the program. IT assists with scoping and implementing new widgets. The customer contact center is the "frontline" for the customers for email and phone for widget support.

Oracle's Service Delivery Manager noted that she helped oversee Evergy's account and that she was responsible for the Home Energy Audits, which is part of the Home Energy Analyzer. The Oracle contact also noted that there is a "NextWeb" delivery team that supports updating the Energy Analyzer. The contact explained that configuration analysts on the "NextWeb" delivery team assist with branding updates and adding questions to the audit tool.

G.2.4 Program Communication

The contacts said they were satisfied with their working relationship and effective communication methods and practices. Contacts said that there are bi-weekly meetings to discuss the Energy Analyzer. The contact also noted that issues are addressed as they arise, over email or through ad hoc phone calls. She said that there are monthly marketing meetings to coordinate any updates or changes to the Analyzer. The contact stated that they try to do contact center updates as frequently as possible and provide updated trainings to customer service representatives, as needed. Evergy's contact noted that they have quarterly in-person "report outs" that act as a summary and update on the program's status and metrics. These meetings have shifted from in-person to virtual because of the COVID-19 pandemic.

G.2.5 Awareness

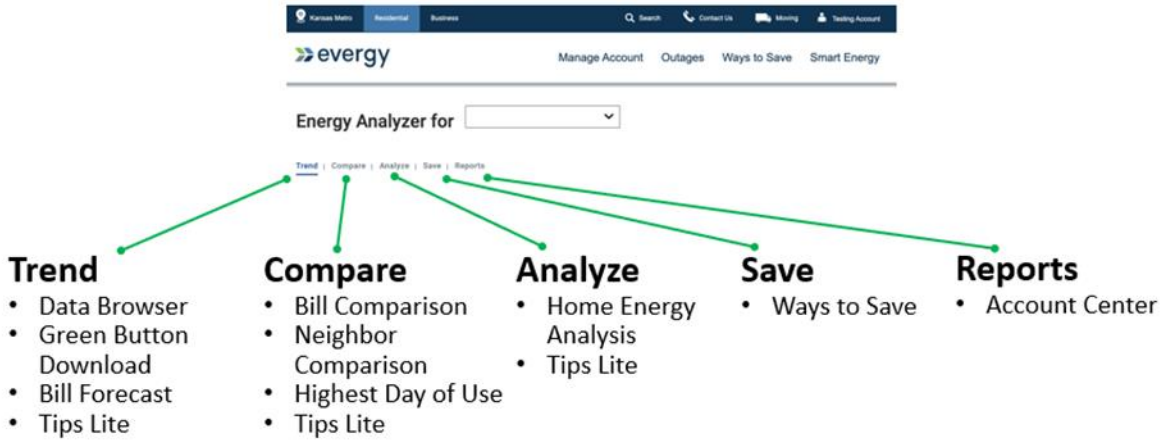
Contacts noted that the biggest challenge for the program was customer awareness and education. Evergy's Senior Product Manager said that the program is primarily marketed through electronic communication and noted that they avoided "one off" emails to their customers to promote the tool, and instead cross-promoted the tool through high bill/usage and new customer email outreach. She also mentioned that they have website banners and images to promote the tool on the Evergy website. The contact noted that they had done physical bill inserts in the past but had preferred to use digital methods for

promotion of the tool. The Oracle contact noted that they had run promotions on the HERs as well.

G.2.6 Program Design

ADM asked the contacts to clarify the Energy Analyzer tool's setup and terminology. Evergy's Senior Product Manager explained that the Energy Analyzer has several tabs (Trends, Compare, Analyze, Save, and Reports) on a page in the program's authenticated portal. The tabs organize the tool's widgets (see Figure G-1).

Figure G-1: Widget Organization



A barrier to participation in the past was suboptimal user experience, which caused customers to drop off after they started using the tool. The Evergy Senior Product Manager noted that the program made several changes to the tool in 2019 and 2020. In 2019 the tool was redesigned to have widgets integrated under tabs on a single page. The Evergy contact noted that this improved the user experience and helped increase engagement. The Evergy Senior Product Manager stated that the reorganization of the widgets and pages has helped reduce the difficulty of use and effectively encouraged customers to return and engage with the tool. The Evergy Senior Product Manager reported no significant future plans for updating the tool or its widgets at the time of the interview.

In 2020, Evergy released the Green Button Download widget in Missouri. This update enabled customers to be able to investigate their cost and interval data. Evergy's Senior Product Manager said that there was a significant effort to design, test, and release this in 2020 to "get customers closer to their energy usage." Though the contacts noted that they have made a conscious effort to educate customers on this feature, usage is limited. The Oracle contact stated that in 2020 there had been 40 downloads and in 2021 there had been 20 customer downloads.

The contacts noted that the program does not have any plans for residential widget updates in the future.

G.2.7 Program Metrics

The Evergy contact noted that their email team measures open and click through rates and is constantly assessing the effectiveness of their marketing practices. They are able to track customer engagement with physical outreach materials examining clicks to URLs included on the material. She observed that digital-to-digital promotion – that is, promoting the Energy Analyzer with emails or search ads – is the most effective manner of program promotion.

The contacts noted that they keep track of several other metrics, such as the number of home energy audit completions as well as widget views. The Oracle contact provided a summary of the reporting statistics that confirmed tracking of HEA completions as well as customer views of 11 Energy Analyzer widgets.

The contacts reported they track the number of unique logins and use that number and the number of Evergy customers to estimate the proportion that had accessed the tool. Evergy's Senior Product Manager stated that in Missouri in 2020, the approximately 40,000 unique logins represented about 10% of Evergy's 400,000 active customers, though she noted that only about half of customers are "digital customers" or have a MyAccount, indicating that about 20% of those with accounts logged in.

The contacts reported that unique logins appear to have increased from 2019 to 2020. This was not possible to confirm with certainty, as an upgrade to the tool had prevented tracking logins prior to May in 2019. However, by extrapolating the number of May-December logins backward, they could compare to the total for 2020, showing an increase. Data provided by the Oracle contact confirms this: assuming a uniform rate of logins over the year, 27,233 logins achieved from May to December extrapolates to 40,586 for the year. The total of 44,208 achieved in 2020 exceeds the 2019 estimate by 9%.

ADM asked the contacts regarding demographic information of the Energy Analyzer users. Though the contacts noted that the program did not track demographic metrics and its goal was to serve all customers. An Evergy contact noted that societal factors such as access to the internet and skill with technology may impact who utilizes the tool. She suggested that it if they investigated demographic user information, their findings would likely be similar to other programs, such as their TOU (time of use) project. She observed that younger, more "digital types" of customers as well as single family and renter customers participate at a higher rate compared to elderly and low-income customers.

Evergy's Senior Product Manager hypothesized that the COVID-19 pandemic and customers' staying home more had likely driven higher login and usage numbers in 2020. She noted that some tips had to be updated because of CDC guidance. For example, they changed a tip that had suggested using cold water to wash clothes as it went against CDC health and safety guidelines.

G.3 Materials Review

ADM reviewed the online Energy Analyzer in real time and reviewed a slide deck that Oracle had prepared for training Evergy customer service representatives. The tool is comprehensive and generally appears straightforward and user-friendly. ADM did note two items:

- Some of the language in the FAQ section could be simplified. For example, it includes the sentence, "Research has shown that customers who want to become more efficient often are held back by misconceptions as to how energy use is used throughout their homes." On on-line readability analyzer gave this sentence a Flesch-Kincaid Grade Level of 12.42.
- In the Neighbor Comparison widget, information on how the customer's home is compared to "neighbors" is accessed by clicking a link labeled "Who are my neighbors?" at the bottom of the "Neighbor Comparison" window. This link may not be noticeable to some users. As discussed above regarding HER recipients' use of the Energy Analyzer (F.5.3), some respondents questioned the basis of the comparison in a way that suggests they may not have seen this information. Although fewer than 10% reported that concern, that may underestimate the actual percentage who agree with the comparison, as the question did not explicitly ask about the comparison.

G.3.1 Participant Survey

ADM collaborated with Oracle in fielding the participant survey. Each year, Oracle fields a Customer Engagement Tracker (CET) survey to assess customer engagement with Evergy's Home Energy Analyzer ("Energy Analyzer") and home energy reports. This year, ADM contributed questions to the survey to address research questions specific to this process evaluation.

Oracle implemented the survey with samples of about 6,050 HER recipients and 4,450 control group customers from the Missouri service territory. As noted in Section H.2.3, these total samples consisted of two components: 1) stratified random samples of 5,000 HER recipients and 4,000 HER control customers; and 2) an oversample of customers from the HER recipient/control population who had completed the Home Energy Audit

(HEA) within the past two years, and which we estimated to have included 1,050 HER recipients and 450 controls.

A total of 182 customers (160 HER recipients and 22 controls) reported using the Energy Analyzer tool. As noted in Sections H.2.3.6 and H.2.4.5, 37% of HER recipients and 29% of HER controls used the Energy Analyzer. Based on these percentages, we estimate that 2,238 HER recipients and 1,290 control customers, or a total of 3,528 of the surveyed HER customers, used the Energy Analyzer. Thus, we estimate that 5.2% of the Energy Analyzer users invited to take this survey provided responses.

Note that the HER population – both recipients and controls – are selected nonrandomly from the general Evergy population. Therefore, there is a chance that responses from these survey respondents are not representative of all Energy Analyzer users. The CET survey also included a sample of 5,000 customers randomly selected from all customers in Evergy's Kansas service territory who had logged onto their Evergy web accounts since the beginning of 2020. Of those, 142 responded to the survey and reported having used the Energy Analyzer tool. This sample is closer to being a representative sample of Evergy customers. Therefore, in the following sections, we note where any results differ between the Missouri HER respondents and the Kansas population and we discuss the implications for generalizing the Missouri HER results to the larger population of Energy Analyzer users.

As detailed below, the survey revealed the following:

- Customers reported high overall satisfaction with Evergy, agreeing that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills.
- More than four out of five respondents were somewhat to very familiar with Evergy energy efficiency or conservation programs, particularly those for smart thermostats and LED lighting.
- Respondents generally tended to rate their efforts to save energy favorably. However, the patterns of response to survey items assessing concern about energy use, knowledge of steps to take, and intention to take the steps indicates that about half of Energy Analyzer users may need additional motivation or informational assistance to take effective steps to reduce energy use, and about one-third of that group may be particularly resistant to such efforts.
- Respondents most commonly reported having engaged with the Energy Analyzer "a few times." They most commonly found it on the website themselves or learned about it from a bill insert.
- Respondents reported a variety of uses of the Energy Analyzer, but least commonly to learn how to save energy. They most commonly reported use of the Compare

component and least commonly, the Analyze component. About three-quarters of those expressing a view said the information on their home's energy use was accurate. Those who disagreed most commonly said the reported use was too high or questioned the basis of the comparison with other households.

- Respondents generally reported that the Coronavirus pandemic had not affected their likelihood of taking advantage of Evergy's energy efficient programs and services.

G.3.2 Respondent Characteristics

The Missouri HER recipient and control respondents tended to report greater ages than the Kansas general population respondents. Among respondents who reported their age, 57% of the combined Missouri HER recipients and controls and 45% of the Kansas general population customers said they were at least 55 years old (Table G-1). Both groups tend to skew older than the Census-identified range of householder ages in the Missouri and Kansas service territories, but the Kansas general population customers were much closer to both ranges than were the Missouri HER recipient and control customers.

Table G-1: Age

Q27: Which of the following categories best describes your age?	Percent of Responders (MO)[1]	Percent of Responders (KS)[1]	Census (MO)	Census (KS)
18 to 34	6%	11%	22%	22%
35 to 44	18%	25%	17%	17%
45 to 54	20%	19%	18%	17%
55 to 64	21%	16%	19%	19%
65 to 74	28%	24%	14%	14%
75 or over	6%	5%	11%	10%
Total	**100%**	**100%**	**100%**	**100%**

[1]5% of MO respondents and 8% of KS respondents did not report their age.

The Missouri HER respondents reported lower education levels than did the Kansas general population respondents (Table G-2). Of those reporting their education levels, 57% of Missouri respondents reported at least a four-year college degree, compared to 73% of Kansas respondents. Both groups skewed considerably more educated than the general population of householders in Evergy's Missouri and Kansas service territories.

Table G-2: Education Level

Q29: Which of the following categories best describes your highest level of education?	Percent of Responders (MO)[1]	Percent of Responders (KS)[1]	Census (MO)	Census (KS)
Some high school or less	<1%	0%	8%	7%
High school graduate or GED	7%	4%	29%	23%
Trade/technical school, two-year degree	35%	25%	33%	33%
Four-year college degree or higher	58%	73%	31%	37%
Total	**100%**	**100%**	**100%**	**100%**

[1]7% of MO respondents and 8% of KS respondents did not report their education level.

The percentage of homeownership was comparable for Missouri (84%) and Kansas (80%) respondents. Homeownership in both groups of respondents was considerably higher than in the Evergy customer populations for Missouri (64%) and Kansas (65%).

We cannot determine whether the above differences reflect a bias for older or more educated householders to log onto the Evergy website, to respond to the survey, both, or something else. Without that knowledge, we cannot determine whether it would be appropriate to weight the results to reflect the general population of Energy Analyzer users. In the following subsections, we indicate when responses to survey questions are related to these demographic variables and discuss what implications that has for generalizing the survey results to the overall population of customers that have used the Energy Analyzer.

G.3.3 Attitudes About Evergy

Customers reported high overall satisfaction with Evergy. On a scale from 0 (extremely dissatisfied) to 10 (completely satisfied), 80% of respondents rated their satisfaction a 7 or higher; 53% gave a rating of 9 or 10.

Respondents generally agreed that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills (Table G-3). They also agreed, but less strongly, that Evergy provides a variety of energy efficiency programs and services and that Evergy messaging is attention-getting. Respondents were least likely – although more likely than not – to report that Evergy helps them manage their monthly energy usage or that Evergy wants to help them save energy.

Table G-3: Attitudes About Evergy

Q4A: Thinking about Evergy, how much do you agree or disagree with each of the following	Disagree	Neither Agree nor Disagree	Agree
Evergy provides customers with useful tools to learn about energy usage	10%	9%	81%
Evergy provides useful suggestions on ways I can reduce my energy usage and lower my monthly bills	13%	13%	75%
Evergy provides a variety of energy efficiency programs and services	14%	19%	67%
Evergy creates messages that get my attention	14%	25%	61%
Evergy helps me manage my monthly energy usage	15%	21%	63%
Evergy wants to help me save money	19%	24%	58%

[1]Ageement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

The Missouri HER customers (the participants in this survey) indicated greater agreement than did the Kansas customers – by a factor of about one-sixth to two-thirds – to all of the above items except "Every provides customers with useful tools…." As noted above, the Kansas sample may more closely resemble the general population of Energy Analyzer users, and so it is possible that the above results over-state the favorable attitudes of Energy Analyzer users in general. An alternative possibility is that this reflects a more general difference between the customers in the two service territories.

G.3.4 Awareness of Evergy Energy Efficiency Offerings

More than four out of five respondents said that they were either somewhat (60%) or very (22%) familiar with Evergy energy efficiency or conservation programs. When asked which Evergy energy efficiency initiatives they were familiar with, more than four out of five reported familiarity with an initiative for smart thermostats and above two-thirds said they were familiar with initiatives for LED lighting (Table G-4). Fewer reported familiarity with offerings for heating and cooling or for insulation and air sealing.

Table G-4: Awareness of Evergy Energy Efficiency Offerings

Energy Efficiency Measure	Percent Aware of Offering
Smart Thermostat	84%
LED Lighting	71%
Heating and Cooling	52%
Insulation and Air Sealing	46%

The Missouri HER customers indicated greater overall familiarity with Evergy offerings as well as greater familiarity with rebates for smart thermostats and LED lighting than did the Kansas customers. These differences ranged from a factor of about one-sixth to two-fifths. Again, this may suggest that the above results over-state the familiarity of Energy Analyzer users with Evergy offerings or may reflect a difference between the two service territories.

G.3.5 Energy Conservation Knowledge and Actions

Respondents reported on their knowledge of, concerns about, and actions taken regarding energy conservation. They generally tended to rate their efforts to save energy favorably, with 63% giving themselves the highest or second-highest rating (Table G-5).

Table G-5: Self-Reported Efforts to Save Energy

Q24: How would you rate your household's efforts to save energy in your home in the last year?	Percent
1: I have not done anything	3%
2	2%
3	23%
4	38%
5: I have done almost everything I can	30%
Don’t know	2%
Prefer not to answer	3%
Total	**100%**

Three-quarters of respondents said they were concerned about their household’s energy costs and nearly that many said they knew of steps they could take to reduce their energy use (Table G-6). Just over half said they intended to take steps to reduce their energy use in the next six months.

Table G-6: Attitudes About Energy Reduction

Q25: Please rate how much you agree or disagree with the following statements.	Disagree	Neither Agree nor Disagree	Agree
I am concerned about my household's energy costs	9%	10%	75%
I know of steps I could take to reduce my household energy use	13%	9%	72%
I intend to take steps to reduce my household's energy use in the next six months	14%	23%	57%
I don't think there is anything else I could do to reduce my household's energy use	40%	13%	41%

[1]Ageement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

From the fact that 75% of respondents agreed they are concerned about their energy costs but 72% agreed they know of steps mean that 3% are concerned but do not know of steps to take? No. In fact, one-fifth agreed with the "concerned" statement" but did not agree with "know of steps." This points to a rather large potential for increased education about energy saving steps, even among customers who have accessed the Energy Analyzer.

Through further exploration of the patterns of agreement and disagreement, we identified five meaningful groupings of respondents that represent different implications for the program:

- The first group consists of respondents who know of steps they can take to reduce their energy use and intend to take them. It does not differential between customers who did and did not report being concerned about energy use, since the relevant characteristics were the intent to take steps and knowing what steps to take. Presumably, these customers group do not need much additional effort on Evergy's part to move toward greater energy savings. All Evergy needs to do is continue to make information about energy savings available.
- The second group differs from the first only in that they do not know of steps to take. These are customers that are motivated but not prepared.
- The third group consists of those who are concerned about energy use but do not know what steps to take or have intentions to take any steps. For these respondents, there may be a barrier beyond lack of knowledge.

- The fourth group are customers who are concerned about their use and knows steps they may take but do not intend to take those steps. For these customers, motivation may be the most significant barrier.
- Finally, the fifth group consists of customers who are not concerned about their energy use and have no intent to take steps to reduce it. These may be the most difficult customers to reach.

Table G-7 summarizes these groups and the percentage each comprises of the respondents. The first group is the largest, comprising half of the respondents. This is not surprising: as customers that have used the Energy Analyzer, the respondents have demonstrated an interest in reducing their energy use and should know some steps to take. Customers that have not used the Energy Analyzer may well show a distribution across the five groups.

Table G-7: Patterns of Attitudes About Energy Reduction

Group	Percent of Total
Knowledgeable intent: Knows steps to take and intends to take them	50%
Unknowledgeable intent: Intends to take steps but does not know them	9%
Unknowledgeable concern: Concerned but does not know or intend to take steps	9%
Concern, no intent: Concerned and knows steps but does not intend to take them	17%
No concern or intent: Not concerned and does not intend to take steps	16%

Given that all groups are customers that have used the Energy Analyzer, it is interesting that half still say they do not know what steps to take to save energy or do not intend to take any steps. We examined whether the various groups differed in how they answered other survey questions to try to identify likely barriers to developing knowledge of energy reducing steps or forming an intent to take those steps.

We did not see many clear-cut relationships between the above groups and respondents' attitudes toward Evergy's energy efficiency offerings or messaging (Table G-8). The only obvious finding is that the two "unknowledgeable" groups are the most likely to say there is not anything else they can do to save energy and they had the least familiarity with Evergy's energy efficiency offerings. Interestingly, these two groups were the most-educated of all of respondents, suggesting their lack of knowledge did not point to challenges with information collection.

Other than the above, the "knowledgeable intent" group provided the most agreement of any group that Evergy provides useful suggestions and tools and that Evergy offers a variety of energy efficiency programs and services. This does not identify any specific

barriers affecting the other groups, but it does show a positive relationship between being favorably disposed toward Evergy's energy efficiency efforts and having positive attitudes toward saving energy.

Table G-8: Relationship Between Energy Reduction Attitudes and Other Survey Responses

Group	Cannot Do Anything Else	Evergy Provides Useful Suggestions	Evergy Messaging is Attention-Getting	Evergy Provides a Variety of EE Offerings	Energy Provides Useful Tools	At Least Somewhat Familiar with Evergy EE Offerings	Have At Least College Degree
Knowledgeable intent	37%	87%	58%	71%	84%	74%	56%
Unknowledgeable intent	53%	70%	90%	60%	60%	40%	80%
Unknowledgeable concern	87%	38%	38%	50%	25%	38%	60%
Concern, no intent	34%	71%	43%	57%	57%	79%	55%
No concern or intent	43%	50%	70%	50%	60%	50%	43%

G.3.6 Engagement with the Energy Analyzer

The 182 respondents who reported they had used the Energy Analyzer most commonly reported that they learned about the tool on their own by exploring the Evergy website (Table G-9). The only other frequently identified source was an Evergy bill insert. No respondent reported having learned about it from a contractor installing energy-using equipment, from social media, or from traditional media advertising.

Table G-9: Sources of Energy Analyzer Awareness

Q17: How did you learn about the Energy Analyzer tool?	Percent
Found on website	62%
An Evergy bill insert	31%
A friend, acquaintance, or relative	2%
Other	1%
Don't know	3%
Prefer not to answer	1%
Total	**100%**

About half of respondents reported they had used the tool “a few times” (Table G-10). Most of the rest were fairly closely split between those who had used it once and those who had used it at least once a month.

Table G-10: Frequency of Energy Analyzer Use

Q19: How often have you used the Energy Analyzer tool?	Percent
Once	26%
A few times	48%
About once a month	17%
About once a week or more often	5%
Don’t know	3%
Prefer not to answer	1%
Total	**100%**

Respondents most commonly used the tool to visualize their home’s energy usage or see how their home’s usage compared to that of other homes (Table G-11). They also frequently used it to learn how to save energy.

Table G-11: Reasons for Using Energy Analyzer

Q18: Why did you decide to use the Energy Analyzer tool?	Percent
To see how my home’s energy usage compared to others’ homes	50%
To visualize my home’s energy usage	49%
To learn how to save energy	38%
Other	5%
Don’t know	3%

Consistent with the above, respondents commonly reported using the Compare function of the tool, which compares their usage to that of similar homes (Table G-12). Respondents also frequently reported use of the Trend and Save functions.

Table G-12: Use of Energy Analyzer Components

Q20: Which of the following parts of the Energy Analyzer tool have you engaged with?	Percent
Compare: compares your usage to that of similar homes	67%
Trend: shows how usage and costs relate to the weather over time	57%
Save: shows energy saving tips for your home	57%
Analyze: an on-line interactive tool that disaggregates usage based on survey responses	32%

Three-quarters of the respondents reported either that the Energy Analyzer's information on their home's energy usage was accurate or they did not know whether it was accurate (Table G-13). Of the remaining respondents, most said the reported usage was too high or identified something else that was not correct.

Table G-13: Perceptions of Energy Analyzer Accuracy

Q22: Do you think the information about your home's energy usage in Energy Analyzer is accurate?	Percent	Percent of Responders
Yes	54%	73%
No – the usage that was reported was too high	12%	16%
No – the usage that was reported was too low	0%	0%
No – there was something else that was not correct (Specify):	8%	11%
Don't know	23%	n/a
Prefer not to answer	3%	n/a
Total	**100%**	**100%**

Of the 18 respondents who identified something that was incorrect about the information in the Energy Analyzer other than the reported level of energy usage, 13 questioned the comparison made with other homes. Of those six were unspecific about the basis of the question; two each said their house was larger than that of their neighbors or that their house was either all-electric or used electric heat, while neighbor homes used natural gas; one indicated they ran a business out of their home and one cited other, unspecified load differences ("extra building usage"); and one lives in an apartment building and thought the comparison might have included empty units. One respondent pointed out that Evergy had been unable to read the smart meter signals for two months, which caused an artificial increase in the readings once it was fixed. Finally, four respondents gave unclear responses (e.g., "non encompassing," "hourly").

Nearly three-quarters of respondents reported that the coronavirus pandemic had not affected their likelihood of engaging with Evergy's energy efficiency offerings (Table G-14). To the extent that respondents indicated an effect, it was in the direction of their being more likely to engage with Evergy's offerings.

Table G-14: COVID Effects

Q7: How has the COVID-19 situation impacted your likelihood of taking advantage of Evergy's energy efficiency programs and services?	Percent
Much less likely now	4%
Less likely now	7%
No change	71%
More likely now	15%
Much more likely now	4%
Prefer not to answer	0%
Total	**100%**

G.3.7 Nonparticipant Survey

A total of 78 respondents to the CET survey (77 HER recipients and 1 control) had been identified by Oracle has representing a household that had completed the HEA but did not confirm they used the Energy Analyzer tool. This could mean that someone else in their household or, possibly, a previous resident, had done the HEA; they had done the HEA but had forgotten; or they knew they had done the HEA but did not realize it was considered part of the Energy Analyzer. In any case, for the purpose of the survey, they are considered Energy Analyzer nonparticipants.

Throughout this section, we identify any results representing statistically significant differences from the participant results.

As detailed below, the survey revealed the following:

- Customers reported high overall satisfaction with Evergy, agreeing that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills, although they agreed less strongly about the useful tools than did the participants (Energy Analyzer users).
- Relatively fewer respondents were familiar with Evergy energy efficiency or conservation programs than were participants; while these respondents were about as likely as participants to be aware of the smart thermostat offering, they were less familiar with offerings for LED lighting and for heating and cooling.

- Respondents generally tended to rate their efforts to save energy favorably, although not as highly as did participants. Our analysis of responses regarding concern, knowledge, and intentions regarding energy use indicates that more than half of these Energy Analyzer non-users may need additional motivation or informational assistance to take effective steps to reduce energy use, and about one-quarter of that group may be particularly resistant to such efforts.
- Respondents most commonly said the reason they had not used the Energy Analyzer was because they were not aware of it.
- Respondents generally reported that the Coronavirus pandemic had not affected their likelihood of taking advantage of Evergy's energy efficient programs and services.

G.3.8 Respondent Characteristics

The respondents tend to skew slightly older than the Census-identified range of householder ages (Table G-15).

Table G-15: Age

Q27: Which of the following categories best describes your age?	Percent of Responders[1]	Census
18 to 34	<1%	22%
35 to 44	23%	17%
45 to 54	20%	18%
55 to 64	23%	19%
65 to 74	21%	14%
75 or over	13%	11%
Total	**100%**	**100%**

[1]10% did not report their age.

Respondents also skewed considerably more educated than the general population of householders in Evergy's Missouri service territory (Table G-16).

Table G-16: Education Level

Q29: Which of the following categories best describes your highest level of education?	Percent of Responders[1]	Census
Some high school or less	3%	8%
High school graduate or GED	7%	29%
Trade/technical school, two-year degree	36%	33%
Four-year college degree or higher	54%	31%
Total	**100%**	**100%**

[1]12% of respondents did not report their education level.

The percentage of homeownership (83%) was considerably higher than in the Evergy customer population for Missouri (64%).

We cannot determine whether the above differences reflect a bias for older or more educated householders to respond to the survey or to something else. Without that knowledge, we cannot determine whether it would be appropriate to weight the results to reflect the general population of Energy Analyzer non-users. In the following subsections, we indicate when responses to survey questions are related to these demographic variables and discuss what implications that has for generalizing the survey results to the overall population of customers that have used the Energy Analyzer.

G.3.9 Attitudes Toward Evergy

Customers reported high overall satisfaction with Evergy. On a scale from 0 (extremely dissatisfied) to 10 (completely satisfied), 83% of respondents rated their satisfaction a 7 or higher; 45% gave a rating of 9 or 10.

Respondents generally agreed that Evergy provides useful tools for learning about energy usage and useful suggestions for reducing energy usage and lowering energy bills (Table G-17). They also agreed, but less strongly, that Evergy provides a variety of energy efficiency programs and services and that Evergy messaging is attention-getting. Respondents were least likely – although more likely than not – to report that Evergy helps them manage their monthly energy usage or that Evergy wants to help them save energy.

Table G-17: Attitudes About Evergy

Q4A: Thinking about Evergy, how much do you agree or disagree with each of the following	Disagree	Neither Agree nor Disagree	Agree
Evergy provides customers with useful tools to learn about energy usage	13%	21%	65%
Evergy provides useful suggestions on ways I can reduce my energy usage and lower my monthly bills	10%	17%	73%
Evergy provides a variety of energy efficiency programs and services	10%	29%	60%
Evergy creates messages that get my attention	12%	29%	58%
Evergy helps me manage my monthly energy usage	17%	32%	51%
Evergy wants to help me save money	19%	29%	51%

[1]Ageement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

Nonparticipants showed less agreement than did participants that Evergy provides useful tools to learn about energy efficiency (65% vs. 81%). None of the other items showed statistically significant differences from the participant findings.

G.3.10 Awareness of Evergy Energy Efficiency Offerings

Sixty-one percent of respondents said that they were either somewhat (56%) or very (5%) familiar with Evergy energy efficiency or conservation programs. This percentage was lower than that for participants (84%).

When asked which Evergy energy efficiency initiatives they were familiar with, three-quarters reported familiarity with an initiative for smart thermostats and just over half said they were familiar with initiatives for LED lighting (Table G-18). Fewer reported familiarity with offerings for heating and cooling or for insulation and air sealing. Nonparticipants' familiarity with Evergy offerings for LED lighting and for heating and cooling both were lower than the participants' familiarity (71% and 52%, respectively).

Table G-18: Awareness of Evergy Energy Efficiency Offerings

Energy Efficiency Measure	Percent Aware of Offering
Smart Thermostat	74%
LED Lighting	55%
Heating and Cooling	33%
Insulation and Air Sealing	33%

G.3.11 Energy Conservation Knowledge and Actions

Respondents reported on their knowledge of, concerns about, and actions taken regarding energy conservation. They generally tended to rate their efforts to save energy favorably, with 53% giving themselves the highest or second-highest rating (Table G-19). However, that 53% favorability was lower than that reported by participants (68%).

Table G-19: Self-Reported Efforts to Save Energy

Q24: How would you rate your household's efforts to save energy in your home in the last year?	Percent
1: I have not done anything	1%
2	6%
3	35%
4	35%
5: I have done almost everything I can	18%
Don’t know	1%
Prefer not to answer	4%
Total	**100%**

Three-quarters of respondents said they were concerned about their household’s energy costs and two-thirds said they knew of steps they could take to reduce their energy use (Table G-20). Just over half said they intended to take steps to reduce their energy use in the next six months.

Table G-20: Attitudes About Energy Reduction

Q25: Please rate how much you agree or disagree with the following statements.	Disagree	Neither Agree nor Disagree	Agree
I am concerned about my household's energy costs	6%	12%	76%
I know of steps I could take to reduce my household energy use	8%	22%	63%
I intend to take steps to reduce my household's energy use in the next six months	8%	22%	63%
I don't think there is anything else I could do to reduce my household's energy use	38%	18%	37%

[1]Ageement was rated on a five-point scale with all five points labeled: 1=Strongly disagree, 2=Somewhat disagree, 3=Neither agree nor disagree, 4=Somewhat agree, 5=Strongly agree. We collapsed "strongly" and "somewhat" disagree into "disagree" and "strongly" and "somewhat" agree into "agree."

As with the Energy Analyzer participants, we identified five groupings of respondents the based on the patterns of agreement and disagreement with the above items (Table G-21). Somewhat fewer nonparticipants were in the "knowledgeable intent" group, compared to the participants. We observed few other differences.

Table G-21: Patterns of Attitudes About Energy Reduction

Group	Percent of Total
Knowledgeable intent: Knows steps to take and intends to take them	42%
Unknowledgeable intent: Intends to take steps but does not know them	14%
Unknowledgeable concern: Concerned but does not know or intend to take steps	11%
Concern, no intent: Concerned and knows steps but does not intend to take them	19%
No concern or intent: Not concerned and does not intend to take steps	14%

G.3.12 Engagement with the Energy Analyzer

For the 78 respondents who reported not using the Energy Analyzer, the most common reason given was lack of awareness of the tool, with half of respondents giving this reason (Table G-22). About one-seventh of respondents gave a reason that suggested lack of motivation to use or need for the tool (not interested, do not have the time, was getting all needed information elsewhere).

Table G-22: Reasons for Not Using Energy Analyzer

Q23: What is the primary reason that you have not used the Energy Analyzer tool?	Percent
Was not aware of the Energy Analyzer	50%
Was getting all the information I needed about saving energy from other sources	6%
Do not have the time	5%
Not interested	4%
Other	5%
Don't know	12%
Prefer not to answer	18%
Total	**100%**

G.3.13 COVID Effects

Three-quarters of respondents reported that the coronavirus pandemic had not affected their likelihood of engaging with Evergy's energy efficiency offerings (Table G-23). To the extent that respondents indicated an effect, it was in the direction of their being more likely to engage with Evergy's offerings.

Table G-23: Effects of Coronavirus Pandemic on Participants' Use of Evergy Offerings

Q7: How has the COVID-19 situation impacted your likelihood of taking advantage of Evergy's energy efficiency programs and services?	Percent
Much less likely now	0%
Less likely now	5%
No change	81%
More likely now	13%
Much more likely now	1%
Prefer not to answer	0%
Total	**100%**

G.4 OHEA Process Evaluation Conclusions and Recommendations

The findings from the program and implementer staff interviews, the review of program materials, and the participant and nonparticipant surveys suggest the following conclusions:

- Participants (Energy Analyzer self-reported users) and nonparticipants (non-users) are generally satisfied with Evergy and the tools it provides for learning about and reducing energy usage. Participants and nonparticipants believe they are doing well in saving energy, but about half of participants and more than half of nonparticipants may need additional motivation or informational assistance to take effective steps to reduce energy use, although a substantial minority may be particularly resistant to such efforts.
- Participants most commonly have engaged with the Energy Analyzer "a few times," after finding it on the website themselves or learning about it from a bill insert. They use it for a variety of purposes, most commonly to visualize their energy use and compare it to that of other homes, and least commonly to learn how to save energy. Most believe the information on their home's energy use is accurate, but a substantial minority question the reported use or the basis of the comparison with other households. One reason for dissatisfaction is the belief that the comparison with other homes does not account for differences in the home's use that are not captured by Oracle's algorithm.
- Our review of the Energy Analyzer indicates that some of the language in the FAQ section may be overly complex for some users and could be simplified. In addition, the way to access information on how the customer's home is compared to "neighbors" may not be noticeable to some users, which may exacerbate questions about the basis for the comparison.
- Participants and nonparticipants are generally familiar with Evergy energy efficiency or conservation programs. Familiarity with offerings for heating and cooling and for insulation and air sealing lags behind that for smart thermostats and LED lighting. This may simply reflect the greater number of customers that may be considering purchase of those items. The levels of awareness of the heating/cooling and insulation/air sealing offerings are on a par with, or even somewhat higher, than the levels often found in program nonparticipant surveys.

Based on the above, ADM offers the following recommendations:

- Evergy and Oracle should consider developing ways to tailor messaging to the different groups of customers that represent different levels of readiness to take steps to reduce energy use. In particular, tailoring messaging to the "unknowledgeable intent," "unknowledgeable concern," and "concern, no intent"

groups may provide the needed nudge or knowledge to turn them into effective energy savers.

- Oracle should also consider reviewing the Energy Analyzer to ensure its readability level reaches all customers.
- Oracle may also consider discontinuing the practice of telling 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.

Appendix H Business Demand Response

This chapter describes the evaluation activities that were performed by ADM to evaluate the Business Demand Response Program.

H.1 Program Overview

The Business Demand Response (BDR) 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 H-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 H-2: Multi-Year Incentive Calculation

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

Expected Energy Savings and Demand Reduction

Energy and demand impact goals for the Business Demand Response Program years 2020-2022 are shown in the tables below. These goals were provided in the KCP&L filing EO-2019-0132.

Table H-1: Program Goal Savings by Year, Missouri Metro

Program Year	Energy Savings Goal (kWh)	Peak Demand Reductions Goal (kW)
2020	0	15,000
2021	0	15,000
2022	0	15,000
Total	0	45,000

Table H-2: Program Goal Savings by Year, Missouri West

Program Year	Energy Savings Goal (kWh)	Peak Demand Reductions Goal (kW)
2020	0	49,488
2021	0	52,092
2022	0	54,834
Total	0	156,414

Table H-3 below provides a summary of program metrics for the PY1.

Table H-3: Program Goal Savings by Year

Metric	PY1 Total	West	Metro
Number of Participants*	119	106	14
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 Reduction	64,487.69	49,487.69	15,000.00
Reported Peak Demand Reduction	60,350.00	40,680.00	19,670.00
Gross Verified Peak Demand Reduction	59,566.26	39,383.72	20,182.54
Net Verified Peak Demand Reduction	59,566.26	39,383.72	20,182.54
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	1.83	1.82	1.86

H.2 EM&V Methodologies

In evaluating the PY1 Business Demand Response Program, ADM implemented a variety of impact evaluation practices that include estimates of gross and net peak demand reductions (kW) as framed by the following research questions:

- How many Evergy customers participated in the program?
- What are the demand savings achieved by participants, according to the ex-ante DERMS customer baselines (CBLs)?
- Can the DERMS CBL estimates and incentive payments be independently reproduced?
- Which baseline estimation technique produces the least error and bias in estimating loads during non-event days?
- What is the average load (kW) reduction during event hours compared to the baseline?
- Demand Response Events in 2020

H.3 Sampling Plan

ADM evaluated a census of participants.

H.4 Data collection

Data used for this evaluation include:

- Program tracking data This data identifies which customers participated in the program and contains data fields such as contract curtailment amount, hourly usage, hourly baseline estimate used to calculate the incentive, CBL method used to make baseline estimate, and other relevant data fields
- 15-minute interval meter data (AMI) for each customer participating in the BDR program
- A full schedule of BDR Program events, including the time of the event
- 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. In addition, ADM was able to replicate the following data:
  - Hourly usage in tracking data
  - Hourly baseline estimates
  - Incentive payment calculation
- Weather Data: ADM collected recorded weather data from the National Oceanographic and Atmospheric Administration (NOAA) to estimate the impact of weather on usage and for use in weather adjustments for a portion of CBLs tested on each site. Data was collected from the Kansas City International Airport.

H.5 Gross Impact Methodology

This section describes the impact evaluation activities and methodology that ADM performed for Evergy's PY1 Business Demand Response Program. The impact evaluation was performed for Evergy Metro and Evergy Missouri West. Based on Missouri regulations, ADM used method 1a and protocol 2a to evaluate the BDR program. Evergy does not claim energy savings for DRI; thus, the evaluation team did not calculate energy savings. ADM assumes energy loads to be mostly shifted to times outside of the event period. The methodology in the following sections describes ADMs approach for the calculation of Demand Reduction.

H.5.1 Program Activity

As shown in Table H-4, there were two BDR events called in 2020 and both fell in the month of August. The curtailment events began at 1400 CDT and ended at 1800 CDT.

Table H-4: DR Events in 2020

August						
S	M	T	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Participants

Table provides a count of service point IDs for Evergy utilities. Many participants had several service point IDs enrolled in the program.

Table H-5: Device Types by Service Area

Service Area	Number of Service Point IDs	Number of Participants
Missouri West	319	106
Missouri Metro	75	14
Total	394	119[8]

H.5.2 Gross Energy Savings and Demand Reduction

Estimating Evaluation Impacts - Customer Baseline (CBL)

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

[8] One participant had service point IDs in Missouri West and Missouri Metro

load—that is, the load that would have manifested had there not been an event called that day.

In general, determining this baseline is a non-trivial task, especially in the context of commercial and industrial customers whose energy usage could theoretically be a function of the weather, the number of orders received, shift schedules, economic trends, and any number of variables that cannot always be explicitly modeled. Due to the intractability of modeling energy usage at this level of detail, baselines are typically estimated using heuristic rules applied to historical usage data. For example, if an event were called for Tuesday afternoon, a very simple heuristic would be to use Monday afternoon's load profile as the Tuesday event's baseline.

While the above baseline rule seems overly simplistic, it could perform adequately for a certain kind of business, such as one whose energy needs do not change from day to day. However, for most businesses, these assumptions do not hold, and this simple baseline rule would not be adequate. Both Evergy and ADM employed more sophisticated techniques to estimate counterfactual baseline usage.

The following terms are used for describing Evergy and ADM estimates and are referenced in the tables in the sections below.

- **Lookback Window** – Days prior to the event day that are eligible for inclusion in the CBL. The quantity of days and type of day included are determined by "Day Type" and "Days in Lookback Window" which are described below.
- **Day Type** – One of the eligibility requirements for a day to be included in the "Lookback Window" for the CBL.
- **"Any Weekday"** CBLs use any non-holiday, non-event weekdays.
- Similar Day of Week" CBLs use any non-holiday, non-event days that are a "similar day" to the event. For Evergy and ADM CBLs, Monday and Friday are defined as similar. Tuesday, Wednesday, Thursday are also defined as similar days.
- **"Same Day of Week"** CBLs use any non-holiday, non-event days that are the same day of the week as the event.
- **Days in Lookback Window** – Number of days in the lookback window. These days will be ranked by usage during the hours determined by "Hours Used to Determine Baseline Day Selection."
- **Hours Used to Determine Baseline Day Selection** – The hours that are selected for averaging usage and ranking days in the lookback window.
- **Days Selected from Lookback window** – Number of days selected from the lookback window. The highest ranked are selected.

- **Unadjusted Baseline** – Once the days are selected from the lookback window, they are averaged across hours. This creates the "unadjusted baseline."
- **Load Adjustment** – The "unadjusted baseline" can be adjusted to account for weather or usage prior to the event.
- **Weather based** - a weather adjustment is made by comparing historic customer usage and weather data. For example, ADM used a linear correction term with facility demand as the dependent variable and the dry bulb temperature as the independent variable.
- **Usage based – Multiplicative** – If the load prior to event notification on the event day is different than the unadjusted baseline, the unadjusted baseline is multiplied by event day usage / unadjusted baseline usage.
- **Usage based – Additive** - If the load prior to event notification on the event day is different than the unadjusted baseline, the sum of the difference between the event day usage and the unadjusted baseline is added to the unadjusted baseline.
- **Load Adjustment Min** – This is the lower bound for the Load Adjustment. A downward adjustment is capped at the "Load Adjustment Min" multiplied by the unadjusted baseline.
- **Load Adjustment Max** – This is the upper bound for the Load Adjustment. An upward adjustment is capped at the "Load Adjustment Max" multiplied by the unadjusted baseline.
- **Proxy Event Day** – The highest system usage non-holiday weekdays where no event was called. CBLs are tested against these days as they serve as a good proxy for actual event days.

In the next sections, Evergy's CBLs are described.

Customer Baseline Selection

Evergy has selected one of the CBL scenarios in Table H-6 to apply to each of the participants in the BDR Program. The CBL results whereas used for calculating "Percentage of Enrolled kW Achieved" for the incentive calculation and for Expected kW.

Table H-6: Baselines

Days in Lookback Window	Days Selected from Lookback Window	Day Type	Hours Used to Determine Baseline Day Selection	Load Adjustment	Load Adjustment Min	Load Adjustment Max
4	3	Any weekday	2-6pm	None	NA	NA
9	2	Any weekday	2-6pm	Usage based - Multiplicative	0.8	1.2
3	3	Similar day of week	2-6pm	Usage based - Multiplicative	NA	NA
10	3	Any weekday	2-6pm	Usage based - Multiplicative	NA	NA
3	2	Same day of week	12-8pm	None	NA	NA
2	2	Any weekday	2-6pm	Usage based - Multiplicative	0.8	1.2
4	3	Same day of week	2-6pm	Usage based - Multiplicative	0.7	1.3
8	2	Similar day of week	12-3pm	Usage based - Multiplicative	0.8	1.2
4	2	Same day of week	2-6pm	Usage based - Multiplicative	0.8	1.2
9	2	Any weekday	2-6pm	Usage based - Multiplicative	0.7	1.3

The selection for appropriate CBL for each participant was made using a four-step process:

Selection of test days: the top three hottest non-event days in 2019 were selected for each customer, ensuring at least one test event from each “similar” day type. The hottest days are identified as the days with the highest temperature during the test event period, 2 PM – 6 PM.

All ten of the CBLs above are calculated for each customer on the test days.

Bias screen: any method which underpredicts load on test days greater than 70% of the time, or less than 30% of the time is eliminated.

Accuracy Rank: rank-order remaining methods by RMSE and choose the most accurate method (lowest RMSE).

Evaluation Customer Baseline Selection

In the case of evaluating demand reduction impacts associated with the BDR Program, CBLs should represent what participant's usage would have been if the event had not occurred. ADM tested multiple baseline models and selected the best fitting models (i.e., models that produced load profiles which best represented participant's usage in absence of the program as determined by a statistical test) for each customer. The list of CBLs can be found in Appendix M.

ADM identified CBL "best fits" for each customer using residual root mean squared error (RRMSE) scores from the event window (12-8pm) during the five weekdays with the highest system peak during the program year. These days serve as a good proxy for event days as they were days when an event was close to being called and will be referred to as "proxy event days." For 2020, 7/17/2020, 7/23/2020, 7/28/2020, 8/14/2020, and 8/26/2020 were used.

It has been ADM's experience that CBL construction methods often produce generally consistent results, but in some cases CBLs may produce divergent results. To minimize calculation bias, ADM employed the same bias screen described in step 3 in Section 1.2.2.2 above. In addition, ADM combined results as a weighted average of the best three models for each customer. The weights were the inverse squares of the model RRMSEs. For example, of three models having RRMSEs of 5%, 11%, and 52% respectively, their relative weights will be 82%, 17%, and 1%, respectively.

Two participants had highly variable (coefficient of variation > 50), process driven usage. ADM chose to use a 9 of 10 "any weekday" CBL with no adjustment for these participants. A weather adjustment was not used because the usage was not weather sensitive. A day of adjustment was not used because of both participants can ramp up and ramp down their usage quickly and unpredictably which can lead to poor estimates. The graphs of both participant's event day usage and CBL counterfactual can be found in the results section below. ADM will refer to them as Customer A and Customer B.

Estimating Gross Peak Demand Reductions (kW)

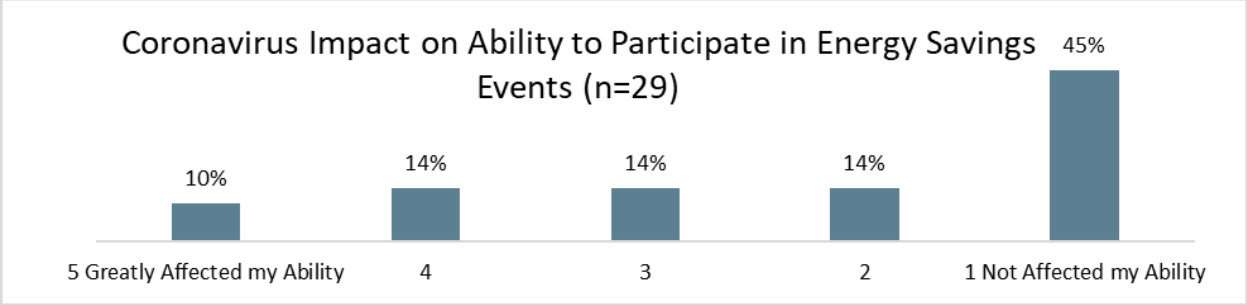
Peak demand reduction from the BDR Program events is estimated on a customer by customer basis. The customer demand reduction is calculated as the average load shed (in kW) during the duration of all events. The program peak demand reduction is equal to the sum of each customer's demand reduction. Hourly load shed is calculated by subtracting hourly usage from the CBL baseline calculated for each customer for each event.

H.5.3 COVID-19 Impact Considerations

Prior to June 16th, Missouri was under Phase 1 of its COVID-19 reopening plan which had restrictions on business operations. Phase 2 of Missouri's reopening plan began on June 16th and contains no statewide public health order. Since all DR events and baseline days used in the analysis were during Phase 2, ADM determined that CBL estimates were still appropriate for energy impact estimation and that no adjustment needed to be made to lookback window length.

While the analysis methodology did not require modification due to the COVID-19 pandemic, many participants stated that their ability to participate in events in 2020 was impacted. As Figure H-1 shows, sixty-five percent of participants stated that their ability to participate in energy savings events was impacted in some way.

Figure H-1: Coronavirus Impact on Ability to Participate in Energy Savings Events



An increase in indoor air quality requirements was cited by several participants as how their ability to participate in energy savings events was impacted. The impact of COVID-19 may help explain the programs divergence from the kW Goal in 2020.

H.6 Gross Impact Evaluation Findings

The following sections provide the results of the impact evaluation for the BDR Program.

H.6.1 Peak Demand Reduction from Demand Response Events

Peak demand reduction (kW) was determined as the average hourly difference between event hours and a counterfactual non-event period. The method used to determine the counterfactual baseline is described in the Methodology section of this chapter.

Figure H-2 provides the aggregate load shapes[9] of event days for event one, while Figure H-3 provides the same average for event two. A significant reduction in consumption is present during the event periods.

[9] Customer A and B mentioned in Section 1.2.2.3 are omitted from this graph as their large, unpredictable usage obfuscates the CBL fit for the other participants. Their aggregate load shapes can be found in Appendix A

Figure H-2: BDR Load Shape, Event 1

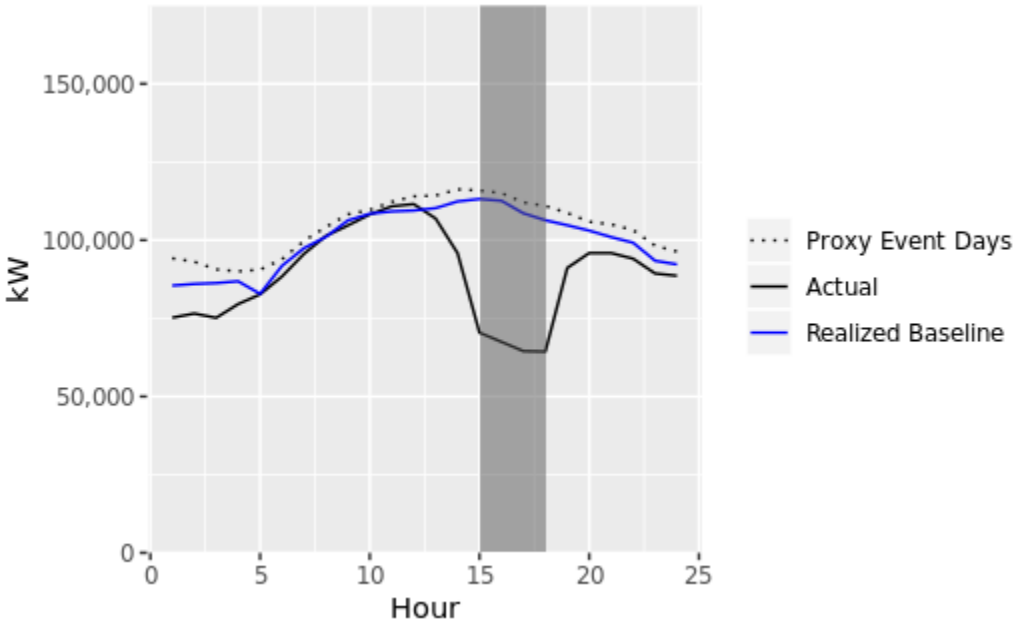


Figure H-3: BDR Load Shape, Event 2

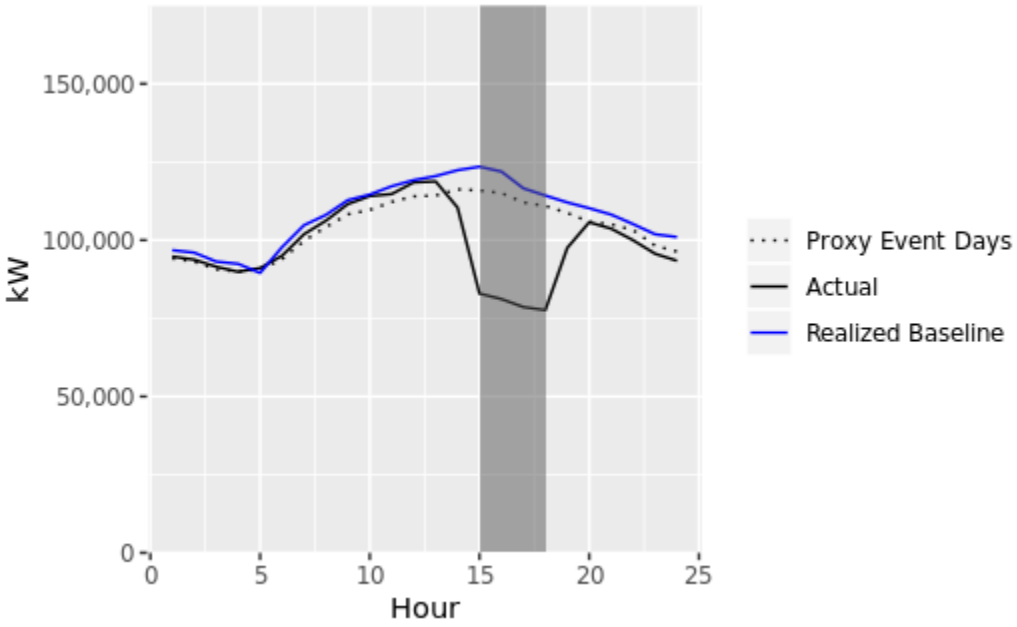


Table H-7 provides impact results for all BDR events called in Cycle 3 PY1. The two events resulted in a peak demand reduction representing 92% of the program goal and 85% of the expected reduction. The columns in the table contain averages (weighted on the number of responding units) or sums across both demand response events. The difference in the average realized kW per customer is due to the Metro service territory having much higher usage participants enrolled in the program allowing them to make greater reductions during events. The average kW in August from 2-6pm for Metro participants was 4,102 while West participants averaged 523 kW.

Table H-7: BDR Savings Summary

Service Area	# of Customer	# of Service Point IDs	Expected kW	Realized kW	Realization Rate
Missouri West	106	319	40,680	39,384	97%
Missouri Metro	14	75	19,670	20,183	103%
Total	119[10]	394	60,350	59,566	99%

In addition to testing CBLs that incorporated weather data on each participant, ADM analyzed weather's impact on the program overall. Table H-8 provides DR event savings versus weather during event hours.

Table H-8: DR Event Savings vs. Weather

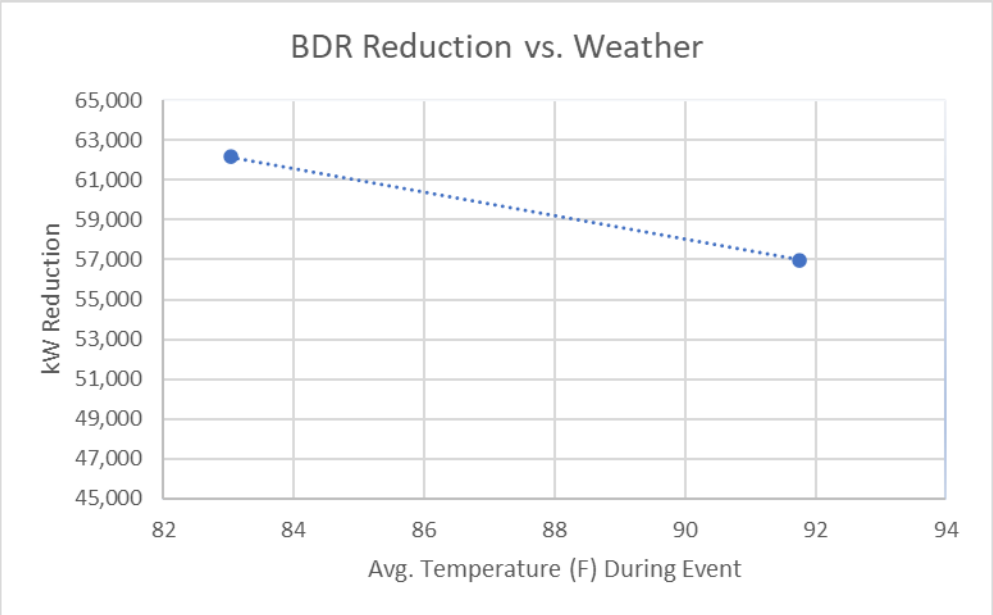
Service Area	Event Date	Avg. Temp (F) Event Hours	Realized kW
Missouri West	8/10/2020	83.03	40,925
Missouri West	8/25/2020	91.76	37,710
Missouri Metro	8/10/2020	83.03	21,239
Missouri Metro	8/25/2020	91.76	19,258

The service territories had a relatively mild summer in 2020 with only two demand response events called. Figure H-4 shows BDR event reduction and average temperature on event days. Many of the customers usage is process driven, however, ADM found that

[10] One participant had service point IDs in Missouri West and Missouri Metro

the relationship between temperature and total participant consumption during summer event hours is positive (.19). Due to the limited number of demand response events run in 2020, there is insufficient information to determine a trend between peak demand reduction and weather. The inverse relationship of peak demand reduction and temperature seen in the graph may have occurred due to chance. ADM will continue to review the influence of ambient temperature in future demand response events.

Figure H-4: BDR Savings vs. Weather



H.7 Net Impact Evaluation Findings

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 one (1).

H.8 Impact Evaluation: Final Savings Tables

Table H-9 summarize the verified peak demand reduction for the Business Demand Response Program. Evergy does not claim energy savings for DRI; thus, the evaluation team did not calculate energy savings.

Table H-9: Peak Demand Reduction (kW)

Service Area	# of Customer	# of Service Point IDs	Expected kW	Realized kW	Realization Rate
Missouri West	106	319	40,680	39,384	97%
Missouri Metro	14	75	19,670	20,183	103%
Total	**119**[11]	**394**	**60,350**	**59,567**	**99%**

H.9 Process Evaluation

H.9.1 Program Operations

The Business Demand Response (BDR) Program was a new program launched in Cycle 3. The current program manager took over operations in March 2020. CLEAResult implements the DR program on behalf of Evergy

Roles and Responsibilities

The Evergy program manager is supported by three staff from CLEAResult: the program manager, the data analyst, and the outreach manager. Each staff member performs various functions to manage the DR process, calculate the DR reductions, and recruit Commercial & Industrial (C&I) program, participants.

As part of the Cycle 3 launch, the BDR program database program tracking and customer notification were handled through the new Distributed Energy Management Resource System (DERMS).

The Evergy program manager oversees all program processes, prepares reports to the Commission, and manages program budgets. Staff from CLEAResult assist in the day-to-day program operations. Their primary responsibilities are coordinating with the outreach team to ensure a sufficient number of participants enrolled and engaged in the BDR program. CLEAResult also provides analytical support to develop customized curtailment plans for each program participant, based on an audit and review of each facility.

CLEAResult staff uses the interval data gathered during each curtailment event and develops reports for each customer at the end of each event. Then the staff conducts follow-up meetings with the customers to share the report and determines which customers are over-or-underperforming.

[11] One participant had service point IDs in Missouri West and Missouri Metro

However, the DERMS database is the heart of the overall BDR program operations. Several Evergy staff and three additional outside contractors provide database support for program tracking and management.

Program Design

The changes in the program design and incentive levels made recruitment more difficult compared to previous years. As the CLEAResult staff explained, the most significant was in the Value Proposition to the customer.

Cycle 3 also launched without a pre-existing customer base. Unlike prior years, since the program had been completely redesigned, the CLEAResult staff had to recruit all customers into the new program. This process required educating the customer about the new program requirements and ensuring they knew the incentive was now based on the actual kW saved during each event rather than a guaranteed incentive.

The program targets include some of Evergy's largest Commercial & Industrial (C&I) Evergy customers. Due to their size, each customer is assigned a Customer Success Manager or Evergy representative. To minimize confusion, CLEAResult staff must recruit the largest customers indirectly, through the Evergy representative, rather than approaching the customer directly.

Once a customer enrolls in the program, CLEAResult staff schedules a site visit to identify all potential equipment modified during a curtailment event. CLEAResult will develop a "curtailment plan" tailored to each customer's facility. After each event, the staff follows up with the customers to determine if the curtailment plan needs to be adjusted.

Recruitment activities began in March through June. After the curtailment season started, the CLEAResult staff focuses on account management and ongoing communication regarding their facilities' performance compared to goals.

A total of 119 participants enrolled in PY1.

H.9.2 Program Performance

The program goal was modified for Cycle 3 to 49,488 kW reduction, which was slightly lower than Cycle 2 kW goals. However, to achieve this reduction, the program manager focused on three overall objectives:

- Recruit the number of customers needed to achieve the required kW reductions during each called event;
- Ensure that there is sufficient customer enrollment by over-recruiting program participants to offset any customers that are unable to curtail load during a specific curtailment event; and,
- Achieve high levels of customer satisfaction so enrolled customers will participate in future years.

For Cycle 3, the program design was changed from a firm power level program to a pay-for-performance program where customers still receive incentives for participating. Yet, they are not as familiar with the new program requirements.

"There were challenges with customers understanding what the baseline (for program operations was) and how to get the contracted amount. That is an ongoing challenge, and we will continue to educate customers going forward." - CLEAResult Program Staff

In previous cycles, customers were offered an enrollment incentive and a smaller performance incentive. For Cycle 3, customers only receive the performance incentive based on actual savings.

The notification window was also shortened from four hours to one hour before an event. The program implementation staff still tries to give customers as much notification as possible. Customers who have to turn off equipment manually are not always able to participate in these events.

"We do try to give customers as much notification as possible, but we would like a full day's notice before an event."- CLEAResult Program Staff

The program's kilowatt (kW) savings goals decreased for Missouri West customers while maintaining the current enrollment levels for Metro Missouri.

Program Participation and Marketing

CLEAResult staff also recruit customers via "cold calling" potential participants. During these initial visits, the team also explains other Evergy C&I programs and promotes "cross-pollination" of these energy efficiency program opportunities.

Given the unique nature of this program, most marketing is face-to-face. Evergy developed a short informational sheet about the program, but marketing is driven by direct contact with the CLEAResult program representatives.

Evergy staff planned on mailing out materials to C&I customers in March 2020, but that plan was not executed due to the COVID-19 lockdown.

Communication

Evergy and CLEAResult staff have weekly meetings to discuss all aspects of program operations. They also have a specific weekly meeting dedicated to discussing the technical aspects of integrating program details into the DERMS database.

CLEAResult prepares weekly and monthly status reports that address all aspects of program operations, and the Evergy staff are pleased with these reports.

Data Tracking, Quality Control and Quality Assurance (QA/QC)

Most of the QA/QC activities concentrate on refining the data collected in the DERMS database. Evergy works with its support contractors to include more error-checking features in its database. CLEAResult staff calculates the individual customer incentives, which the evaluation contractor then reviews.

"We had some learning curves with DERMS this year…We just needed to implement a lot more of the data checks our DERMS. From a QA/QC standpoint, we were pulling a lot of reports and cross-checking between them." Evergy Program Staff

Program Tracking and Reporting

Developing the DERMS database remained an ongoing challenge for both Evergy and CLEAResult staff.

"We had some issues with the DERMS reporting system at the beginning of last year, though we were able to work through them by the end. Because there were delays, it made it more difficult for customers."-Evergy Program Staff

The short program window to implement the DERMS database system also contributed to these issues. The staff only had a few months with the DERMS database operational before the program curtailment events started.

"That was our biggest roadblock in 2020."-Evergy Program Staff

Part of the challenge was to reconfigure the DERMS system to meet the needs of the BDR program.

"It took us a while to understand how the data needed to be organized in DERMS. It took a long time to get the performance data for each customer from DERMS during the season. Ideally, we wanted to contact the customer quickly after each event." - CLEAResult Program Staff

These database issues delayed communicating with customers regarding their performance in each curtailment event. As one program staff member explained, ideally, customers would receive a report several days after the curtailment event. The delays with DERMS meant that customers did not receive any feedback until several weeks after the curtailment event, which made it harder for them to recall their actions on the event

day. However, this situation improved throughout the season, so by the end of the season, the CLEAResult staff could provide customer feedback in a timelier manner.

H.9.3 Strengths and Challenges

Program management solved many of these operational issues by the end of the first program year. Overall, the staff was pleased by "pivoting during the pandemic" and still recruiting customers into the program by adapting their recruiting methods to focus on text messaging rather than in-person conversations.

Staff also communicates more clearly with customers regarding expectations for peak load reductions and wants to ensure that both the customers and the Customer Success Managers are engaged with the program.

"We want them to feel good about what they signed up for." Evergy Program Staff

Ideally, the program staff would like to extend the event notification window beyond one hour, if possible.

Another key lesson learned during this first year is to recruit customers who are a good fit for this program design. Some customers cannot curtail equipment, and this feedback will help refine recruitment efforts in the next year.

The program continued to operate despite the COVID-19 pandemic. However, the staff observed that every year there are occurrences when customers cannot curtail their load due to some unexpected spikes in manufacturing or increased customer demand. Although COVID-19 required changing marketing and outreach tactics, overall, the pandemic did not adversely affect program operations.

H.10 Program Survey

Almost a quarter of the program participants completed the BDR survey.

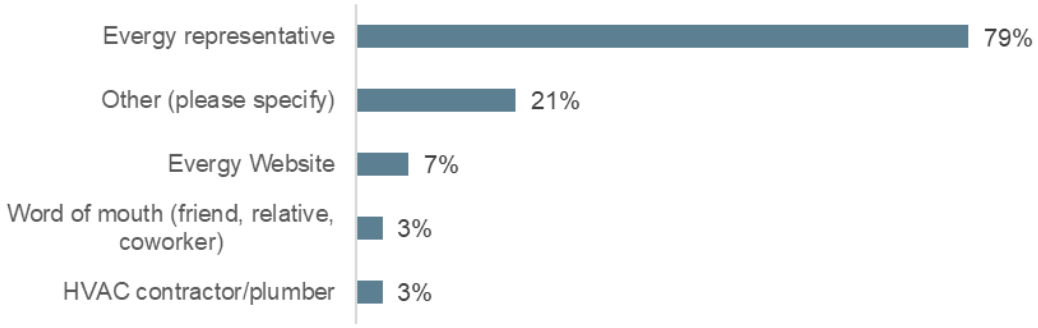
Table H-10: Residential Survey Sample Disposition

Survey Characteristic	Disposition	Percentage
Total Population	119	
Sample Size	118	99%
Returned email	8	7%
Unsubscribe	0	0%
Number of completes	29	24%

Program Awareness

Most respondents learned about this program directly from Evergy—either from a program representative (79%) or from the website (7%). Figure H-5 illustrates these findings.

Figure H-5: Ways Respondents Heard about the Business Demand Response Program



* multiple response questions

Program Participation and Enrollment

Most respondents enrolled in the program to receive incentives which they could then use to fund other projects (41%). Another one-third (35%) of the respondents cited the relatively low-risk associated with program participation, as Table shows.

Table H-11: Reasons for Participation

Response	Number Mentioning	Percent of Total (n=29)
Savings: Use incentives to fund other energy efficiency projects	12	41 %
Low-risk: are no financial penalties	10	35 %
Awareness: Your customers and employees will have more awareness of how your business is taking measures to lower impact on the local environment	3	10 %
Customized: We offer a curtailment plan specific to your site	2	7 %
Other	2	7 %
Total	**29**	**100%**

Nearly all respondents (96%) said Evergy staff developed a tailored curtailment plan, while two respondents did not, and one was unsure (see Table).

Table H-12: Curtailment Plan Tailored to The Business

Response	Number Mentioning	Percent of Total (n = 29)
Yes	26	90%
No	2	7%
Not sure	1	3%
Total	**29**	**100%**

Table H-13 summarizes the types of actions these respondents did during a curtailment event. Temporarily shutting down equipment (59%) was mentioned by most respondents, while 41 percent said reducing cooling loads. Other everyday actions included dimming lights in non-critical areas (34%) or reducing motor loads (21%).

*Table H-13: Types of Actions to Curtail Energy During an Event**

Action	Number Mentioning	Percent of Total (n=29)
Temporarily shut down equipment, production lines and perform routine maintenance	17	59%
Reduce cooling loads with small temperature adjustments	12	41%
Dim lights in non-critical areas	10	34%
Reduce motor loads in elevators, compressors, conveyors, etc.	6	21%
Something else (please specify)	5	17%
Utilize certified self-generation	4	14%
Reschedule shifts to off-peak times	2	7%
Total	56	NA

*multiple response question

Event Participation

Most respondents (86%) recalled participating in the August 10 Energy Savings Event from 2-6 p.m. More importantly, 92 percent recalled receiving notification before the event.

However, four respondents could not recall participating in this event, primarily because they either were unable to reduce their loads or the business was not operating at the time of the event.

Table H-14: Event Participation Aug 10, 2020, 2-6 p.m.

Event Participation- August 10, 2020	Number Mentioning	Percent of Total (n = 29)
Yes	25	86%
Don't Recall	4	14%
Total	29	100%

Most respondents (69%, n = 20) also recalled receiving an incentive for program participation in 2020, while one-quarter (28%, n = 8) were unsure. One respondent said they did not receive an incentive for participation.

Satisfaction

The respondents rated their satisfaction with the BDR program components using a five-point scale where "5" means "Very Satisfied" and "1" means "Very Dissatisfied." First, they rated their satisfaction with the Curtailment Plan that Evergy had developed for each customer. As Table H-15 shows, on average, customers provided a satisfaction rating of 4.15, and a total of 81 percent of these respondents awarded a "4" or "5" rating indicating they were "Satisfied."

Table H-15: Satisfaction with the Curtailment Plan developed by Evergy

Rating	Number Mentioning	Percent of Total
5 – Very Satisfied	10	38%
4	11	42%
3	4	15%
2	1	3%
1 – Very Dissatisfied	0	0%
Total	**26**	
Mean	**4.15**	

Using the same five-point scale, the survey respondents rated their satisfaction with other BDR features. These results, summarized in Table , indicate that the respondents were most the ease of enrollment (4.38 average rating) and the Energy Savings Events' overall duration (3.96 mean rating). Three-quarters of respondents are satisfied with Evergy overall, providing an average rating of 3.96.

Table H-16: Satisfaction with Program Components

Business Demand Response Program	Average Satisfaction Score	% Satisfied (i.e., "4" or "5" Rating)
Ease of Enrolling (n = 26)	4.38	92%
Notification of DR Event (n = 28)	3.82	71%
Duration of DR Event (n = 28)	3.96	82%
Amount of Incentive Received (n = 24)	3.65	67%
Business DR Program Overall (n = 27)	3.88	81%
Evergy Overall (n = 28)	3.96	75%

Figure H-6 and Figure H-7 and illustrate these findings for the BDR program components.

Figure H-6: Average Satisfaction Scores for the Business DR Program

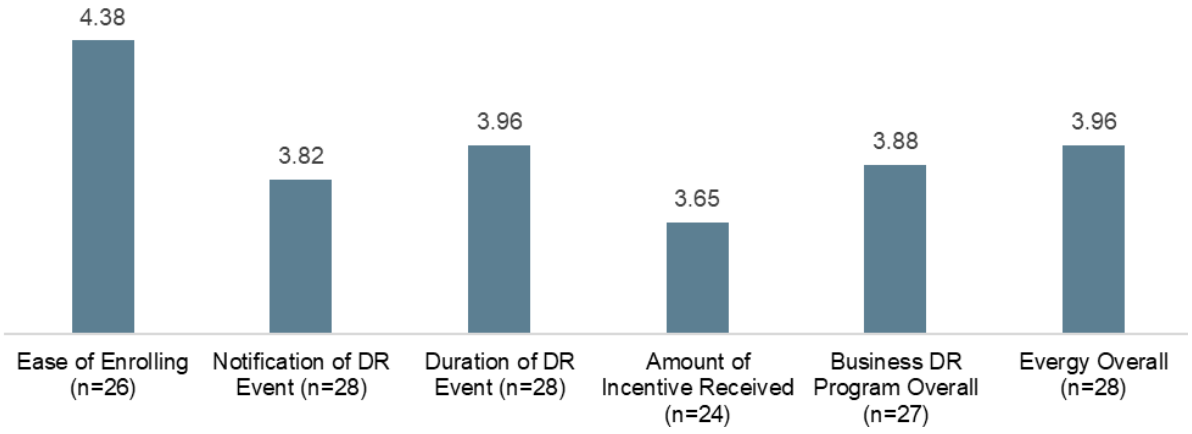
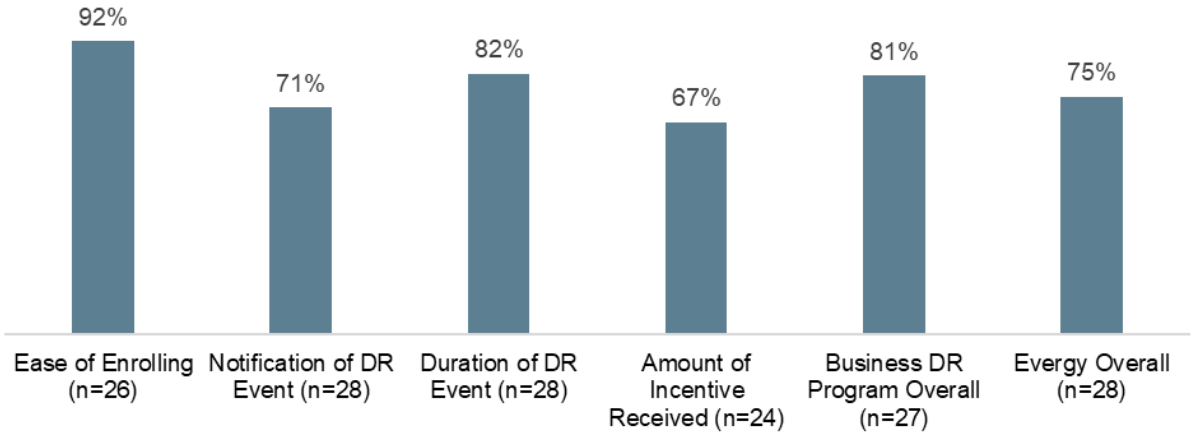


Figure H-7: Percent of Business DR Respondents Who Were Satisfied



Respondents also provided their reasons for their satisfaction ratings. Not surprisingly, most of these comments were highly positive, as the respondents were pleased with their

interactions with Evergy representatives, event notification, and the program overall. A few respondents did not believe that the incentives were sufficiently large to encourage them to participate in the program.

"A rep from Evergy came to our site and explained everything and then completed all the paperwork only requiring of us to sign."

"Just said yes to enrollment, and Evergy handled the rest."

"It's quick and contact with Rep is easy."

"With no penalty for failing to meet benchmarks, this is a win for our side of things. The enrollment part was straightforward and easy."

"In the past two years, notification of an event has been too brief. When the program first began, I was notified 24 hours before the event. Now it may only be an hour or so. That is not enough time for us to comply."

"Very nice incentive to participate."

"Very helpful, keeping us up to date on energy incentives."

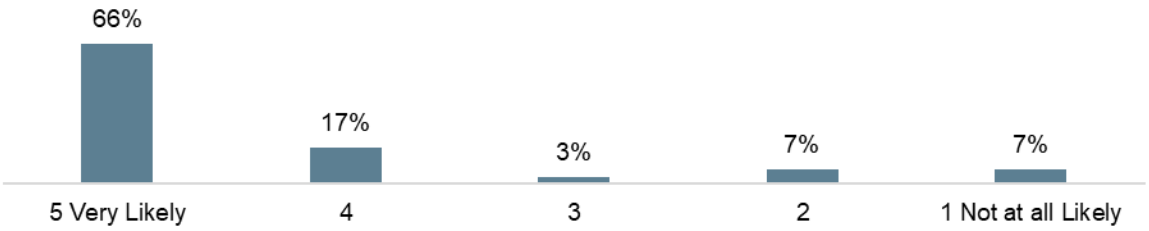
J.1.2.4 Likelihood of Future Participation

As maintaining program enrollment levels are critical to the program's overall success, the respondents also rated their likelihood of participating in the BDR program going forward. Using a five-point scale, where "1" means "Very Unlikely," and "5" means "Very Likely," the two-thirds (66%) of these respondents indicated they would participate in future program years (see Table H-17 and Figure H-8). Overall, the question had an average rating of 4.28, suggesting that most respondents are willing to participate in the future years.

Table H-17: Likelihood of Participation in 2021

Rating	Number Mentioning	Percent of Total
1 - Not at all Likely	2	7%
2	2	7%
3	1	3%
4	5	17%
5 - Very Likely	19	66%
Total	**29**	
Mean	**4.28**	

Figure H-8: Likelihood of participation in PY2



H.11 Conclusions and Recommendations

The Evaluator had no recommendations for this program.

Appendix I Residential Demand Response

This chapter describes the evaluation activities that were performed by ADM to evaluate the Residential Demand Response Program.

I.1 Program Overview

The Residential Demand Response (RDR) program uses automatic event call technology to curtail energy use during peak demand periods. Eligible customers are provided an incentive to participate in curtailment events.

Participation Channels:

- Customers can purchase devices and install the device themselves.
- Customers can receive devices provided at a discounted price and receive professional installation.
- Customers can enroll their eligible existing device.

Called upon devices (Cycle 3) will increase a customer's setpoint between 2- and 5-degrees Fahrenheit. Pre-cooling occurs prior to an event and the customer receives notification via their smart device application.

Expected Energy Savings and Demand Reduction

Targeted energy and demand impact for the Residential Demand Response program years 2020-2022 are shown in the tables below. These Targeted savings are taken from KCP&L filing EO-2019-0132.

Table I-1: Program Goal Savings by Year, Missouri Metro

Program Year	Energy Savings Goal (MWh)	Peak Demand Reductions Goal (MW)
2020	1,171	8.68
2021	1,330	9.96
2022	1,466	11.14
Total	3,967	29.78

Table I-2: Program Goal Savings by Year, Missouri West

Program Year	Energy Savings Goal (MWh)	Peak Demand Reductions Goal (MW)
2020	1,221	9.22
2021	1,402	10.6
2022	1,549	11.17
Total	4,172	30.99

Table I-3 below provides a summary of program metrics for the PY1.

Table I-3: Performance Metrics – Residential Demand Response

Metric	PY1 Total	West	Metro
Number of Participants*	5,403	2,618	2,785
Energy Savings (kWh)			
Targeted Energy Savings	2,391,663	1,220,615	1,171,048
Reported Energy Savings	964,709	466,496	498,213
Gross Verified Energy Savings	964,709	466,496	498,213
Net Verified Energy Savings	964,709	466,496	498,213
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	17,900.16	9,220.80	8,679.36
Reported Peak Demand Reduction	9,224.60	4,454.80	4,769.80
Gross Verified Peak Demand Reduction	7,850.51	3,989.42	3,861.09
Net Verified Peak Demand Reduction	7,850.51	3,989.42	3,861.09
Benefit / Cost Ratios*			
Total Resource Cost Test Ratio	1.49	1.42	1.43

*Includes Business Smart Thermostats in totals

I.2 EM&V Methodologies

This chapter describes the impact evaluation activities and methodology that ADM performed for Evergy's 2020 Residential Demand Response Program. The impact evaluation was performed for Evergy Metro and Evergy Missouri West. Table I-4 provides a summary of the savings approach by program year.

Table I-4: Savings Approaches by Program Year

Program Year	kW Savings (Demand Response)	kWh Savings
2020	Calculated	Evergy TRM
2021	Calculated	Evergy TRM
2022	PY2021 Value	Evergy TRM

In evaluating the 2020 Residential Demand Response Program, ADM implemented a variety of impact evaluation exercises including estimation of gross and net energy savings (kWh) as well as peak demand reductions (kW) as framed by the following research questions:

- How many Evergy customers participated in the program? What is the quantity and type of measures incentivized/rebated?
- What is the energy savings for each incentivized measure?
- What is the peak demand reduction for each incentivized measure?
- What percentage of gross savings is directly attributable to the program (net savings analysis)?

Demand Response Events in 2020

As shown in Table I-5, there were two DR events called in 2020 and both fell in the month of August. Curtailment events were called between the hours of 4 p.m. through 6 p.m. CDT for all DR events.

Table I-5 Demand Response Events in 2020

August						
S	**M**	**T**	**W**	**Th**	**F**	**Sa**
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Smart Thermostat Devices

Table I-6 provides a count of devices for each device type and service area. Across both service areas, Google Nest accounted for almost two-thirds of devices (63%), with Ecobee accounting for the remainder of units.

Table I-6 Device Types by Service Area

Service Area	Device Type	# of Devices
Missouri West	Ecobee	1,394
Missouri West	Google Nest	2,239
Missouri Metro	Ecobee	1,315
Missouri Metro	Google Nest	2,462

As shown in Table I-7, the most popular device was the Google Nest Learning Thermostat which accounted for 39% of all devices across both service areas.

Table I-7 Device Subtypes by Service Area

Utility	Device Type	Number of Devices
Missouri West	ecobee Smart Thermostat with voice control	571
Missouri West	ecobee3	121
Missouri West	ecobee3 Lite	519
Missouri West	ecobee4	183
Missouri West	Google Nest 1st Gen	1
Missouri West	Google Nest 2nd Gen	25
Missouri West	Google Nest Learning Thermostat	1,446
Missouri West	Google Nest Thermostat E	767
Missouri Metro	ecobee Smart Thermostat with voice control	479
Missouri Metro	ecobee3	113
Missouri Metro	ecobee3 Lite	531
Missouri Metro	ecobee4	192
Missouri Metro	Google Nest 1st Gen	1
Missouri Metro	Google Nest 2nd Gen	49
Missouri Metro	Google Nest Learning Thermostat	1,451
Missouri Metro	Google Nest Thermostat E	961

Table I-8 provides the number of Smart Thermostat units installed and the number of customers for each measure type[12]. Do-it-yourself (DIY) installations were the most frequent measure type for RDR and accounted for 46% of installations in 2020. In addition, Bring-Your-Own-Thermostat (BYOT) accounted for 26% of installations while Professional (PRO) installations accounted for the remaining 28% of installed units.

[12] Counts include all devices present in PY20 tracking data, with the exclusion of devices that were removed or returned in PY20.

Table I-8 Smart Thermostat Installations by Measure Type

Utility	Measure Type	Smart Thermostat Units	Number of Customers
Missouri West	BYOT Installation	925	835
Missouri West	DIY Installation	1,747	1,744
Missouri West	PRO Installation	961	835
Missouri Metro	BYOT Installation	1,004	923
Missouri Metro	DIY Installation	1,679	1,677
Missouri Metro	PRO Installation	1,094	959

I.3 Sampling Plan

ADM performed an analysis on a census of Residential Demand Response participant.

I.4 Data collection

Data used for this evaluation include:

- Program tracking data for 2020. 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, and.
- A full schedule of program events, including the time of the event.

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 energy savings calculations and guidelines set by the Evergy Technical Reference Manual.

In addition, the heating and cooling equipment type for a sample of 30 customers were reviewed to ensure tracking data was entered correctly (e.g., efficiency and unit tonnage). The review of equipment data fields was only relevant to customers that have the smart thermostat professionally installed and was performed using the AHRI database.

Weather Data

ADM collected recorded weather data from the National Oceanographic and Atmospheric Administration (NOAA) to estimate the impact of weather on usage.

ADM collected monthly Heating Degree Days (HDD) and Cooling Degree Days (CDD) from NOAA.gov for use in the regression analysis. Data was collected from the nearest available weather stations and assigned to each customer based on customer zip code.

Monthly HDDs are calculated as the sum of daily average temperature values under the heating setpoint (65°F) in each month, while monthly CDDs are calculated as the sum of daily average temperature values over the cooling setpoint (70°F) in a given month. The setpoint values for HDDs and CDDs were determined by running regressions with multiple setpoints from 60°F-80°F and choosing the setpoint combination with the highest adjusted R-squared value (i.e., best fit).

I.5 Gross Impact Methodology

This section describes the impact evaluation activities and methodology that ADM performed for Evergy's PY1 Residential Demand Response Program.

I.5.1 Gross Energy Savings and Demand Reduction

Demand Response Demand Reduction (kW) Methodology

Demand savings for the demand response portion of the program was estimated using a weather-adjusted Linear Fixed Effects Regression (LFER) model. The model uses customers' 15-minute AMI data on event and non-event days to estimate the impact on energy demand. The LFER model specifies energy demand as a function of temperature and other variables that influence usage. ADM identified non-event days during the same month as demand response events whose weather pattern most closely matches the weather pattern on event days, and these days served as the counterfactual baseline. ADM defined baseline days as those with maximum and average daily temperature greater than or equal to the minimum observed maximum/average temperature during all demand response events.

When fitting regression models, ADM tested correlations between explanatory variables, statistical significance of variables, and the impact of each variable on model fit.

The final form of the model is shown below.

Equation I-1: Linear Fixed Effects Regression Model

$$Usage\ (kWh)_{it} = \alpha_0 + \beta_1 CDH_{it} + \beta_2 PreCooling_{it} + \beta_3 Event_{it} + \beta_4 Snapback_{it} + \beta_5 MA4CDH_i + \beta_6 MA24CDH_{it} + \beta_7 NHBU_{it} + \sum_{h=1}^{24} \alpha_h * Hour_{it,h} + \epsilon_{it}$$

Where,

α_0 = *intercept term*

t = *index for time intervals*

i = *index for smart thermostat devices*

$Usage(kWh)$	*= average usage during the time interval*
β_k, α_h	*= vectors of coefficients. The primary coefficient of interest is β_3 which provides the average kW reduction estimate during the demand response events*
CDH	*= cooling degree hours*
$PreCooling$	*= dummy variable for the three hours preceding an event*
$Event$	*= binary dummy variable for event hours*
$Snapback$	*= binary dummy variable for the three hours following an event*
$NHBU$	*= normalized heat build-up, defined as the cumulative heat buildup based on the weighted average of past hourly values. The weighting uses a compounded discount factor of 0.95833[13] for the number of hours prior (up to 48 hours[14])*
$MA4CDH$	*moving average of the last 4 hours CDH*
$MA24CDH$	*= moving average of the last 24 hours CDH*
$Hour$	*= vector of dummy variables for each hour of the day*
ϵ	*= error term*

ADM estimated savings as a rate in kW/ton and kW/unit separately for both Evergy Metro and Evergy Missouri West. Tonnage was available for units with professional installation and was used as a proxy for the average tonnage of the population.

Prior to running the model, ADM removed devices that fail to meet certain criteria, including:

- Missing zip code for a device/customer (due to inability to map to correct weather data).
- Opt-out devices.
- Non-responding devices (NRD).

A device is considered a "non-responding device" (NRD) if it does not respond to the curtailment signal for reasons other than the device being manually overridden by the

[13] The discount factor comes from an estimate in PY2019 by Guidehouse. ADM tested the impact of various discount factors and found no impact on savings or model fit.

[14] For NHBU, 48 hours was selected by Guidehouse in PY2019, and ADM tested several other time periods, including 24 and 72 hours prior, and found no impact or savings or model fit.

customer. Common causes of non-response are system outages, internet accessibility issues or other physical barriers that may block the signal.

Prior to the calculation of peak demand savings factors, non-responding devices are identified and removed from the sample using the NRD identification algorithm discussed below. Customers that opt-out of a DR event or manually override their thermostat cannot be told apart from NRD devices using AMI data alone. However, devices for customers who opt-out or override their thermostat during a demand response event behave like NRDs. As such, ADM calculated the %NRD/Opt-out rate for each demand response event to account for NRD devices and customer opt-outs.

Classification of Non-Responding Devices using AMI Billing Data

Prior to the calculation of subgroup demand factors, non-responding devices are identified and removed from the analysis sample using a combination of 2 algorithms: a cumulative sum (CSUM) change in slope analysis and a straight 10% decrease in load detection. When a demand response event is called, each device is sent curtailment instructions that result in a significant load drop over the event period. This drop is illustrated in Figure I-1, where an example event is presented with an example "normal" usage curve.

The CSUM smoothing technique is a rolling sum:

Equation I-2: Cumulative Sum Smoothing

$$x = (a, b, c, \ldots, z) \quad CSUM(x) = (a, a+b, a+b+c, \ldots, a+\ldots+z)$$

where x is a vector of kWh measures taken at increasing one-hour intervals during the event day. By taking the CSUM of each treatment site for the demand response period a smoothed, increasing curve is created (Figure I-2). The slopes of this curve for the three hours before the event starts, and the two hours of the event are calculated (Figure I-3). To test if there is a significant change in the slope due to the demand response event, we first take the ratio of the event period slope divided by the pre-period slope. A responding device is detected by a decrease in the line slope, so the ratio will be less than 1. Some sites have unique meter profiles that can confuse this first test, so a second test is applied. Test 2 uses the average meter curve for each site on baseline days to create a "site-normal" curve to compare with the event curve. The same CSUM slopes are taken of the non-event curve and a ratio is measured. If the ratio of the non-event curve is greater than the ratio event curve, then the device is classified as responding. Any devices left over after the two tests are classified as non-responding and removed.

In parallel with the CSUM analysis, a straight test for 10% reduction in consumption due to the event being called is also employed. For each unique device, the kWh for 1-hour

pre-event and consumption for the first hour of the event are analyzed for a drop greater than 10% using the following:

Equation I-3: Pre-Event Test

$$Non - Responding\ if\ T1_{kWh} \leq T2_{kWh},\qquad where$$

$$T1_{kWh} = PreHr_{kWh} - EventHr_{kWh} \quad and \quad T2_{kWh} = PreHr_{kWh} * 10\%$$

These two lists of non-responding devices are then cross-referenced, and those devices identified by both methods are removed from the analysis subgroup. By taking advantage of the processing speed of vectorized programming in the R-Studio environment, every individual site in the program is tested per event.

Figure I-1: Example of Site-Level Load Shapes During Event Hours

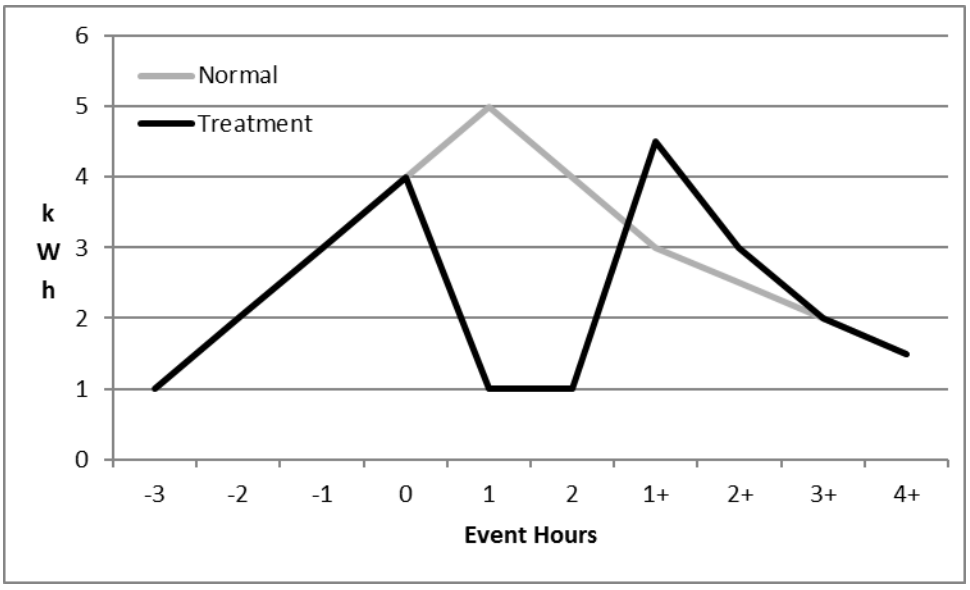


Figure I-2: Example of Site-Level CSUM Slope Changes During Event Hours

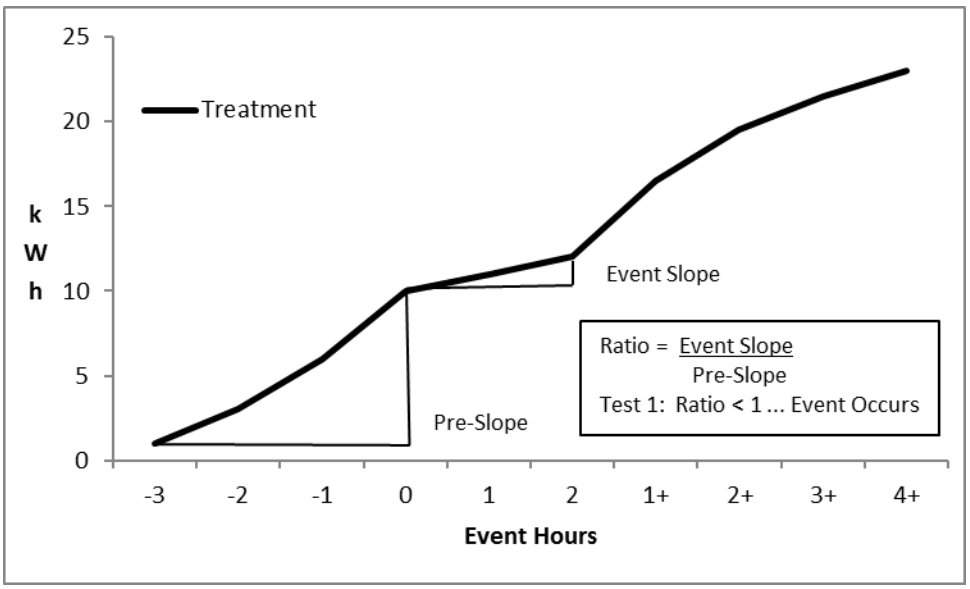
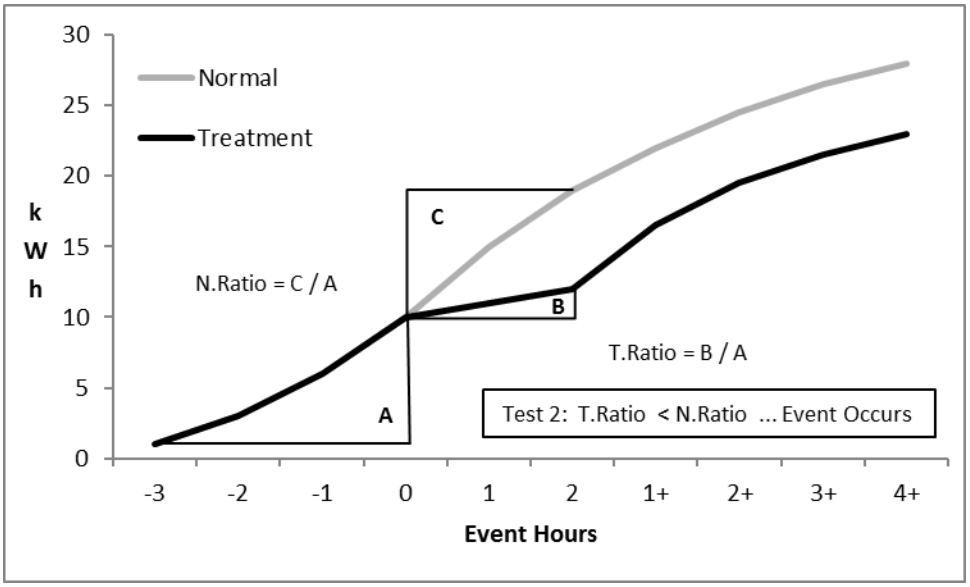


Figure I-3: Example of the CSUM Change in Slope Analysis used to Identify NRDs.



Annual Energy Savings (kWh) Methodology

For annual energy savings ADM utilized energy savings calculations from the Evergy Technical Resource Manual (TRM). This specifies 197.00 kWh/unit for smart thermostats. The total annual energy savings (kWh) for the program were calculated by taking the kWh/unit TRM value and multiplying by the number of thermostat units considered part of the program in 2020.

Estimating Net Savings

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%.

I.5.2 COVID-19 Impact Considerations

Prior to June 16th, Missouri was under Phase 1 of its COVID-19 reopening plan which had restrictions on business operations. Phase 2 of Missouri's reopening plan began on June 16th and contains no statewide public health order. Since all demand response events were called after Phase 2, ADM determined there were no impacts to the DR events from COVID-19.

I.6 Gross Impact Evaluation Findings

The following sections provide the results of the impact evaluation for Residential Demand Response. Results are based on two event days called in 2020. When savings are shown at the service area level, savings and other units are averaged and weighted by the number of available devices for each demand response event.

I.6.1 Peak Demand Reduction from Demand Response Events

Figure I-4 provides a participant example load shape on baseline and event days for event 1, while Figure I-5 provides the same average for event 2.

Figure I-4 DR Residential Load Shape Example, Event 1

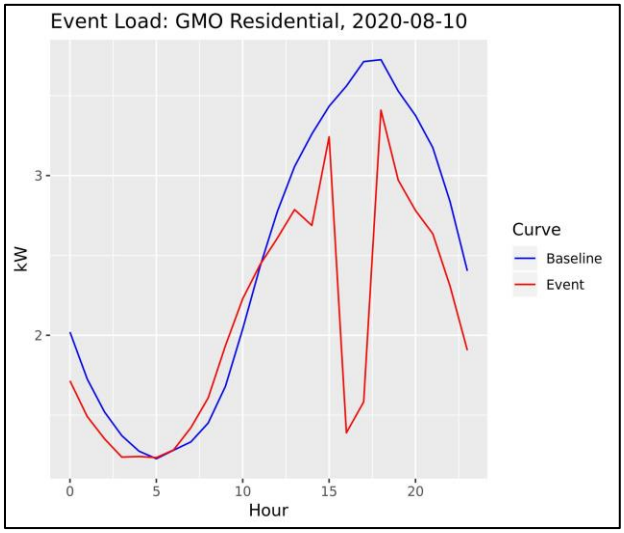


Figure I-5 DR Residential Load Shape Example, Event 2

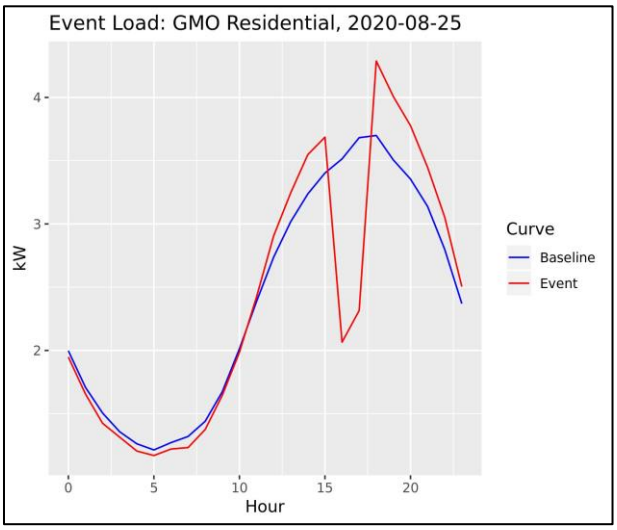


Table I-9 provides the correlation matrix for the variables included in the regression. ADM tested the exclusion of highly correlated variables during the modeling process and found very limited impacts on savings and model fit. Therefore, ADM opted not to exclude model covariates to ensure comparability and consistency with regression modeling in prior program years.

Table I-9 Regression Variable Correlation Matrix

Variable	CDD	MA4CDH	MA24CDH	NHBU	Pre-Cooling Dummy	Snapback Dummy	Event Dummy
CDD	1.000	0.906	0.227	0.342	0.023	0.016	0.048
MA4CDH	0.906	1.000	0.262	0.574	-0.002	0.050	0.032
MA24CDH	0.227	0.262	1.000	0.748	-0.156	-0.178	-0.144
NHBU	0.342	0.574	0.748	1.000	-0.090	-0.041	-0.052
Pre-Cooling Dummy	0.023	-0.002	-0.156	-0.090	1.000	-0.016	-0.013
Snapback Dummy	0.016	0.050	-0.178	-0.041	-0.016	1.000	-0.013
Event Dummy	0.048	0.032	-0.144	-0.052	-0.013	-0.013	1.000

The tables below provide regression results for each utility and each DR event.

Table I-10 Regression Results, Missouri West 8-10-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.045	0.037	1.223	0.221	-0.016	0.105
MA4CDH	0.955	0.051	18.845	0.000	0.872	1.039
MA24CDH	0.761	0.100	7.621	0.000	0.596	0.925

Event Dummy	-1.758	0.023	-75.983	0.000	-1.796	-1.720
Snapback Dummy	-0.225	0.018	-12.450	0.000	-0.255	-0.196
Pre-Cooling Dummy	0.058	0.020	2.891	0.004	0.025	0.091
NHBU	0.000	0.000	-0.706	0.480	-0.001	0.000
Hour: 1	-0.254	0.014	-18.133	0.000	-0.277	-0.231
Hour: 2	-0.407	0.014	-28.731	0.000	-0.430	-0.383
Hour: 3	-0.513	0.014	-35.509	0.000	-0.537	-0.489
Hour: 4	-0.573	0.015	-38.652	0.000	-0.597	-0.548
Hour: 5	-0.578	0.015	-37.685	0.000	-0.603	-0.553
Hour: 6	-0.503	0.016	-31.612	0.000	-0.529	-0.477
Hour: 7	-0.443	0.017	-26.813	0.000	-0.470	-0.416
Hour: 8	-0.372	0.018	-20.708	0.000	-0.402	-0.343
Hour: 9	-0.238	0.019	-12.408	0.000	-0.269	-0.206
Hour: 10	-0.008	0.019	-0.430	0.667	-0.039	0.023
Hour: 11	0.227	0.020	11.528	0.000	0.194	0.259
Hour: 12	0.446	0.020	21.875	0.000	0.412	0.479
Hour: 13	0.638	0.022	29.345	0.000	0.602	0.674
Hour: 14	0.732	0.022	32.577	0.000	0.695	0.769
Hour: 15	0.910	0.022	40.479	0.000	0.873	0.947
Hour: 16	0.995	0.022	44.974	0.000	0.959	1.032
Hour: 17	1.150	0.022	52.869	0.000	1.114	1.185
Hour: 18	1.234	0.020	60.908	0.000	1.201	1.267
Hour: 19	1.056	0.019	55.302	0.000	1.025	1.088
Hour: 20	0.985	0.018	55.071	0.000	0.955	1.014
Hour: 21	0.871	0.016	54.212	0.000	0.844	0.897
Hour: 22	0.613	0.015	41.793	0.000	0.588	0.637
Hour: 23	0.265	0.014	18.774	0.000	0.242	0.288
Adjusted R-Squared: 0.575						

Table I-11 Regression Results, Missouri West 8-25-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.008	0.053	0.149	0.882	-0.079	0.094
MA4CDH	0.898	0.064	13.933	0.000	0.792	1.004
MA24CDH	1.052	0.141	7.459	0.000	0.820	1.284
Event Dummy	-1.493	0.023	-64.192	0.000	-1.531	-1.455
Snapback Dummy	0.422	0.019	22.139	0.000	0.391	0.453
Pre-Cooling Dummy	0.198	0.019	10.415	0.000	0.167	0.229

NHBU	-0.001	0.000	-2.771	0.006	-0.001	0.000
Hour: 1	-0.265	0.015	-17.462	0.000	-0.290	-0.240
Hour: 2	-0.434	0.016	-27.950	0.000	-0.460	-0.409
Hour: 3	-0.545	0.016	-33.799	0.000	-0.572	-0.519
Hour: 4	-0.621	0.017	-36.759	0.000	-0.649	-0.593
Hour: 5	-0.636	0.018	-35.216	0.000	-0.665	-0.606
Hour: 6	-0.558	0.019	-28.894	0.000	-0.590	-0.527
Hour: 7	-0.514	0.020	-25.209	0.000	-0.547	-0.480
Hour: 8	-0.436	0.023	-19.152	0.000	-0.474	-0.399
Hour: 9	-0.296	0.025	-12.010	0.000	-0.336	-0.255
Hour: 10	-0.074	0.023	-3.169	0.002	-0.112	-0.035
Hour: 11	0.171	0.024	7.003	0.000	0.131	0.211
Hour: 12	0.430	0.025	17.423	0.000	0.389	0.470
Hour: 13	0.620	0.024	25.430	0.000	0.580	0.660
Hour: 14	0.776	0.025	30.715	0.000	0.735	0.818
Hour: 15	0.902	0.025	36.077	0.000	0.861	0.944
Hour: 16	0.997	0.025	40.374	0.000	0.956	1.037
Hour: 17	1.179	0.024	49.001	0.000	1.139	1.219
Hour: 18	1.243	0.023	54.600	0.000	1.206	1.281
Hour: 19	1.091	0.021	51.112	0.000	1.056	1.126
Hour: 20	1.012	0.020	51.018	0.000	0.980	1.045
Hour: 21	0.928	0.018	50.959	0.000	0.898	0.958
Hour: 22	0.656	0.016	40.211	0.000	0.629	0.682
Hour: 23	0.286	0.015	18.480	0.000	0.260	0.311
Adjusted R-Squared: 0.584						

Table I-12 Regression Results, Missouri Metro 8-10-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.218	0.036	5.986	0.000	0.158	0.277
MA4CDH	0.646	0.050	12.891	0.000	0.564	0.729
MA24CDH	0.742	0.099	7.519	0.000	0.580	0.905
Event Dummy	-1.551	0.023	-67.806	0.000	-1.589	-1.514
Snapback Dummy	0.011	0.018	0.601	0.548	-0.019	0.040
Pre-Cooling Dummy	0.053	0.020	2.660	0.008	0.020	0.086
NHBU	0.000	0.000	2.101	0.036	0.000	0.001
Hour: 1	-0.233	0.014	-16.815	0.000	-0.256	-0.210
Hour: 2	-0.360	0.014	-25.683	0.000	-0.383	-0.337
Hour: 3	-0.455	0.014	-31.866	0.000	-0.479	-0.432

Hour: 4	-0.522	0.015	-35.624	0.000	-0.546	-0.498
Hour: 5	-0.541	0.015	-35.692	0.000	-0.566	-0.516
Hour: 6	-0.524	0.016	-33.320	0.000	-0.550	-0.498
Hour: 7	-0.478	0.016	-29.235	0.000	-0.504	-0.451
Hour: 8	-0.450	0.018	-25.316	0.000	-0.480	-0.421
Hour: 9	-0.398	0.019	-21.002	0.000	-0.429	-0.367
Hour: 10	-0.245	0.019	-13.175	0.000	-0.276	-0.215
Hour: 11	-0.024	0.019	-1.212	0.225	-0.056	0.008
Hour: 12	0.216	0.020	10.701	0.000	0.183	0.249
Hour: 13	0.412	0.022	19.165	0.000	0.377	0.447
Hour: 14	0.541	0.022	24.364	0.000	0.505	0.578
Hour: 15	0.729	0.022	32.789	0.000	0.692	0.766
Hour: 16	0.773	0.022	35.333	0.000	0.737	0.809
Hour: 17	0.935	0.022	43.483	0.000	0.900	0.970
Hour: 18	1.024	0.020	51.122	0.000	0.991	1.057
Hour: 19	0.860	0.019	45.513	0.000	0.829	0.891
Hour: 20	0.829	0.018	46.868	0.000	0.800	0.858
Hour: 21	0.804	0.016	50.601	0.000	0.778	0.830
Hour: 22	0.592	0.014	40.871	0.000	0.569	0.616
Hour: 23	0.298	0.014	21.340	0.000	0.275	0.321
Adjusted R-Squared: 0.577						

Table I-13 Regression Results, Missouri Metro 8-25-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.150	0.052	2.900	0.004	0.065	0.235
MA4CDH	0.638	0.063	10.065	0.000	0.534	0.743
MA24CDH	0.531	0.139	3.823	0.000	0.302	0.759
Event Dummy	-1.444	0.023	-63.065	0.000	-1.481	-1.406
Snapback Dummy	0.424	0.019	22.619	0.000	0.394	0.455
Pre-Cooling Dummy	0.176	0.019	9.401	0.000	0.145	0.207
NHBU	0.001	0.000	2.664	0.008	0.000	0.001
Hour: 1	-0.240	0.015	-16.055	0.000	-0.265	-0.216
Hour: 2	-0.378	0.015	-24.707	0.000	-0.403	-0.353
Hour: 3	-0.478	0.016	-30.073	0.000	-0.504	-0.451
Hour: 4	-0.552	0.017	-33.175	0.000	-0.579	-0.524
Hour: 5	-0.575	0.018	-32.343	0.000	-0.604	-0.545
Hour: 6	-0.544	0.019	-28.611	0.000	-0.575	-0.513
Hour: 7	-0.489	0.020	-24.385	0.000	-0.522	-0.456
Hour: 8	-0.459	0.022	-20.474	0.000	-0.496	-0.422

Hour: 9	-0.410	0.024	-16.891	0.000	-0.450	-0.370
Hour: 10	-0.258	0.023	-11.277	0.000	-0.296	-0.220
Hour: 11	-0.035	0.024	-1.437	0.151	-0.074	0.005
Hour: 12	0.231	0.024	9.503	0.000	0.191	0.271
Hour: 13	0.444	0.024	18.493	0.000	0.405	0.484
Hour: 14	0.600	0.025	24.129	0.000	0.559	0.641
Hour: 15	0.712	0.025	28.929	0.000	0.672	0.753
Hour: 16	0.780	0.024	32.109	0.000	0.740	0.820
Hour: 17	0.941	0.024	39.714	0.000	0.902	0.980
Hour: 18	0.998	0.022	44.515	0.000	0.961	1.035
Hour: 19	0.849	0.021	40.410	0.000	0.815	0.884
Hour: 20	0.815	0.020	41.718	0.000	0.783	0.847
Hour: 21	0.810	0.018	45.191	0.000	0.780	0.839
Hour: 22	0.606	0.016	37.743	6.61689612606119e-311	0.579	0.632
Hour: 23	0.306	0.015	20.098	0.000	0.281	0.331
Adjusted R-Squared: 0.587						

Table I-14 provides impact results for all residential demand response events called in 2020. The columns contain averages (weighted on the number of responding units) or sums across all DR events. The following columns are referenced in the tables below:

- Service Area – This column describes which service area the results cover.
- Event Date – This column contains the date of each DR event.
- Coefficient – This column contains the regression estimate of average kW savings/hour for DR events (or kWh savings/day for annual energy savings); a negative value indicates positive savings.
- Avg. # of Units Installed – The average number of units installed per premise.
- Avg. Tonnage – The average tonnage per premise based on professionally installed measures.
- Expected kW/Unit Savings – This column contains the expected DR event kW/Unit savings = 1.40.
- Realized kW/Unit Savings – This column contains the realized average DR event kW/Unit savings = (-1)*(Estimate)*(Avg # of Units Installed).
- Realized kW/Ton Savings – This column contains the realized average DR event kW/Ton savings = (-1)*(Estimate)*(Avg # of Units Installed).

- Expected kWh/Unit Savings – This column contains the expected annual kWh/Unit savings = 197.
- Realized kWh/Unit Savings – This column contains the realized annual kWh/Unit savings.
- Available Units (Sample) – This column contains the sampled number of available devices for the DR event. A device is deemed available if it was not removed or returned prior to the DR event and if the completion date is prior to the DR event date.
- Responding Units (Sample) – This column contains the number of responding devices in the sample = Available Units (Sample)*(1-%NRD/Opt-Out).
- Eligible Units – This column contains the number of devices eligible for savings. For kWh savings, a device is deemed eligible if the measure type is Do-it-Yourself (DIY) or Professional (PRO); Bring-Your-Own-Thermostat (BYOT) is ineligible for annual kWh savings as the assumption is that these customers would have installed the device in the absence of the program. In addition, the device must have been installed in PY20 and not returned or removed. For kWh eligible units, devices must have been installed but do not have to be available for DR events. For kW eligible units, devices must be available for DR events at some point in the program year to be eligible for savings.
- Responding Units – This column contains the number of extrapolated responding devices in total = Eligible Units*(1-%NRD/Opt-Out).
- %NRD/Opt-Out – This column contains the percentage of devices that were either Non-Responding Devices or customer opt-outs.
- Expected kW Savings – This column contains the total expected DR kW savings = Expected kW/Unit Savings*Eligible Units.
- Realized kW Savings – This column contains the total DR kW savings = Realized kW/Unit Savings*Responding Units.
- Expected kWh Savings – This column contains the total expected annual kWh savings = Expected kWh/Unit Savings*Eligible Units.
- Realized kW Savings – This column contains the total realized annual kWh savings = Realized kWh/Unit Savings*Eligible Units.

Table I-14 Residential DR Savings Summary

Service Area	Coefficient	Avg. # of Units Installed	Avg. Tonnage	Realized kW/Unit Savings	Realized kW/Ton Savings	Available Units (Sample)	% NRD/Opt-Out	Responding Units (Sample)
Missouri West Residential	-1.63	1.07	3.06	1.52	0.53	2,144	18%	1,754
Missouri Metro Residential	-1.50	1.08	2.90	1.39	0.52	2,110	18%	1,718

Table I-15 provides impact results for each residential DR event called in 2020. In addition,

Table I-15 Residential DR Savings by Event Date

Service Area	Event Date	Coefficient	Avg. # of Units Installed	Realized kW/Unit Savings	Realized kW/Ton Savings	Available Units (Sample)	% NRD/Opt-Out	Responding Units (Sample)
Missouri West Residential	8/10/2020	-1.76	1.07	1.65	0.57	2,055	12%	1,810
Missouri West Residential	8/25/2020	-1.49	1.07	1.39	0.49	2,232	24%	1,699
Missouri Metro Residential	8/10/2020	-1.55	1.08	1.44	0.54	1,997	13%	1,733
Missouri Metro Residential	8/25/2020	-1.44	1.08	1.33	0.49	2,223	23%	1,703

Table I-16 provides DR event savings versus weather during event hours.

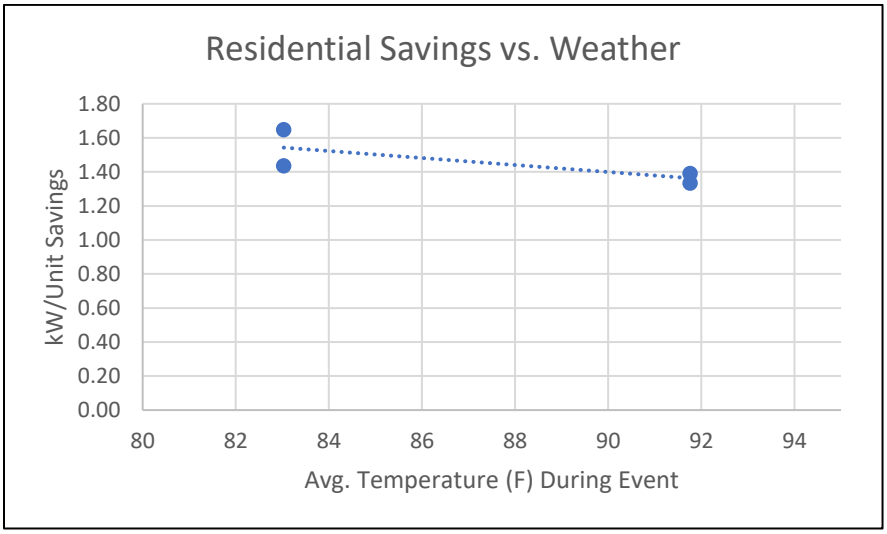
Table I-16 DR Event Savings vs. Weather

Service Area	Event Date	Avg. Temp (F) Event Hours	Realized kW/Unit Savings	% NRD/Opt-Out
Missouri West Residential	8/10/2020	83.03	1.65	12%
Missouri West Residential	8/25/2020	91.76	1.39	24%
Missouri Metro Residential	8/10/2020	83.03	1.44	13%
Missouri Metro Residential	8/25/2020	91.76	1.33	23%

Figure I-6 shows residential demand response event savings and weather correlations. While load is expected to increase with higher temperatures, there are conditions that may offset the increased savings potential. An example of these effects may include

increased numbers of manual overrides from customers reacting to the hotter weather and the additional HVAC runtime needed to cool at higher temperatures. Due to the limited number of demand response events run in 2020, there is insufficient information to determine a trend between savings and weather, and the inverse relationship of savings and temperature seen in the graph may have occurred due to chance.

Figure I-6 Residential DR Savings vs. Weather



I.7 Impact Evaluation: Final Savings Tables

Reported and Verified kW savings for RDR is shown in Table I-17 below. The realization rate for peak demand savings is 85%.

Table I-17 Residential Demand Response Peak Reduction (kW)

Service Area	Expected kW/Unit Savings	Realized kW/Unit Savings	Eligible Units	Responding Units	Expected kW Savings	Realized kW Savings	RR
Missouri West	1.40	1.52	3,182	2,618	4,454.80	3,989.42	90%
Missouri Metro	1.40	1.39	3,407	2,785	4,769.80	3,861.09	81%
Total			**6,589**	**5,403**	**9,224.60**	**7,850.51**	**85%**

Table I-18 shows annual expected and realized savings for residential Smart Thermostats. The realization rate is 100%.

Table I-18 Residential Annual Energy Savings (kWh)

Service Area	Expected kWh/Unit Savings	Realized kWh/Unit Savings	Eligible Units	Expected kWh Savings	Realized kWh Savings	RR
Missouri West	197	197	2,368	466,496	466,496	100%
Missouri Metro	197	197	2,529	498,213	498,213	100%
Total			**4,897**	**964,709**	**964,709**	**100%**

I.8 Process Evaluation

I.8.1 Program Operations

Johnson consulting, as a subcontractor to ADM conducted in-depth interviews with Evergy's product manager, Evergy's DSM portfolio manager, and CLEAResult Implementation Staff. The purpose of the in-depth interviews was to gain a better understanding of the program design, operations, challenges, and future opportunities

I.8.2 Roles and Responsibilities

The Residential Demand Response (RDR) program is implemented jointly by staff from Evergy and CLEAResult. Evergy staff provides overall program management and direction, and is responsible for all "programmatic decisions regarding strategies to increase overall program participation."

The program manager's duties includes supervising the CLEAResult team, ensuring that the implementation remains on track, and coordinating activities between CLEAResult and the software provider, Energy Data Metrics (EDM).

The Evergy program manager also coordinates with other Evergy staff internally to ensure that its DERMS database is tracking all relevant information and program details.

"I am the middleman between all of the different moving parts of the program."- Evergy Program Staff

CLEAResult has implemented the RDR program for several program cycles. Staff from CLEAResult include three field technicians who install the qualifying thermostats and also repair legacy thermostats from previous cycles, specially trained Customer Service Representatives (CSRs) and staff who collect customer data and work with EDM to supporting ongoing software development.

I.8.3 Program Operations

The RDR program underwent several changes to meet the new MEEIA requirements in Cycle 3 which included:

- Changing the thermostat offerings to include offerings from ecobee;
- Renegotiating the inclusion of Nest thermostats after Nest was purchased by Google;
- Including a customer co-payment in which the device and installation were no longer free;
- Combining separate databases into Evergy's internal database tracking program for DERMs; and
- Developing new ways to improve the retention of legacy one-ways devices from previous program cycles while also incorporating new Wi-Fi-enabled devices.

The impact of these program changes is summarized next.

Program Communication

Program staff from both organizations communicates regularly about all program activities. CLEAResult staff also shares any upcoming program promotions or discounts with the software provider, EDM, and the call center staff.

The RDR staff hold two weekly meetings to discuss specific program operations; one meeting focuses on updating the EDM database while the other reviews customer feedback from the call center.

Evergy staff will also meet separately with EDM staff and participate in internal meetings regarding the DERMS software, as appropriate.

The Evergy program staff reported that the call center staff does a "good job in de-escalating" any customer calls. CLEAResult has clear communication protocols in place on ways to address customer concerns and notify Evergy staff as appropriate.

Program Design Changes

For Cycle 3, the program design shifted from offering free Wi-Fi-enabled thermostats to now requiring customers to purchase them, albeit at a discounted price. Depending upon the model, customers could receive a $50.00 incentive if they bought their own thermostat (BYOT) or 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, at a discounted price Figure I-7 illustrates these new program enrollment options provided at the beginning of Cycle 3.

Figure I-7: Initial Enrollment Incentives for the Residential Smart Thermostat Program

Enrollment Type	**Description**	**Initial Incentive** (paid after Enrollment Date)	**Annual Participation Reward** (check or credited on Customer's November bill)
Bring Your Own Thermostat ("BYOT")	Enroll previously owned and installed eligible smart thermostat	$50 enrollment incentive	$25 after a full year of participation
Customer Self-Installed ("DIY")	Purchase at discounted price and install eligible smart thermostat from the Online Customer Portal	$0	$25 after a full year of participation
Professional Installation	Discounted Professional Installation of eligible smart thermostat at discounted price	$0	$25 after a full year of participation

Program Enrollment

Figure I-7 also summarizes the three ways in which customers can enroll in the program.

- Call Center: Customers sign up for the program during a call with the CSR on its dedicated thermostat program line. The CSR determines customer eligibility, reviews the terms and conditions, and enrolls the customer directly. If needed, the CSR can also schedule a thermostat installation. The customer can also pay for the installation during this call.
- BYOT: A customer purchases a thermostat and contacts the Call Center. The CSR directs the customer to the online portal, where the customer accepts the terms and conditions.

- Do It Yourself (DIY): The customer clicks on the enrollment link on Evergy's website, answers eligibility questions, selects their enrollment channel and device, and pays for the device.

To qualify for the program, customers must confirm that they have a working central air conditioner and a working Wi-Fi connection at the residence.

The CSRs conduct a number of checks with the customers to ensure that the new thermostat will be compatible with their current HVAC system. Several HVAC manufacturers have proprietary thermostats, and these systems are not eligible for the program. The CSRs also screen the customer's comfort and likely ability to self-install a thermostat and, where appropriate, recommend the customer installs the thermostat using the CLEAResult field technicians. This is a feature unique to Evergy's RDR program.

"I know a lot of other programs have outside HVAC contractors that do that work on their behalf and then somehow gets tied back to the program." Evergy Staff

After the customer has enrolled, regardless of the program channel, they will receive several confirmation emails regarding the device's status and a reminder for the installation appointment.

If a customer does not activate their device within 14 to 16 days, Evergy will send out a reminder email. If the customer does not respond after 25 days, the customer receives a more "strongly worded email" that says they must either install or return the device.

I.8.4 Program Marketing and Outreach

Evergy staff promotes this program using a variety of marketing channels including: the program website, Search Engine Optimization (SEO), and direct mail targeting specific customer groups within the residential market. All marketing and promotions are executed by Evergy staff; however, CLEAResult coordinates the marketing and outreach activities.

Direct mail has been one of the most effective customer engagement strategies, according to the program staff.

Targeted customer emails have also been a successful outreach strategy, but this outreach is coordinated with other Evergy activities to avoid sending customers multiple emails at the same time.

Periodically, Evergy will also offer additional price discounts, leveraging the thermostat manufacturers' promotions, which will reduce the customer's co-payment from $50.00 to $20.00 during some parts of the year.

However, due to the COVID-19 pandemic, all marketing activities were frozen in March 2020. Evergy staff decided to reduce its promotions because many of its residential customers were potentially facing financial hardship.

"We were hoping to offer people savings on their energy bill, but with the customer co-payment, it's hard to (ask) customers to enroll in the program…We try to take advantage of all the promotions we can that reduce the price of the thermostat to zero for a limited time. We're hoping we can provide some relief and also drive order volume at the same time."- Evergy Staff Member

I.8.5 Program Challenges

Identifying and engaging residential customers in the RDR program continues to be an ongoing challenge. As the program manager explained, Evergy has already enrolled the "early adopters."

"It's been more of a struggle to get those customers interested because they may not want a smart thermostat in their homes." – Evergy Program Staff

Now that the program is moving into its sixth year, the utility had to broaden the messaging beyond the technology to emphasize other program benefits, such as improved comfort or bill savings.

Cross Program Coordination

To date, there has been less emphasis on cross-coordination or cross-promotion of other Evergy programs with the RDR program in Cycle 3, compared to Cycle 2. Although there are field technicians in customers' homes, to date, there has not be any active cross-promotion with other Evergy programs.

"We were really on top of that in Cycle 2, and we have had a handout on all of our residential program offerings… we've not done that lately."

However, program staff indicated this was an area they would address going forward as they try to integrate their HVAC trade allies into its energy efficiency program offerings.

I.8.6 Program Results

Program enrollment did not meet expectations in 2020. Delays in contracting with CLEAResult and developing the online portal for the customer co-payment led to a program launch in March 2020, three months later than planned.

The participation goals are based on specific kilowatt (kW) reductions across Evergy's territory for the entire three-year program cycle. As the staff explained, the goals are split between residential and business customers, and across Evergy's two service territories. Table I-19 summarizes the first-year program targets and achieved savings for 2020.

Table I-19: Comparison of Targeted vs. Actual kW Savings for the RDR Program- 2020

Service Territory	kW Goal	kW Actual
Missouri Metro	29,771	21,265
Missouri West	31,594	22,567

As the program staff explained, the annual evaluation tells us "the number of devices we need to enroll in each year to hit our goals." Each device has a unit energy savings value, and the Evergy program manager sets participation levels based on the number of devices are needed to reach the kW savings goal. The enrollment projects are based on a per-device savings measure.

Despite its slow start, both Evergy and CLEAResult staff are optimistic that the RDR program will ultimately reach its three-year cumulative kW savings goals.

The program manager also pointed out that the actual participation rates in the Energy Savings Events were better than expected.

"We had a really good demand response season this year. We called two events, and we had pretty low opt-out rates. Considering that everyone was at home (due to COVID-19), I think that is a win."- Evergy Staff

Another program change that also negatively affected overall participation rates was that midway through 2020, Google acquired Nest. With the change in ownership, Google modified the implementation fees for Nest thermostats and required that their thermostats were enrolled in Google's Rush Hour Rewards Program.

In 2020, Evergy could not incorporate the Nest thermostats into its DERMS software platform, so Evergy could not enroll customers with Nest thermostats into the program. Since Nest was the top-selling thermostat, this program change had a negative effect on Evergy's ability to meet the kW savings goals.

"Nests were the highest sellers, but we only ended up with 50 percent of the total MEEIA goal—so didn't hit savings goal for the first year, but we do have three years to hit the goals as they are cumulative goals."- Evergy Program Staff

However, Evergy did add two other thermostat models to its program offerings: the ecobee3 lite and ecobee SmartThermostat. These thermostats were also cheaper than the Nest models.

"Bringing in ecobee only benefited us." Evergy Program Manager

I.8.7 Quality Assurance/Quality Control

The RDR program incorporates several layers of QA/QC into its ongoing program operations. For example, staff reviews the monthly customer satisfaction surveys and identifies areas requiring program adjustments.

The field technicians also complete a post-test of the thermostat before leaving the residence. The technicians will trouble-shoot any issues until the thermostat is working correctly.

The CLEAResult team reviews the customer call center records weekly and completes its internal QA/QC checks. CLEAResult staff also examines the budgeting and invoicing to ensure that the records are accurate. These issues are discussed, and the numbers are checked during their weekly meetings with Evergy program staff.

I.8.8 Data Tracking

All customer details are collected and stored on Evergy's EDM software program. Program staff from Evergy and CLEAResult are pleased with the data tracking system. Evergy staff is happy with how EDM has developed customized solutions to address any reporting issues.

In 2021, Evergy staff hopes that EDM will provide daily reports to the DERMs database, so DERMS will have a complete database record for all of the demand response programs.

I.8.9 Planned Program Changes

The program staff wants to continue to provide low-cost options for smart thermostats to its residential customers and are planning to market directly to low-income customers in 2021.

The program staff continues to work with EDM to improve its online portal to further streamline program enrollment and customer co-payments.

I.8.10 Areas for Program Improvement

Although the program has been working well, the program management and implementation staff identified several areas for future improvement:

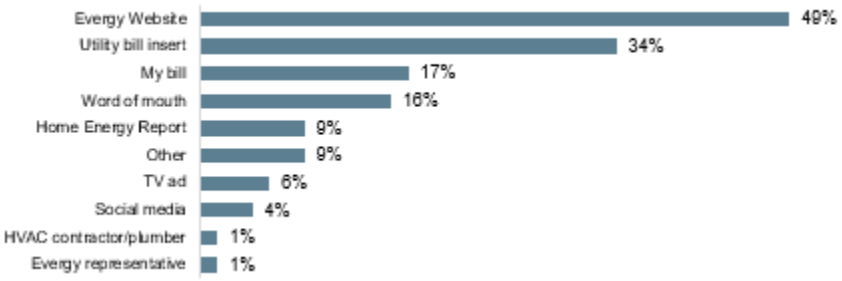
- Develop additional automation within EDM to ensure it is updating the DERMS daily file to be completed in 2021; and
- Focus on education and outreach to HVAC contractors.

I.8.11 Participant Survey Findings

Program Awareness

The survey respondents first identified how they learned about this program. The most frequently mentioned responses included learning about the program via Evergy either from the website (49%), a bill insert (34%), or from information on their electric bill about the program (17%). Figure I-8 summarizes the ways in which survey respondents learned about the program. Note, this was a multiple-response question, so the answers will not total 100%.

Figure I-8: Ways Respondents Heard About the Residential Thermostat Program



*multiple response question

Less frequently mentioned responses included word of mouth (16%), their Home Energy Report (9%), or other types of media advertising (10%). Of note, only one percent of these participants recalled learning about this DR program either directly from an HVAC contractor or an Evergy representative.

Program Participation and Enrollment

Most participants (66%) enrolled in the program before June 2020, while 19% enrolled between June 1 and August 30, 2020 (see Table I-20).

Table I-20: Program Enrollment Dates

Enrollment Period	Number Answering	Percent of Total
Before June 2020	**46**	**66%**
Between June 1 and August 30, 2020	**13**	**19%**
Don't Know	**11**	**16%**
Total	**70**	**100%**

Of the three program delivery channels, most participants installed the qualifying thermostat directly (62%) through the BYOT or DIY options. One-third (38%) used the Evergy's Field Technician to install these thermostats, as Figure I-9 shows.

Figure I-9: Residential Thermostat Installation

Reasons for Participation

There were two primary drivers of program participation: Save money or have a smart thermostat. The following comments illustrate these participants' sentiments.

"I was interested in purchasing the Nest thermostat for our older home. When I saw that we could purchase one through Evergy and, it seemed like a good time to make the change. Also, our son participates in the program."

"Cost savings and smart thermostat control."

"I just happened to need a new thermostat at the time. Also, it's an easy way to conserve ore energy."

"(I) wanted a better thermostat to help regulate energy expenditure."

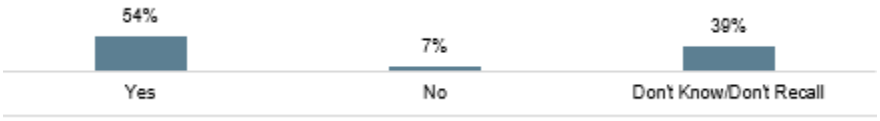
Event Participation

Overall, these respondents reported high levels of participation levels in the Energy Savings Events held in August 2021. Specific findings regarding each event are summarized next.

One Energy Savings Event occurred on August 10 from 4–6 p.m. More than one-half of the survey respondents (54%) recalled participating in that event. Approximately 39 percent of participants did not know or did not remember if they participated in the Energy Savings Event, while 7% (n = 5) did not participate in that event (see Figure I-10).

Of the five participants who did not participate in the Energy Savings Event, four said they were unaware of the event. The fifth respondent explained that the incentive was not high enough to encourage participation.

Figure I-10: Participation in the August 10 Energy Savings Event

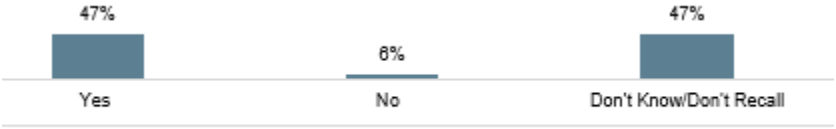


Respondents were asked if they recalled receiving notification before the August 10 event. More than one-half of these respondents (66%) recalled receiving an event notification, while one-quarter (24%) did not. Of note, 11% of participants said they did not receive notification of the event (see Figure I-11).

Figure I-11: Notification of Event on August 10, 2020

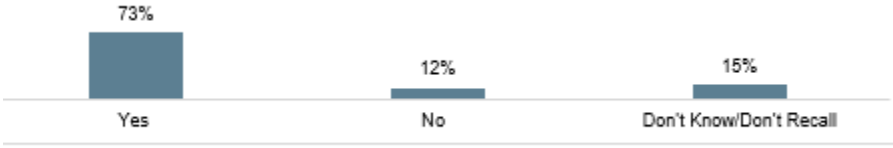
A second Energy Savings Event occurred on August 25 from 4–6 p.m. Nearly one-half of these respondents (47%) recalled participating in the event. Another 47% could not remember, while 6% (n = 4) reported that they did not participate in this savings event. All four participants who did not participate indicated that they were unaware of the event (see Figure I-12).

Figure I-12: Participation on August 25 Energy Savings Event



The respondents also were asked if they received a notification before the event on August 25. Similar to the previous findings, most respondents (73%) recalled receiving a notification about the August 25 Energy Savings Event, 12% did not, and 15% did not remember (see Figure I-13).

Figure I-13: Notification of Event on August 25, 2020



Satisfaction

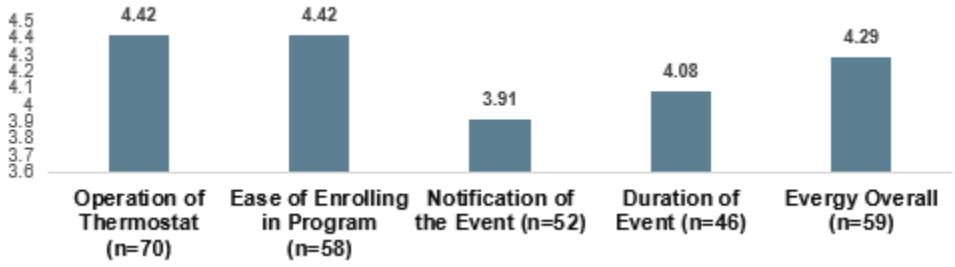
The respondents rated their overall satisfaction with the Residential Demand Response program's components using a five-point scale were "1" meant "Very Dissatisfied" and "5" meant "Very Satisfied." The following table summarizes the average satisfaction ratings for all program components.

Table I-21: Summary of Satisfaction Ratings for the Residential Demand Response Program

Satisfaction Component	Average Satisfaction Score	% Satisfied (i.e., "4" or "5" Rating)
Operation of Thermostat (n = 70)	4.42	90%
Ease of Enrolling in Program (n = 58)	4.42	97%
Notification of the Event (n = 52)	3.91	68%
Duration of Event (n = 46)	4.08	74%
Evergy Overall (n = 59)	4.29	88%

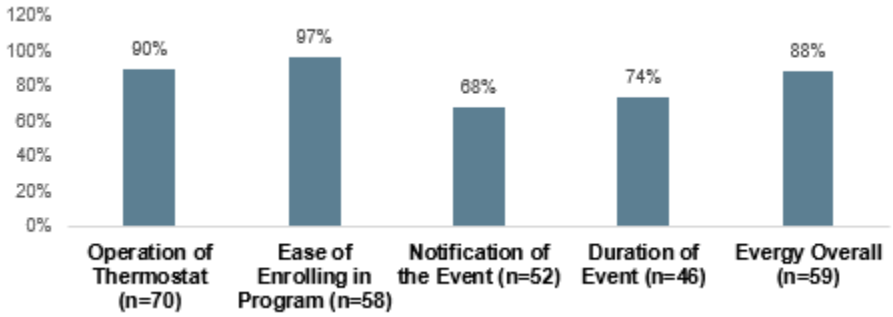
The respondents awarded the highest satisfaction ratings to thermostat's operation and the ease of program enrollment with a rating of 4.42 for each component, respectively. The component that received the lowest satisfaction rating was the notification of the event, with an average satisfaction rating of 3.91. Figure I-14 shows these ratings.

Figure I-14: Average Satisfaction Scores for Residential Smart Thermostat Program



Furthermore, most survey respondents were provided "Satisfied" ratings for all program components except for the "Notification of the Event" (68%). For example, most participants (97%) were satisfied with the ease of enrolling in the program and with the operation of the thermostat (90%). Approximately three-quarters (74%) were "Satisfied" with the duration of the event. Additionally, most survey respondents (88%) were "Satisfied" with Evergy overall (see Figure I-15).

Figure I-15: Percent of Residential Smart Thermostat Respondents Who Were Satisfied



Several respondents provided additional reasons for awarding these satisfaction ratings, which are highlighted next. The overall drivers were responsiveness of thermostat, ease to use and saves energy and money.

"It is responsive, and the phone app works well."

"It saves me money and effort in controlling my thermostat and helps me figure out where I should have it."

"It fluctuates to a temperature needed to help save energy."

"No issues and easy to use once I figured it out.

I.9 Conclusions and Recommendations

- Evergy's Residential Smart Thermostat program received high satisfaction ratings from program participants. However, the survey respondents indicated they wanted better notification of upcoming DR events. Therefore, Evergy staff should consider additional ways to provide event notification, including sending reminder emails to program participants. Evergy can ensure that its program application process captures and updates participant email addresses.
- Evergy can continue to look for ways to expand the eligibility of smart thermostats, as this strategy will make the program more affordable. Evergy should also continue its research into smart thermostat technology to identify additional devices in the next program year.

Appendix J Business Smart Thermostats

This chapter describes the evaluation activities that were performed by ADM to evaluate the Business Smart Thermostat Program.

J.1 Program Overview

The Business Smart Thermostat (BST) program offers customers the ability to control and monitor energy usage through their smart thermostat.

Participation Channels:

- Customers can purchase devices and install the device themselves.

Customers can enroll their eligible existing device

- Customers can receive discounted devices and receive professional installation.

Called upon devices (Cycle 3) will increase a customer's setpoint between 2- and 5-degrees Fahrenheit. Pre-cooling occurs prior to an event and the customer receives notification via their smart device application.

Expected Energy Savings and Demand Reduction

Targeted energy and demand impact for the Business Smart Thermostat program years 2020-2022 are shown in the tables below. These Targeted savings are taken from KCP&L filing EO-2019-0132.

Table J-1: Program Goal Savings by Year, Missouri Metro

Program Year	Energy Savings Goal (MWh)	Peak Demand Reductions Goal (MW)
2020	29	0.21
2021	58	0.43
2022	87	0.64
Total	174	1.28

Table J-2: Program Goal Savings by Year, Missouri West

Program Year	Energy Savings Goal (MWh)	Peak Demand Reductions Goal (MW)
2020	28	0.21
2021	57	0.41
2022	85	0.62
Total	170	1.24

Table J-3 below provides a summary of program metrics for the PY1.

Table J-3: Performance Metrics – Business Smart Thermostats

Metric	PY1 Total	West	Metro
Number of Participants*	114	70	44
Energy Savings (kWh)			
Targeted Energy Savings	57,524	28,368	29,156
Reported Energy Savings	19,503	10,441	9,062
Gross Verified Energy Savings	82,225	44,019	38,206
Net Verified Energy Savings	82,225	44,019	38,206
Peak Demand Reduction (kW)			
Targeted Peak Demand Reduction	420.48	207.36	213.12
Reported Peak Demand Reduction	159.60	98.00	61.60
Gross Verified Peak Demand Reduction	88.15	70.59	17.56
Net Verified Peak Demand Reduction	88.15	70.59	17.56
Benefit / Cost Ratios			
Total Resource Cost Test Ratio	0.72	0.98	0.43

J.2 EM&V Methodologies

This chapter describes the impact evaluation activities and methodology that ADM performed for Evergy's 2020 Business Smart Thermostat Program. The impact evaluation was performed for Evergy Metro and Evergy Missouri West. Table J-4 provides a summary of the savings approach by program year.

Table J-4: Savings Approaches by Program Year

Program Year	kW Savings (Demand Response)	kWh Savings
2020	Calculated	Calculated
2021	Calculated	Calculated
2022	PY2021 Value	Calculated

In evaluating the 2020 Business Smart Thermostat Program, ADM implemented a variety of impact evaluation exercises including estimation of gross and net energy savings (kWh) as well as peak demand reductions (kW) as framed by the following research questions:

- How many Evergy customers participated in the program? What is the quantity and type of measures incentivized/rebated?
- What is the energy savings for each incentivized measure?
- What is the peak demand reduction for each incentivized measure?
- What percentage of gross savings is directly attributable to the program (net savings analysis)?

J.2.1 Demand Response Events in 2020

As shown in Table J-5, there were two demand response events called in 2020 and both fell in the month of August. Curtailment events were called between the hours of 4 p.m. through 6 p.m. CDT for all demand response events.

Table J-5 Demand Response Events in 2020

August						
S	**M**	**T**	**W**	**Th**	**F**	**Sa**
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

J.2.2 Smart Thermostat Devices

Table J-6 provides the quantity of devices for each device type and utility[15]. Across both service areas, more participants installed Google Nest thermostats compared to the Ecobee thermostat.

Table J-6 Device Types by Service Area

Service Area	Device Type	# of Devices
Missouri West	Ecobee	32
Missouri West	Google Nest	43
Missouri Metro	Ecobee	14
Missouri Metro	Google Nest	37

As shown in Table J-7, the most popular device was the Google Nest Thermostat E which accounted for 37% of all devices across both service areas.

[15] Counts include all devices present in PY20 tracking data, with the exclusion of devices that were removed or returned in PY20.

Table J-7 Device Subtypes by Service Area

Utility	Device Type	# of Devices
Missouri West	ecobee Smart Thermostat with voice control	5
Missouri West	ecobee3 Lite	18
Missouri West	ecobee4	9
Missouri West	Google Nest 2nd Gen	1
Missouri West	Google Nest Learning Thermostat	16
Missouri West	Google Nest Thermostat E	26
Missouri Metro	ecobee Smart Thermostat with voice control	12
Missouri Metro	ecobee3 Lite	2
Missouri Metro	Google Nest Learning Thermostat	20
Missouri Metro	Google Nest Thermostat E	17

Table J-8 provides the number of Smart Thermostat units installed and the number of customers for each measure type[16]. Professional (PRO) installations were the most frequent measure type for the BST program and accounted for 61% of installations in 2020. In addition, Do-it-yourself (DIY) accounted for 23% of installations while Bring-Your-Own-Thermostat (BYOT) installations accounted for the remaining 16% of installed units.

[16] Counts include all devices present in PY20 tracking data, with the exclusion of devices that were removed or returned in PY20.

Table J-8 Smart Thermostat Installations by Measure Type

Utility	Measure Type	# of Smart Thermostat Units	# of Customers
Missouri West	BYOT Installation	18	8
Missouri West	DIY Installation	19	19
Missouri West	PRO Installation	38	15
Missouri Metro	BYOT Installation	2	1
Missouri Metro	DIY Installation	10	10
Missouri Metro	PRO Installation	39	18

J.3 Sampling Plan

ADM evaluated each participating thermostat for each event. An extrapolated peak demand reduction value from the analyzed thermostats was applied to thermostats with installation after all events took place.

J.4 Data collection

Data used for this evaluation include:

- Program tracking data for 2020. 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, and.
- A full schedule of program events, including the time of the event.

As a first step, 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 energy savings calculations and guidelines set by the Evergy Technical Reference Manual.

In addition, the heating and cooling equipment type for a sample of 25 customers were reviewed to ensure tracking data was entered correctly (e.g., efficiency and unit tonnage). The review of equipment data fields was only relevant to customers that have the smart thermostat professionally installed and was performed using the AHRI database. ADM found most unit tonnages reported for sampled units were accurate when compared to the AHRI database.

J.4.1 Weather Data

ADM collected two types of weather data for the evaluation: 1) actual recorded weather from the National Oceanographic and Atmospheric Administration (NOAA) and 2) 30-year weather normal or Typical Meteorological year (TMY) weather data. Actual weather data was used when fitting the models and TMY data was used to extrapolate savings (if appropriate).

ADM collected monthly Heating Degree Days (HDD) and Cooling Degree Days (CDD) from NOAA.gov for use in the regression analysis. Data was collected from the nearest available weather stations and assigned to each customer based on customer zip code. Monthly HDDs are calculated as the sum of daily average temperature values under the heating setpoint (65°F) in each month, while monthly CDDs are calculated as the sum of daily average temperature values over the cooling setpoint (70°F) in a given month. The setpoint values for HDDs and CDDs were determined by running regressions with multiple setpoints from 60°F-80°F and choosing the setpoint combination with the highest adjusted R-squared value (i.e., best fit).

ADM collected Typical Meteorological Year (TMY) data[17] from the nearest relevant weather station/s to extrapolate estimated annual savings, as shown in Table J-9.

Table J-9 TMY for Kansas City International Airport

Annual TMY	HDD	CDD
	5,581	1,461

J.5 Gross Impact Methodology

This section describes the impact evaluation activities and methodology that ADM performed for Evergy's PY1 Business Smart Thermostat Program.

J.5.1 Gross Energy Savings and Demand Reduction

Demand Response Demand Reduction (kW) Methodology

Demand savings for the demand response portion of the program was estimated using a weather-adjusted Linear Fixed Effects Regression (LFER) model. The model uses customers' 15-minute AMI data on event and non-event days to estimate the impact on energy demand. The LFER model specifies energy demand as a function of temperature and other variables that influence usage. ADM identified non-event days during the same month as demand response events whose weather pattern most closely matches the

[17] https://rredc.nrel.gov/solar/old_data/nsrdb/1991-2005/tmy3/by_state_and_city.html

weather pattern on event days, and these days served as the counterfactual baseline. ADM defined baseline days as those with maximum and average daily temperature greater than or equal to the minimum observed maximum/average temperature during all demand response events.

When fitting regression models, ADM tested correlations between explanatory variables, statistical significance of variables, and the impact of each variable on model fit.

The final form of the model is shown below.

Equation J-1: Linear Fixed Effects Regression Model

$$Usage\ (kWh)_{it} = \alpha_0 + \beta_1 CDH_{it} + \beta_2 PreCooling_{it} + \beta_3 Event_{it} + \beta_4 Snapback_{it} + \beta_5 MA4CDH_i + \beta_6 MA24CDH_{it} + \beta_7 NHBU_{it} + \sum_{h=1}^{24} \alpha_h * Hour_{it,h} + \epsilon_{it}$$

Where,

α_0	*= intercept term*
t	*= time interval*
I	*= index for smart thermostat devices*
$Usage(kWh)$	*= average usage during the time interval*
β_k, α_h	*= vectors of coefficients. The primary coefficient of interest is β_3 which provides the average kW reduction estimate during the demand response events*
CDH	*= cooling degree hours*
$PreCooling$	*= dummy variable for the three hours preceding an event*
$Event$	*= binary dummy variable for event hours*
$Snapback$	*= binary dummy variable for the three hours following an event*
$NHBU$	*= normalized heat build-up, defined as the cumulative heat buildup based on the weighted average of past hourly values. The weighting uses a compounded discount factor of 0.95833[18] for the number of hours prior (up to 48 hours)[19]*

[18] The discount factor comes from an estimate in PY2019 by Guidehouse. ADM tested the impact of various discount factors and found no impact on savings or model fit.

[19] For NHBU, 48 hours was selected by Guidehouse in PY2019, and ADM tested several other time periods, including 24 and 72 hours prior, and found no impact or savings or model fit.

$MA4CDH$ = *moving average of the last 4 hours CD.*

$MA24CDH$ = *moving average of the last 24 hours CDH*

$Hour$ = *vector of dummy variables for each hour of the day*

ϵ = *error term*

ADM estimated savings rates in kW/ton and kW/unit separately for both Evergy Metro and Evergy Missouri West. Tonnage was available for units with professional installation and was used as a proxy for the average tonnage of the population.

Prior to running the model, ADM removed devices that fail to meet certain criteria, including:

- Missing zip code for a device/customer (due to inability to map to correct weather data);
- Opt-out devices;
- Non-responding devices (NRD).

A device is considered a "non-responding device" (NRD) if it does not respond to the curtailment signal for reasons other than the device being manually overridden by the customer. Common causes of non-response are system outages, internet accessibility issues or other physical barriers that may block the signal.

Prior to the calculation of demand factors, non-responding devices are identified and removed from the sample using the NRD identification algorithm discussed below. Customers that opt-out of a demand response event or manually override their thermostat cannot be told apart from NRD devices using AMI data alone. However, devices for customers who opt-out or override their thermostat during a demand response event behave like NRDs. As such, ADM calculated the %NRD/Opt-out rate for each demand response event to account for NRD devices and customer opt-outs.

Classification of Non-Responding Devices using AMI Billing Data

Prior to the calculation of subgroup demand factors, non-responding devices are identified and removed from the analysis sample using a combination of 2 algorithms: a cumulative sum (CSUM) change in slope analysis and a straight 10% decrease in load detection. When a demand response event is called, each device is sent curtailment instructions that result in a significant load drop over the event period. This drop is illustrated in Figure J-1, where an example event is presented with an example "normal" usage curve.

The CSUM smoothing technique is a rolling sum:

Equation J-2: Cumulative Sum Smoothing

$$x = (a, b, c, \ldots, z) \quad CSUM(x) = (a, a+b, a+b+c, \ldots, a+\ldots+z)$$

where x is a vector of kWh measures taken at increasing one-hour intervals during the event day. By taking the CSUM of each treatment site for the demand response period a smoothed, increasing curve is created. The slopes of this curve for the three hours before the event starts, and the two hours of the event are calculated (Figure J-3). To test if there is a significant change in the slope due to the demand response event, we first take the ratio of the event period slope divided by the pre-period slope. A responding device is detected by a decrease in the line slope, so the ratio will be less than 1. Some sites have unique meter profiles that can confuse this first test, so a second test is applied. Test 2 uses the average meter curve for each site on baseline days to create a "site-normal" curve to compare with the event curve. The same CSUM slopes are taken of the non-event curve and a ratio is measured. If the ratio of the non-event curve is greater than the ratio event curve, then the device is classified as responding. Any devices left over after the two tests are classified as non-responding and removed.

In parallel with the CSUM analysis, a straight test for 10% reduction in consumption due to the event being called is also employed. For each unique device, the kWh for 1-hour pre-event and consumption for the first hour of the event are analyzed for a drop greater than 10% using the following:

Equation J-3: Pre-event Consumption

$$Non - Responding \; if \; T1_{kWh} \leq T2_{kWh}, \qquad where$$

$$T1_{kWh} = \; PreHr_{kWh} - EventHr_{kWh} \quad and \quad T2_{kWh} = PreHr_{kWh} * 10\%$$

These two lists of non-responding devices are then cross-referenced, and those devices identified by both methods are removed from the analysis subgroup. By taking advantage of the processing speed of vectorized programming in the R-Studio environment, every individual site in the program is tested per event.

Figure J-1: Example of Site-Level Load Shapes During Event Hours

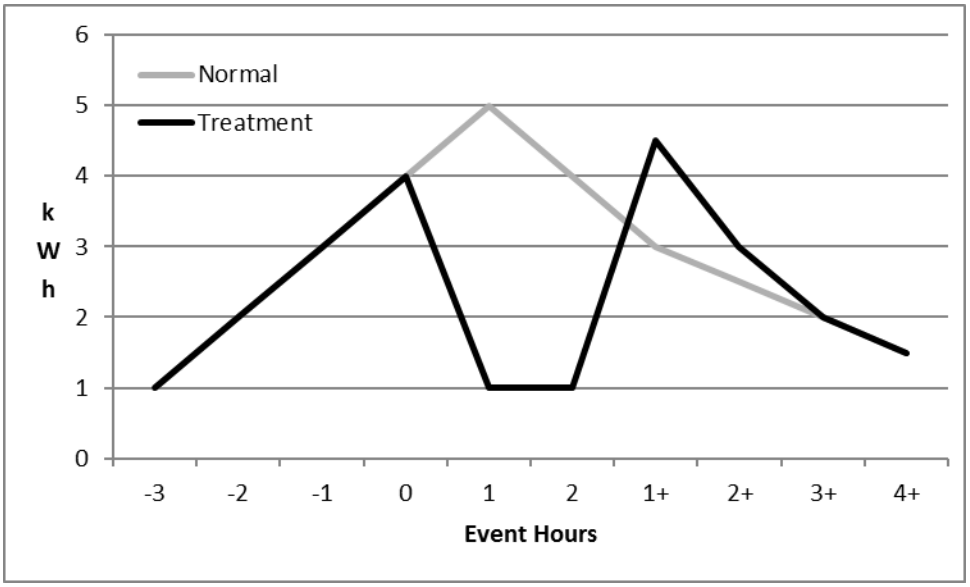


Figure J-2: Example of Site-Level CSUM Slope Changes During Event Hours

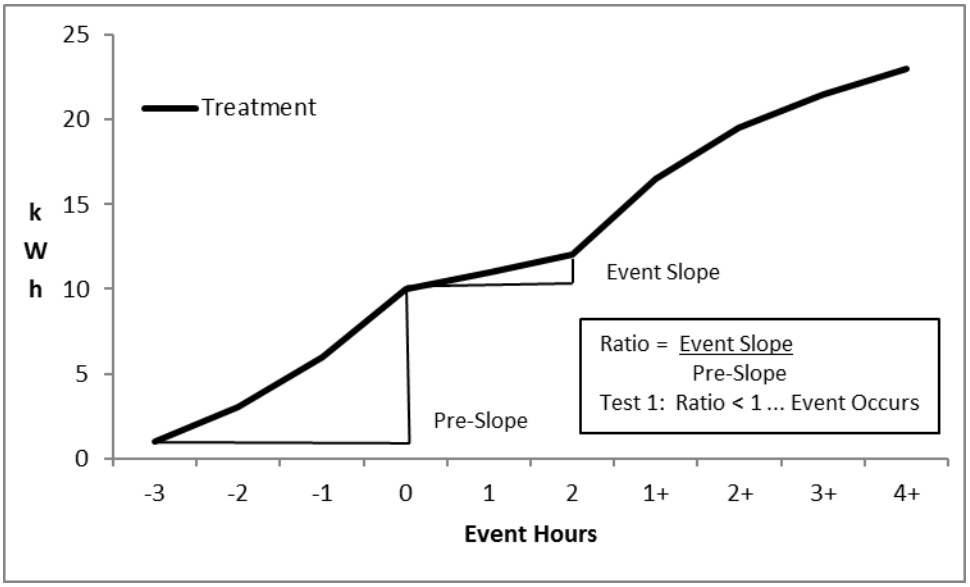
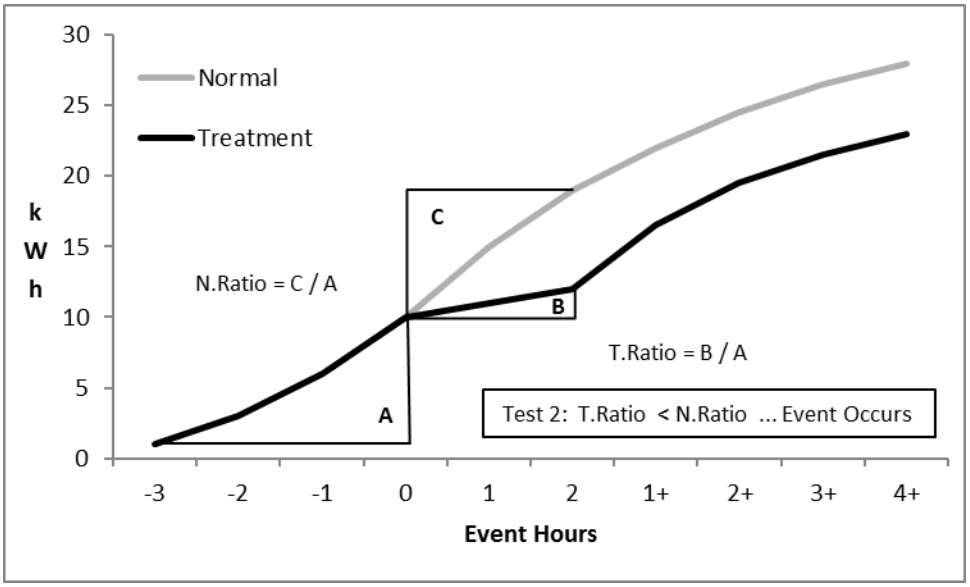


Figure J-3: Example of the CSUM Change in Slope Analysis used to Identify NRDs.



Annual Energy Savings (kWh) Methodology

Annual energy savings for smart thermostat customers were estimated using a weather-adjusted Lagged Dependent Variable (LDV) ordinary least-squares (OLS) regression model. A matched comparison group was created using a propensity score matching (PSM) approach. With the PSM approach, a propensity score is estimated for treatment customers (i.e., those who received program services) and a group of customers who did not receive program services using a logit model. Customers in the treatment and control groups are matched based on seasonal pre-period usage (e.g., summer, spring, fall, and winter) and zip code (or other geographical identifiers). In addition, demand response event days are removed from the data to avoid creating bias.

Control group customers were selected from customers who have not participated in any demand response or energy efficiency programs. In addition, the LDV model utilized post period data only. Data for control customers was restricted to the post period timeframe for their matched participant (to ensure the same number of observations in the post period). After creating a matched comparison group, the program impacts were estimated with the following regression.

The final form of the model is shown below.

Equation J-4: Final Model

$$Usage\ (kWh)_{it} = \alpha_0 + \sum_{m=1}^{12} \alpha_m * Month_{m,t} + \beta_1 * Treatment_{it} + \beta_2 * Weekday_{it} + \beta_3 * HDD_{it} + \beta_4 * CDD_{it} + \beta_5 * Treatment_{it} * HDD_{it} + \beta_6 * Treatment_{it} * CDD_{it} + \epsilon_{it}$$

Where,

α_0	*= intercept term*
T	*= index for the time interval*
I	*= index for the customer*
$Month$	*= dummy variable for month of the year*
$Treatment$	*= dummy variable = 1 if in the treatment group, and 0 otherwise*
$Weekday$	*= dummy variable for weekdays*
HDD_{it}	*= average heating degree hours for time interval t*
CDD_{it}	*= average cooling degree hours for time interval t*
ϵ_{it}	*= error term*
α, β	*= parameters to be estimated by the model.*

The total annual energy savings (kWh) for the program is calculated by taking the estimated kWh savings/unit and multiplying by the number of thermostat units considered part of the program in 2020.

Estimating Net Savings

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%.

J.5.2 COVID-19 Impact Considerations

Prior to June 16th, Missouri was under Phase 1 of its COVID-19 reopening plan which had restrictions on business operations. Phase 2 of Missouri's reopening plan began on June 16th and contains no statewide public health order. Since all DR events were called after Phase 2, ADM determined there were no impacts to the DR events from COVID-19.

J.6 Gross Impact Evaluation Findings

The following sections provide the results of the impact evaluation for Business Smart Thermostats. When savings are shown at the service area level, savings and other units are averaged and weighted by the number of available devices for each demand response event.

J.6.1 Peak Demand Reduction from Demand Response Events

Figure J-4 provides an example load shape on baseline and event days for event 1, while Figure J-5 provides the same average for event 2.

Figure J-4 BST DR Load Shape Example, Event 1

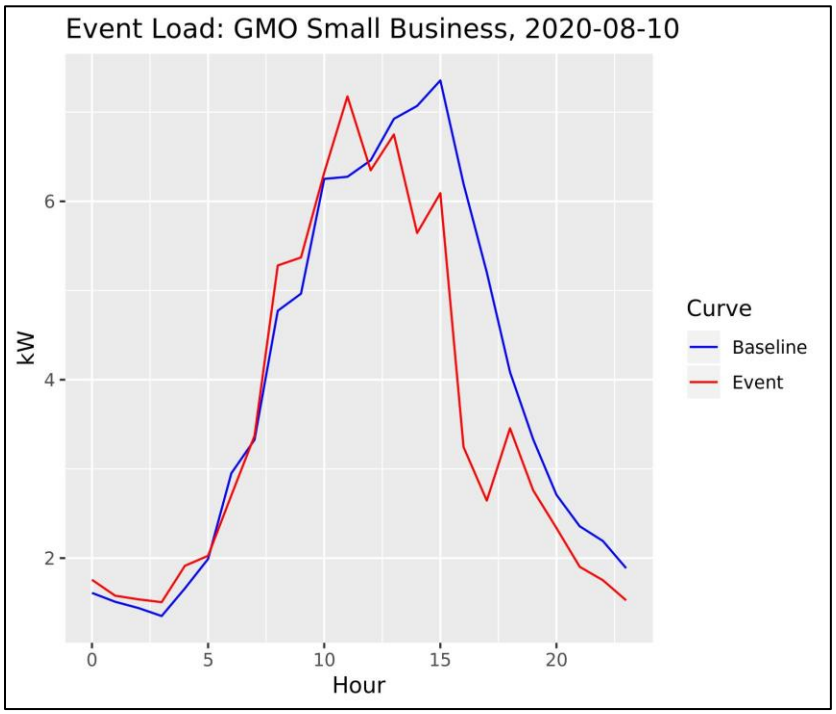


Figure J-5 BST DR Load Shape Example, Event 2

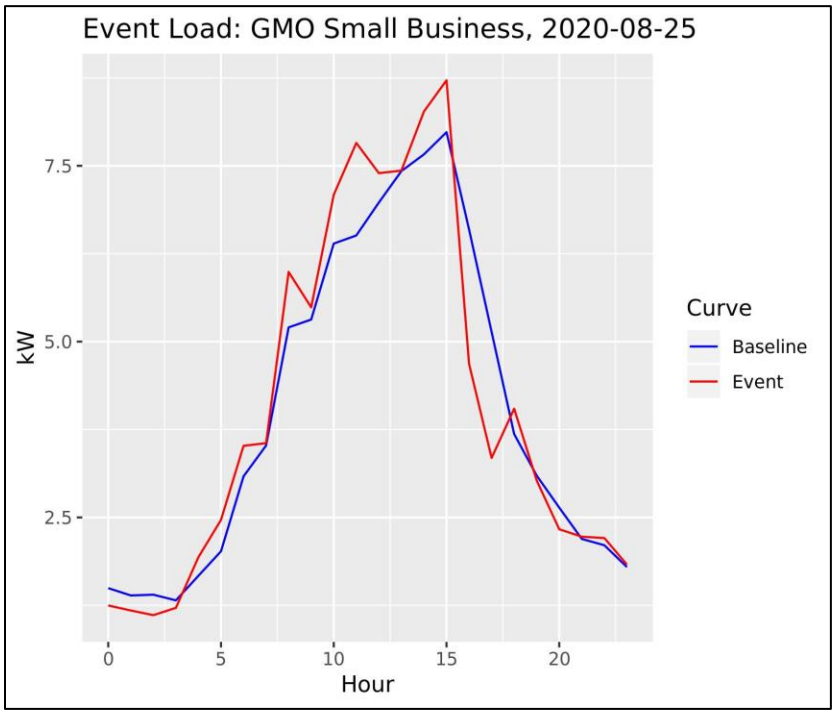


Table J-10 provides the correlation matrix for the variables included in the regression. ADM tested the exclusion of highly correlated variables during the modeling process and found very limited impacts on savings and model fit. Therefore, ADM opted not to exclude

model covariates to ensure comparability and consistency with regression modeling in prior program years.

Table J-10 Regression Variable Correlation Matrix

Variable	CDD	MA4CDH	MA24CDH	NHBU	Pre-Cooling Dummy	Snapback Dummy	Event Dummy
CDD	1.000	0.911	0.189	0.335	0.205	0.099	0.159
MA4CDH	0.911	1.000	0.230	0.583	0.178	0.167	0.177
MA24CDH	0.189	0.230	1.000	0.721	-0.015	0.021	-0.004
NHBU	0.335	0.583	0.721	1.000	0.018	0.163	0.091
Pre-Cooling Dummy	0.205	0.178	-0.015	0.018	1.000	-0.016	-0.013
Snapback Dummy	0.099	0.167	0.021	0.163	-0.016	1.000	-0.013
Event Dummy	0.159	0.177	-0.004	0.091	-0.013	-0.013	1.000

The tables below provide regression results for each utility and each DR event.

Table J-11 Regression Results, Missouri West 8-10-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	-0.617	0.951	-0.649	0.516	-2.181	0.947
MA4CDH	2.023	1.311	1.544	0.123	-0.133	4.180
MA24CDH	3.328	2.581	1.290	0.197	-0.918	7.574
Event Dummy	-2.254	0.598	-3.769	0.000	-3.239	-1.270
Snapback Dummy	-0.251	0.468	-0.537	0.592	-1.021	0.519
Pre-Cooling Dummy	-0.429	0.520	-0.825	0.409	-1.285	0.427
NHBU	-0.008	0.006	-1.230	0.219	-0.018	0.003
Hour: 1	-0.081	0.362	-0.224	0.823	-0.677	0.515
Hour: 2	-0.141	0.366	-0.384	0.701	-0.743	0.461
Hour: 3	-0.207	0.374	-0.554	0.580	-0.822	0.408
Hour: 4	0.117	0.383	0.306	0.760	-0.513	0.748
Hour: 5	0.415	0.397	1.048	0.295	-0.237	1.068
Hour: 6	1.329	0.411	3.231	0.001	0.652	2.006
Hour: 7	1.743	0.427	4.083	0.000	1.041	2.446
Hour: 8	3.251	0.465	6.991	0.000	2.486	4.017
Hour: 9	3.336	0.495	6.735	0.000	2.521	4.151
Hour: 10	4.392	0.487	9.017	0.000	3.591	5.194
Hour: 11	4.357	0.509	8.566	0.000	3.520	5.194
Hour: 12	4.301	0.527	8.162	0.000	3.434	5.168
Hour: 13	4.745	0.562	8.439	0.000	3.820	5.670
Hour: 14	4.693	0.581	8.082	0.000	3.738	5.648

Hour: 15	4.968	0.581	8.546	0.000	4.012	5.925
Hour: 16	3.825	0.572	6.684	0.000	2.883	4.766
Hour: 17	2.898	0.562	5.155	0.000	1.973	3.824
Hour: 18	1.821	0.524	3.475	0.001	0.959	2.683
Hour: 19	1.158	0.494	2.344	0.019	0.345	1.971
Hour: 20	0.634	0.462	1.370	0.171	-0.127	1.395
Hour: 21	0.355	0.415	0.855	0.393	-0.328	1.038
Hour: 22	0.341	0.379	0.898	0.369	-0.283	0.964
Hour: 23	0.151	0.365	0.414	0.679	-0.450	0.752
Adjusted R-Squared: 0.629						

Table J-12 Regression Results, Missouri West 8-25-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.521	1.380	0.378	0.706	-1.749	2.791
MA4CDH	0.977	1.690	0.578	0.563	-1.803	3.758
MA24CDH	6.672	3.699	1.804	0.071	0.585	12.758
Event Dummy	-1.843	0.610	-3.022	0.003	-2.847	-0.840
Snapback Dummy	0.017	0.500	0.034	0.973	-0.805	0.840
Pre-Cooling Dummy	0.407	0.498	0.818	0.414	-0.412	1.227
NHBU	-0.013	0.008	-1.689	0.091	-0.026	0.000
Hour: 1	-0.136	0.399	-0.342	0.732	-0.792	0.519
Hour: 2	-0.135	0.408	-0.331	0.741	-0.805	0.536
Hour: 3	-0.231	0.423	-0.547	0.585	-0.928	0.465
Hour: 4	0.108	0.443	0.244	0.807	-0.621	0.837
Hour: 5	0.449	0.473	0.949	0.343	-0.330	1.228
Hour: 6	1.447	0.507	2.855	0.004	0.613	2.281
Hour: 7	1.723	0.535	3.223	0.001	0.843	2.603
Hour: 8	3.319	0.598	5.554	0.000	2.336	4.302
Hour: 9	3.173	0.646	4.909	0.000	2.109	4.236
Hour: 10	4.194	0.610	6.879	0.000	3.190	5.197
Hour: 11	4.235	0.641	6.610	0.000	3.181	5.289
Hour: 12	4.529	0.647	7.002	0.000	3.465	5.594
Hour: 13	4.883	0.640	7.632	0.000	3.830	5.935
Hour: 14	5.197	0.663	7.839	0.000	4.106	6.288
Hour: 15	5.605	0.656	8.544	0.000	4.525	6.684
Hour: 16	4.272	0.647	6.598	0.000	3.207	5.337
Hour: 17	2.943	0.631	4.663	0.000	1.904	3.981
Hour: 18	1.681	0.597	2.815	0.005	0.698	2.663
Hour: 19	1.166	0.560	2.082	0.037	0.244	2.087

Hour: 20	0.847	0.520	1.628	0.104	-0.009	1.704
Hour: 21	0.571	0.478	1.196	0.232	-0.215	1.357
Hour: 22	0.535	0.428	1.251	0.211	-0.169	1.239
Hour: 23	0.276	0.406	0.679	0.497	-0.392	0.943
Adjusted R-Squared: 0.65						

Table J-13 Regression Results, Missouri Metro 8-10-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.204	0.575	0.355	0.723	-0.743	1.151
MA4CDH	-0.081	0.793	-0.102	0.919	-1.386	1.224
MA24CDH	2.003	1.562	1.282	0.200	-0.568	4.573
Event Dummy	-0.908	0.362	-2.509	0.012	-1.504	-0.313
Snapback Dummy	-0.563	0.283	-1.989	0.047	-1.029	-0.097
Pre-Cooling Dummy	-0.081	0.315	-0.258	0.796	-0.600	0.437
NHBU	-0.004	0.004	-1.074	0.283	-0.010	0.002
Hour: 1	-0.153	0.219	-0.699	0.484	-0.514	0.208
Hour: 2	-0.185	0.222	-0.834	0.404	-0.549	0.180
Hour: 3	-0.261	0.226	-1.154	0.249	-0.633	0.111
Hour: 4	-0.281	0.232	-1.212	0.225	-0.663	0.100
Hour: 5	-0.104	0.240	-0.433	0.665	-0.499	0.291
Hour: 6	-0.244	0.249	-0.980	0.327	-0.654	0.166
Hour: 7	-0.052	0.258	-0.202	0.840	-0.477	0.373
Hour: 8	0.016	0.281	0.058	0.954	-0.447	0.480
Hour: 9	0.323	0.300	1.078	0.281	-0.170	0.817
Hour: 10	0.745	0.295	2.528	0.012	0.260	1.230
Hour: 11	1.176	0.308	3.818	0.000	0.669	1.682
Hour: 12	1.159	0.319	3.634	0.000	0.634	1.684
Hour: 13	1.044	0.340	3.067	0.002	0.484	1.604
Hour: 14	1.105	0.351	3.144	0.002	0.527	1.683
Hour: 15	1.400	0.352	3.979	0.000	0.821	1.979
Hour: 16	1.034	0.346	2.985	0.003	0.464	1.604
Hour: 17	0.941	0.340	2.765	0.006	0.381	1.501
Hour: 18	0.854	0.317	2.694	0.007	0.333	1.376
Hour: 19	0.880	0.299	2.944	0.003	0.388	1.372
Hour: 20	0.913	0.280	3.261	0.001	0.452	1.373
Hour: 21	0.683	0.251	2.716	0.007	0.269	1.096
Hour: 22	0.232	0.229	1.012	0.312	-0.145	0.610
Hour: 23	0.168	0.221	0.761	0.446	-0.195	0.532

Adjusted R-Squared: 0.485

Table J-14 Regression Results, Missouri Metro 8-25-2020

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
CDD	0.201	0.862	0.233	0.816	-1.218	1.620
MA4CDH	-0.216	1.056	-0.205	0.838	-1.954	1.522
MA24CDH	1.269	2.312	0.549	0.583	-2.536	5.074
Event Dummy	-0.432	0.381	-1.134	0.257	-1.060	0.195
Snapback Dummy	0.424	0.312	1.356	0.175	-0.091	0.938
Pre-Cooling Dummy	0.551	0.311	1.768	0.077	0.038	1.063
NHBU	-0.003	0.005	-0.639	0.523	-0.011	0.005
Hour: 1	-0.164	0.249	-0.658	0.510	-0.574	0.246
Hour: 2	-0.229	0.255	-0.900	0.368	-0.648	0.190
Hour: 3	-0.302	0.264	-1.142	0.254	-0.737	0.133
Hour: 4	-0.306	0.277	-1.104	0.270	-0.761	0.150
Hour: 5	-0.131	0.296	-0.443	0.658	-0.618	0.356
Hour: 6	-0.284	0.317	-0.898	0.369	-0.806	0.237
Hour: 7	-0.072	0.334	-0.215	0.830	-0.622	0.478
Hour: 8	0.040	0.373	0.107	0.914	-0.575	0.655
Hour: 9	0.387	0.404	0.957	0.339	-0.278	1.051
Hour: 10	0.884	0.381	2.321	0.020	0.257	1.512
Hour: 11	1.306	0.400	3.261	0.001	0.647	1.965
Hour: 12	1.349	0.404	3.338	0.001	0.684	2.015
Hour: 13	1.291	0.400	3.229	0.001	0.633	1.949
Hour: 14	1.296	0.414	3.128	0.002	0.614	1.978
Hour: 15	1.594	0.410	3.889	0.000	0.920	2.269
Hour: 16	1.213	0.405	2.998	0.003	0.547	1.879
Hour: 17	1.111	0.394	2.817	0.005	0.462	1.760
Hour: 18	0.971	0.373	2.602	0.009	0.357	1.585
Hour: 19	1.030	0.350	2.942	0.003	0.454	1.606
Hour: 20	1.034	0.325	3.178	0.002	0.498	1.569
Hour: 21	0.957	0.298	3.205	0.001	0.465	1.448
Hour: 22	0.403	0.267	1.508	0.132	-0.037	0.843
Hour: 23	0.309	0.254	1.218	0.224	-0.109	0.726
Adjusted R-Squared: 0.445						

Table J-15 provides impact results for all BST demand response events called in 2020. The columns contain averages (weighted on the number of responding units) or sums across all demand response events. The following columns are referenced in the tables below:

- **Service Area** – This column describes which service area the results cover.
- **Event Date** – This column contains the date of each DR event.
- **Coefficient** – This column contains the regression estimate of average kW savings/hour for DR events (or kWh savings/day for annual energy savings); a negative value indicates positive savings.
- **Avg. # of Units Installed** – The average number of units installed per premise.
- **Avg. Tonnage** – The average tonnage per premise based on professionally installed measures.
- **Expected kW/Unit Savings** – This column contains the expected DR event kW/Unit savings = 1.40.
- **Realized kW/Unit Savings** – This column contains the realized average DR event kW/Unit savings = (-1)*(Estimate)*(Avg # of Units Installed).
- **Realized kW/Ton Savings** – This column contains the realized average DR event kW/Ton savings = (-1)*(Estimate)*(Avg # of Units Installed).
- **Expected kWh/Unit Savings** – This column contains the expected annual kWh/Unit savings = 197.
- **Realized kWh/Unit Savings** – This column contains the realized annual kWh/Unit savings.
- **%NRD/Opt-Out** – This column contains the percentage of devices that were either Non-Responding Devices or customer opt-outs.
- **Available Units (Sample)** – This column contains the sampled number of available devices for the DR event. A device is deemed available if it was not removed or returned prior to the DR event and if the completion date is prior to the DR event date.
- **Responding Units (Sample)** – This column contains the number of responding devices in the sample = Available Units (Sample)*(1-%NRD/Opt-Out).
- **Eligible Units** – This column contains the number of devices eligible for savings. For kWh savings, a device is deemed eligible if the measure type is Do-it-Yourself (DIY) or Professional (PRO); Bring-Your-Own-Thermostat (BYOT) is ineligible for annual kWh savings as the assumption is that these customers would have installed the

device in the absence of the program. In addition, the device must have been installed in PY20 and not returned or removed[20]. For kWh eligible units, devices must have been installed but do not have to be available for DR events. For kW eligible units, devices must be available for DR events at some point in the program year to be eligible for savings[21].

- **Responding Units** – This column contains the number of responding devices in total = Eligible Units*(1-%NRD/Opt-Out).
- **Expected kW Savings** – This column contains the total expected DR kW savings = Expected kW/Unit Savings*Responding Units.
- **Realized kW Savings** – This column contains the total DR kW savings = Realized kW/Unit Savings*Responding Units.
- **Expected kWh Savings** – This column contains the total expected annual kWh savings = Expected kWh/Unit Savings*Eligible Units.
- **Realized kW Savings** – This column contains the total realized annual kWh savings = Realized kWh/Unit Savings*Eligible Units.

Table J-15 BST DR Savings Summary

Service Area	Coefficient	Avg. # of Units Installed	Avg. Tonnage	Realized kW/Unit Savings	Realized kW/Ton Savings	Available Units (Sample)	% NRD/Opt-Out	Responding Units (Sample)
Missouri West	-2.03	1.67	3.83	1.22	0.53	36	17%	29
Missouri Metro	-0.62	1.32	3.00	0.47	0.21	20	15%	17

Table J-16 provides impact results for each BST demand response event called in 2020. In addition, Table J-17 provides demand response event savings versus weather during event hours.

[20] Evergy also removes devices returned or removed in PY20 that were available or installed in prior program years. The Eligible Unit counts reflect these annual adjustments.

[21] kW savings for devices installed after DR events in PY20 are not extrapolated from the sampled units as the sample size is too small. kW savings for these devices will be claimed in the next program year.

Table J-16 BST DR Savings by Event Date

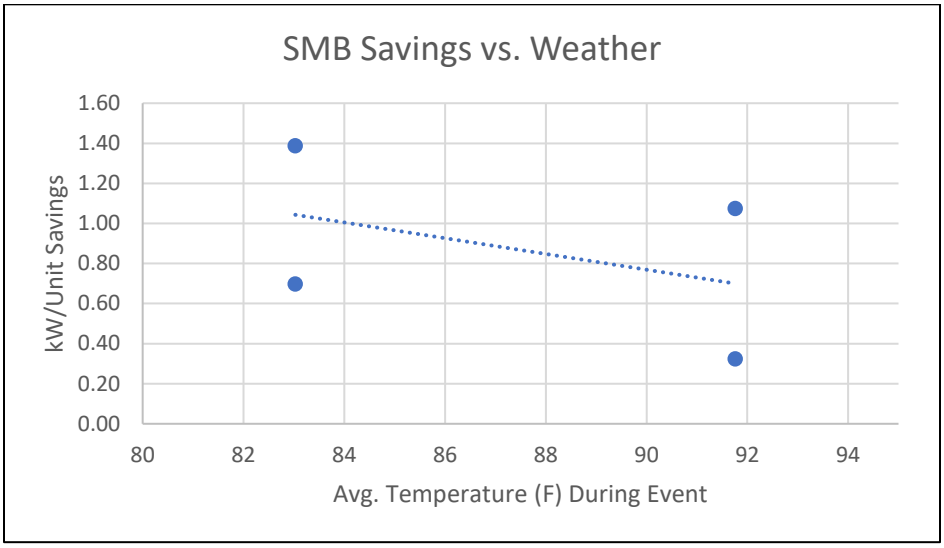
Service Area	Event Date	Coefficient	Avg. # of Units Installed	Realized kW/Unit Savings	Realized kW/Ton Savings	Available Units (Sample)	% NRD/Opt-Out	Responding Units (Sample)
Missouri West	8/10/2020	-2.25	1.63	1.39	0.57	30	11%	27
Missouri West	8/25/2020	-1.84	1.71	1.08	0.50	41	22%	32
Missouri Metro	8/10/2020	-0.91	1.30	0.70	0.30	14	9%	13
Missouri Metro	8/25/2020	-0.43	1.33	0.32	0.14	25	18%	20

Table J-17 BST DR Event Savings vs. Weather

Service Area	Event Date	Avg. Temp (F) Event Hours	Realized kW/Unit Savings	% NRD/Opt-Out
Missouri West	8/10/2020	83.03	1.39	11%
Missouri West	8/25/2020	91.76	1.08	22%
Missouri Metro	8/10/2020	83.03	0.70	9%
Missouri Metro	8/25/2020	91.76	0.32	18%

Figure J-6 shows BST demand response event savings and weather correlations. While load normally increases with higher temperatures, there are effects that may offset the increased savings potential. An example of these effects may include increased numbers of manual overrides from customers reacting to the hotter weather and the additional HVAC runtime needed to cool at higher temperatures. Due to the limited number of demand response events run in 2020, there is insufficient information to determine a trend between savings and weather, and the inverse relationship of savings and temperature seen in the graph may have occurred due to chance.

Figure J-6: BST DR Savings vs. Weather



Expected and realized kW savings for BST DR is shown in Table J-18 below. The realization rate for kW savings is 55%. The realization rate can be explained by the removal of devices found to be non-responding (which would include devices that have been opted out) as well as the difference in realized demand reduction.

Table J-18 BST DR Savings

Service Area	Expected kW/Unit Savings	Realized kW/Unit Savings	Eligible Units	Responding Units	Expected kW Savings	Realized kW Savings	RR
Missouri West Small Business	1.40	1.22	70	58	98.00	70.59	72%
Missouri Metro Small Business	1.40	0.47	44	38	61.60	17.56	29%
Total			**114**	**96**	**159.60**	**88.15**	**55%**

J.6.2 Annual Energy Savings (kWh)

ADM was successful in creating a matched cohort and the results of PSM and the annual consumption estimate for BST are summarized below. ADM used nearest neighbor, 2 to 1 ratio matching and had a considerable pool of control customers to draw upon, as shown in Table J-19. Customers were matched on Zip Code (exact match) and their average pre-period seasonal usage, including summer, fall, and winter for each control and treatment household. Due to the small pool of available treatment customers and the lack of post-period data for spring, customers were not matched on pre-period spring usage as this would have resulted in fewer treatment customers available for matching.

Prior to matching, customers were required to have at least three months of post-period data. In addition, demand response event days were removed from the post-period to avoid creating bias.

Table J-19 PSM Customer Matches

Status	Control	Treated
All	4,037	32
Matched	64	32
Unmatched	3,973	0

Table J-20 presents the propensity score covariate summary of pre-period usage for treatment and control customers before and after matching. The standardized mean difference prior to matching is often over 0.1 for many covariates; however, after matching the absolute value of the standardized mean difference is less than 0.1, which is an ideal outcome.

Table J-20 PSM Covariate Summary

Variable	Before Matching			After Matching		
	Mean Treated	Mean Control	Standardized Mean Difference	Mean Treated	Mean Control	Standardized Mean Difference
Distance	0.008	0.008	0.360	0.008	0.008	-0.001
Pre-period Winter Usage	79.755	70.138	0.078	79.755	71.941	0.063
Pre-period Summer Usage	110.240	83.694	0.164	110.240	109.614	0.004
Pre-period Fall Usage	80.086	67.505	0.105	80.086	78.946	0.009

Table J-21 provides results for a t-test which helps determine the success of matching. The test measures whether there are statistically significant differences in average daily consumption used between the treatment and comparison groups in the pre-period by month[22]. Statistically significant differences are defined as a p-value of less than 0.05 at the 95% significance level. As shown below, the p-value is greater than 0.05 for each month tested. This result further indicates propensity score matching performed well

[22] Due to the small size of the treatment group, customers were not matching on pre-period spring usage and these months were not included in the t-test.

because the differences between the treatment and comparison groups are not statistically significant.

Table J-21 Post Matching T-Test of Difference in Pre-Period Usage by Month

Month	Average Daily kWh Control	Average Daily kWh Treatment	T Stat	Std Error	P-Value	Reject Null?
Jan	77.400	86.055	-1.678	5.157	0.093	No
June	123.875	130.505	-0.411	16.114	0.681	No
July	127.401	121.379	0.793	7.590	0.428	No
Aug	116.866	111.324	0.845	6.561	0.398	No
Sept	116.757	107.091	1.487	6.501	0.137	No
Oct	77.002	70.800	1.384	4.480	0.166	No
Nov	74.096	76.023	-0.402	4.798	0.688	No
Dec	73.691	80.696	-1.399	5.008	0.162	No

Figure J-7 displays the density of each variable employed in propensity score matching, before conducting matching. Figure J-8 displays the density of each variable employed in propensity score matching, after conducting matching.

Figure J-7: Covariate Balance Before Matching

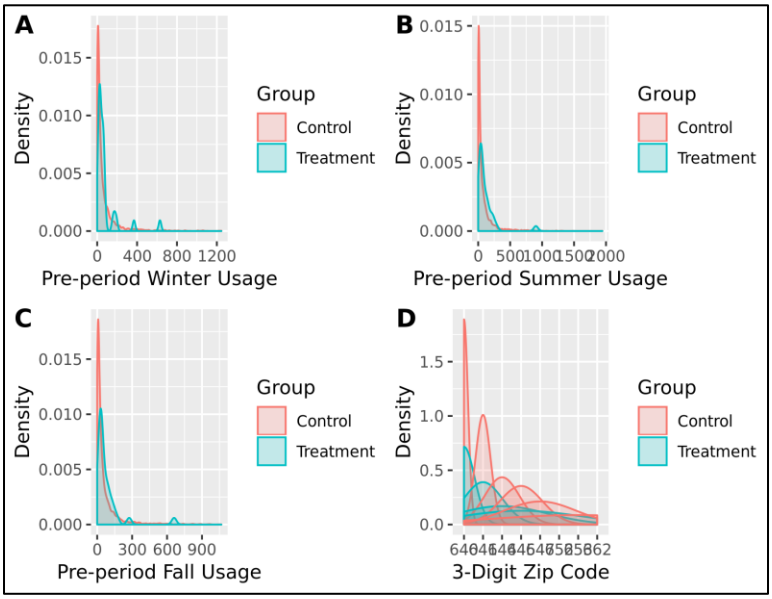
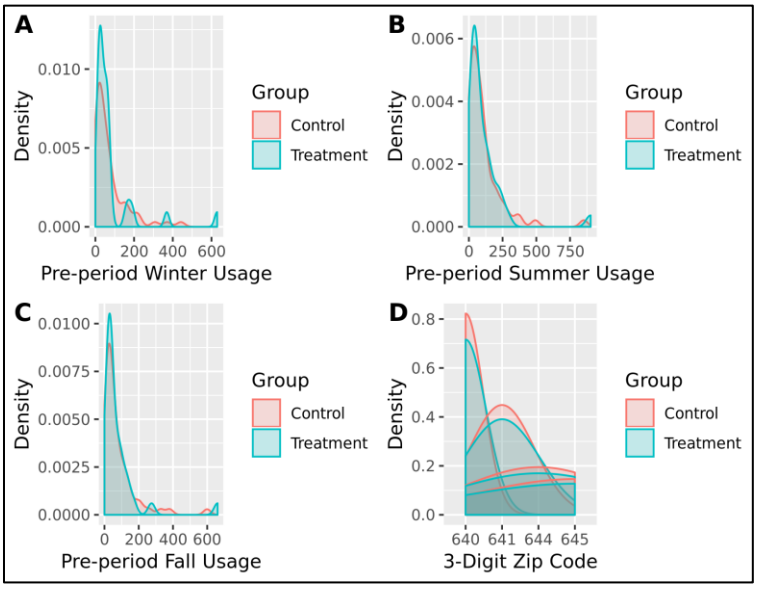


Figure J-8 Covariate Balance After Matching



Lastly, the joint chi-square test for covariate balance had a p-value of 0.97, meaning we failed to reject the null hypothesis of covariate imbalance (i.e., the treatment and comparison group are similar). Figure J-9 shows post-period daily usage after matching for the treatment and control groups.

Figure J-9 BST Post-Period Daily Usage After Matching

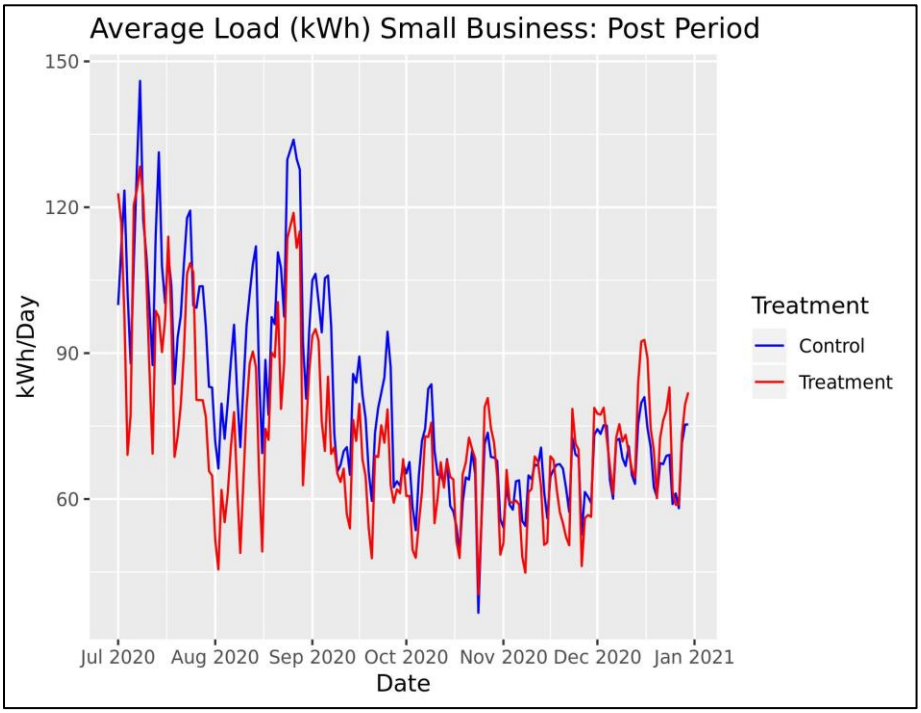


Table J-22 provides regression results for annual energy savings (kWh) savings post matching.

Table J-22 Annual Energy Savings (kWh) Regression Results

Variable	Estimate	Std Error	T-Statistic	P-Value	95% CI Lower	95% CI Upper
(Intercept)	51.410	5.385	9.546	0.000	42.551	60.268
Month: August	1.722	3.365	0.512	0.609	-3.813	7.256
Month: September	3.318	4.106	0.808	0.419	-3.437	10.073
Month: October	-5.580	4.576	-1.220	0.223	-13.107	1.947
Month: November	-4.117	4.911	-0.838	0.402	-12.196	3.961
Month: December	1.219	5.381	0.226	0.821	-7.633	10.071
Weekday Dummy	14.154	1.803	7.850	0.000	11.188	17.120
Treatment Dummy	-9.182	4.225	-2.173	0.030	-16.132	-2.231
CDD	3.037	0.328	9.270	0.000	2.498	3.576
HDD	0.218	0.138	1.582	0.114	-0.009	0.444
Treatment*CDD	-0.375	0.416	-0.901	0.368	-1.059	0.309
Treatment*HDD	0.429	0.188	2.282	0.022	0.120	0.739

Table J-23 shows annual expected and realized energy savings for Business Smart Thermostats. Average annual pre-period usage for BST customers was 32,532 kWh and realized annual energy savings of 831 kWh/Unit represent 4.6% of annual usage. Expected annual energy savings were based on estimates for residential households which have lower usage on average compared to small business customers.

Table J-23 BST Annual kWh Savings

Service Area	Expected kWh/Unit Savings	Realized kWh/Unit Savings	Eligible Units	Expected kWh Savings	Realized kWh Savings	RR
Missouri West	197	831	53	10,441	44,019	422%
Missouri Metro	197	831	46	9,062	38,206	422%
Total			**99**	**19,503**	**82,225**	**422%**

J.7 Impact Evaluation: Final Savings Tables

Based on the impact evaluation results, the total verified net energy savings for the Business Thermostat Program are 82,225 kWh, and the total verified net peak demand savings are 88.15 kW.

Table J-24 and Table J-25 summarize the verified Net energy and demand savings for the Business Smart Thermostat Program.

Table J-24: BST Peak Reduction (kW)

Service Area	Expected kW/Unit Savings	Realized kW/Unit Savings	Eligible Units	Responding Units	Expected kW Savings	Realized kW Savings	RR
Missouri West	1.40	1.22	70	29	98.00	35.64	36%
Missouri Metro	1.40	0.47	44	17	61.60	7.76	13%
Total			**114**	**46**	**159.60**	**43.40**	**27%**

Table J-25: BST Annual Energy Savings (kWh)

Service Area	Expected kWh/Unit Savings	Realized kWh/Unit Savings	Eligible Units	Expected kWh Savings	Realized kWh Savings	RR
Missouri West	197	831	53	10,441	44,019	422%
Missouri Metro	197	831	46	9,062	38,206	422%
Total			**99**	**19,503**	**82,225**	**422%**

J.8 Process Evaluation

J.8.1 Program Management

The Business Smart Thermostat (BST) program is managed by an Evergy program manager and implemented by staff from CLEAResult. The Evergy program manager serves as the overall coordinator of all activities and makes all of the "programmatic decisions" regarding strategies to increase overall program participation.

The program manager also supervises the CLEAResult team, ensures that the implementation remains on track, and coordinates activities between CLEAResult and the software provider, Energy Data Metrics (EDM). The Evergy program manager also coordinates with other Evergy staff internally to ensure that its DERMS database tracks all relevant information and program details.

"I am like the middleman between all of the different moving parts of the program."- Evergy Program Staff

CLEAResult has been implementing the BST program for several years. Staff supporting this program include three field technicians who complete installations of the smart thermostats, call center staff with a dedicated thermostat program line, and specially trained Customer Service Representatives (CSRs) staff who collect customer data work with EDM to supporting ongoing software development.

J.8.2 Program Operations

For Cycle 3, the BST program underwent several changes to meet the new MEEIA requirements. These changes included:

- Changing the thermostat offerings to include offerings from ecobee;
- Renegotiating the inclusion of Nest thermostats after Nest was purchased by Google;
- Including a customer co-payment in which the device and installation were no longer free;
- Combining separate databases into Evergy's internal database tracking program for DERMS; and
- Developing new ways to improve the retention of legacy one-ways devices from previous program cycles while also incorporating new Wi-Fi thermostat models.

The impact of these program changes is summarized next.

J.8.3 Program Design Changes

For Cycle 3, the program design shifted from a free to discounted price for qualifying smart thermostats. Depending upon the thermostat type, customers could either receive a $50.00 incentive if they installed their own thermostat (BYOT) or 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. Thermostats are installed by one of CLEAResult's three field technicians and offered at a discounted price. Figure J-10 illustrates these new program enrollment options offered at the start of Cycle 3.

Figure J-10: Initial Enrollment Incentives for the Business Smart Thermostat Program

Enrollment Type	Description	Initial Incentive (paid after Enrollment Date)	Annual Participation Reward (check or credited on Customer's November bill)
Bring Your Own Thermostat ("BYOT")	Enroll previously owned and installed eligible smart thermostat	$50 enrollment incentive	$25 after a full year of participation
Customer Self-Installed ("DIY")	Purchase at discounted price and install eligible smart thermostat from the Online Customer Portal	$0	$25 after a full year of participation
Professional Installation	Discounted Professional Installation of eligible smart thermostat at discounted price	$0	$25 after a full year of participation

J.8.4 Program Enrollment

Figure J-10 also summarizes the three ways Small and Medium Business customers may enroll in the program.

- **Call Center:** Enroll during a call with the CSR through its dedicated thermostat program line. The CSR screens the customer, determines eligibility, reviews the terms and conditions, and enrolls the customer directly. If needed, the CSR can also schedule a thermostat installation. The customer can pay for the installation cost during the telephone call.
- **BYOT**: A customer purchases a thermostat and contacts the Call Center. The CSR directs the customer to the online portal, where they accept the terms and conditions.
- **Do It Yourself (DIY):** The customer clicks on the enrollment link on Evergy's website, answers eligibility questions, selects their enrollment channel and device, and pays for the device.

The program eligibility requirements are on the program website. The CSRs verify program eligibility during the enrollment call. To qualify, customers must confirm that they have a working central air conditioner and a working Wi-Fi connection at the place of business. If they don't meet those basic qualifications, they are not eligible to participate in the program.

The CSRs conduct a number of checks with the customers to ensure that the new thermostat will be compatible with their current HVAC system. There are proprietary thermostats linked to specific manufacturers that are not eligible for program participation. The CSRs also screen the customer's comfort and likely ability to self-install a thermostat and, where appropriate, recommend a professional installation instead.

If the customer meets all of those eligibility requirements, the CSR will assist the customer in ordering the thermostat, scheduling the installation appointment if appropriate, and taking payment for the device and the installation.

Customers make the payments via their telephone. The customers also receive several confirmation emails regarding the device's status and a reminder for the installation appointment. All customer details are collected and stored on Evergy's EDM software program.

If a customer does not activate their device within 14 to 16 days, Evergy will send out a reminder email. If the customer does not respond after 25 days, the customer receives a more "strongly worded email" that says they must either install or return the device.

Using CLEAResult field technicians to install the qualifying thermostats is a feature unique to Evergy's RDR Program.

"I know a lot of other programs have outside HVAC contractors that do that work on their behalf and then somehow gets tied back to the program." Evergy Staff

J.8.5 Program Marketing and Outreach

The BST program is promoted using various marketing channels, including the program website, Search Engine Optimization (SEO), and direct mail targeting specific customer groups within the residential market.

All marketing and promotions are executed by Evergy staff; however, CLEAResult coordinates the marketing and outreach activities.

Direct mail has been one of the most effective customer engagement strategies, according to the program staff.

"We find great success with direct mail…We mail to a targeted list of customers and …are surprised at the traction we get with just simple letters."- Evergy Program Staff

Targeted customer emails have also been a successful outreach strategy, but this outreach is coordinated with other Evergy activities to avoid "bombarding" customers with multiple emails. Evergy's marketing approach is to "take a program that needs a little boost and highlight it in a product email."

Periodically, Evergy will also offer additional discounts on the thermostat's price, leveraging promotions available from the thermostat manufacturers. These promotions will reduce the customer's co-payment for a new thermostat from $50.00 to $20.00 during some parts of the year.

However, all marketing activities were frozen in March 2020 in response to the COVID-19 pandemic. Evergy staff decided to reduce its promotions given that many of its Small Business customers may be facing financial hardship.

"We were hoping to offer people savings on their energy bill, but with the customer co-payment, it's hard to (ask) customers to enroll in the program…We try to take advantage of all the promotions we can that reduce the price of the thermostat to zero for a limited time. We're hoping we can provide some relief and also drive order volume at the same time."- Evergy Staff Member

J.8.6 Program Communication

Program staff from Evergy and CLEAResult communicate regularly about all program activities. CLEAResult staff also communicates any upcoming program promotions or discounts to EDM. CLEAResult staff also keeps the call center staff updated on all program changes.

Staff from both organizations hold two weekly meetings to discuss various program operations; one meeting focuses on updating the EDM database. Another focuses on addressing feedback from the call centers. The purpose of these meetings is to "make sure there are no holes in the program," as one staff member explained.

Evergy staff will also meet separately with EDM staff and participate in internal meetings regarding the DERMS software, as appropriate.

The call center meetings provide an opportunity to review customer feedback. However, the Evergy program staff reported that the call center staff does a "good job in de-escalating" any customer calls. CLEAResult has clear communication protocols in place on ways to address customer concerns and notify Evergy staff as appropriate.

J.8.7 Program Results

Program enrollment did not meet expectations in 2020. Delays in the contracting and developing of the online portal for the customer co-payment contributed to a later program launch, developing the software platform, and co-payment changes.

The participation goals are based on specific kilowatt (kW) reductions across Evergy's territory for the entire three-year program cycle. As the staff explained, the goals are split between residential and business customers and across Evergy's two service territories. Table J-26 summarizes the first-year program enrollment rates for 2020; however, these rates were lower than the targeted participation rates.

Table J-26: Comparison of Targeted vs. Actual kW Savings for the BST Program- 2020

Service Territory	kW Goal	kW Actual
Missouri Metro	1,278	913
Missouri West	1,244	889

The program staff explained that the annual evaluation tells us "the number of devices we need to enroll in each year to hit our goals." Each device has a deemed savings value, and the Evergy program manager sets participation levels based on the number of devices are needed to reach the kW savings goal. The enrollment projects are based on a per-device savings measure.

Despite its slow start, both Evergy and CLEAResult staff are optimistic that the BST program will ultimately reach its three-year cumulative kW savings goals.

The program manager also pointed out that the actual participation rates in the Energy Savings Events were better than expected.

"We had a really good demand response season this year. We called two events, and we had pretty low opt-out rates."- Evergy Staff

Another program change that also negatively affected overall participation rates was that midway through 2020, Google acquired Nest. With the change in owners, Google also changed the implementation fees for Nest thermostats and required that their thermostats were enrolled in Nest's Rush Hours Rewards Program.

In 2020, Evergy could not incorporate the Nest thermostats into its DERMS software platform, so Evergy could not enroll customers with Nest thermostats into the program. Since Nest was the top-selling thermostat, this program change negatively affected Evergy's ability to meet the kW savings goals.

"*Nests were the highest sellers, but we only ended up with 50 percent of the total MEEIA goal—so didn't hit savings goal for the first year, but do have three years to hit the goals as they are cumulative goals."- Evergy Program Staff*

However, Evergy did add two other thermostat models: the ecobee3 lite and ecobee SmartThermostat. Both ecobee and Nest models had co-payment options of $50.00 or $100.00.

"*Bringing in ecobee only benefited us.*" Evergy Program Manager

J.8.8 Quality Assurance/Quality Control

The BST program incorporates several layers of QA/QC into its ongoing program operations. For example, the staff reviews its monthly customer satisfaction surveys and identifies any specific comments that may require program adjustments. The staff also

works proactively with the call center to identify areas that may require additional training to address customer concerns.

The field technicians also complete a post-test of the thermostat prior to leaving the residence. The technicians will trouble-shoot any issues until the thermostat is working properly.

These technicians also provide servicing on legacy systems installed in prior program cycles as well.

The CLEAResult team reviews the customer call center records weekly and completes their internal QA/QC checks. CLEAResult staff also examine the budgeting and invoicing to ensure that the records are accurate. These issues are discussed, and the numbers are checked during their weekly meetings with Evergy program staff.

J.8.9 Data Tracking

Program staff from Evergy and CLEAResult are also pleased with the data tracking services that EDM provides. Evergy staff is especially pleased with how EDM has developed customized solutions to address any reporting issues.

Going forward, Evergy staff expects that EDM will provide daily reports to the DERMS database, so the DERMS will have a complete database record for all of the demand response programs. However, this is likely to occur in 2021.

J.8.10 Planned Program Changes

The program staff continues to work with EDM to refine its online portal and make it even easier for customers to purchase eligible thermostats online.

J.8.11 Areas for Program Improvement

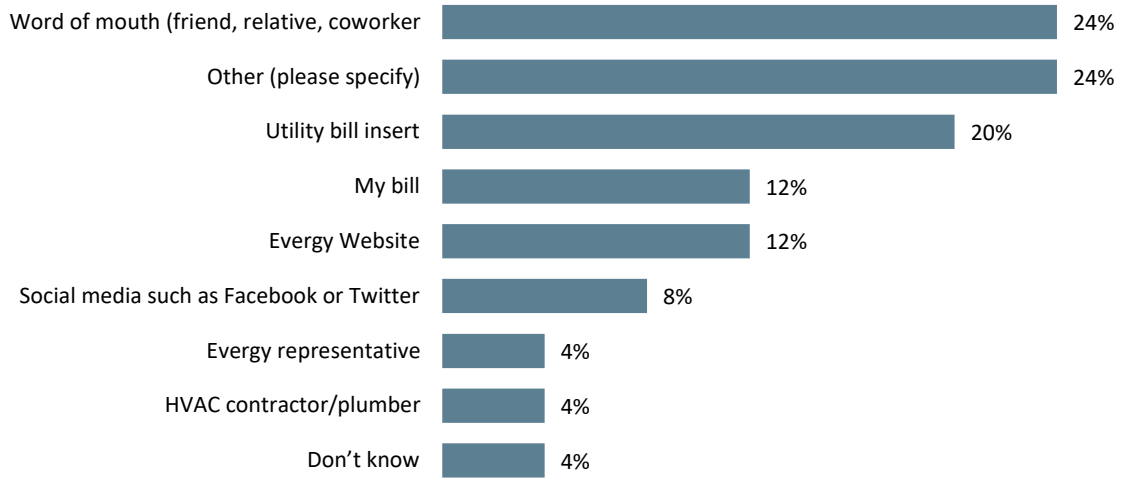
Although the program has been working well, the program management and implementation staff identified an area for future improvement:

- Develop additional automation within EDM to ensure it is updating the DERMS daily file to be completed in 2021

J.8.12 Program Awareness

Most survey respondents mentioned learning about the Business Smart Thermostat program by either "word of mouth" (24%), a bill insert (20%), or information included in their electric bill (12%). Figure J-11 summarizes these responses.

Figure J-11: Ways Respondents Heard about the Business Thermostat Program



J.8.13 Participation and Enrollment

Most respondents could not recall when they first enrolled in the program. Among those who did remember, ten respondents (40%) said they enrolled before June 2020, while another four (16%) indicated they had enrolled sometime during the summer of 2020 (see Table J-27).

Table J-27: Time of Enrollment

Enrollment	Number Responding	Percent of Total
Before June 2020	10	40 %
Between June 1 and August 30, 2020	4	16 %
Don't Recall	11	44%
Total	25	100%

Most respondents (72%) had their thermostats installed by a contractor. Another quarter (28%) either installed the smart thermostat directly or had someone else in their organization install the device, as Table J-28 shows. Twenty- eight percent of respondents were able to install the thermostat themselves or by someone in the organization.

Table J-28: Installations by Contractor

Levels	Number Responding	Percent of Total
By an installation contractor	18	72.0 %
By myself/ someone from my organization (Self-installed/ Bring Your Own)	7	28.0 %
Total	25	100%

Most respondents participate in this program to either "save money" or "save energy." Several respondents also liked the features offered by these smart thermostats, as the following comments indicate.

"Help save on energy bill."

"I want to remote control the thermostat and allow me to save energy"

"I wanted a thermostat I could control remotely and also found the benefits to be helpful."

"Save money. And be able to adjust when I not there. Employees don't always adjust it when they leave for the weekend."

"Basically, to get control of the temperature in the facility, there was also a promotion and a rebate."

"I travel, and I have a farm so that I could adjust the temperature at any time" -

"We wanted to install a smart thermostat; it was installed in an event space. we wanted to monitor off-site."

J.8.14 Event Participation

While a majority (80%) of BST respondents could not recall if they participated in the Energy savings Event held on August 10, 2020, between 4–6 p.m., four of the 25 survey participants remembered this event. The 20 respondents that did not recall simply indicated they "were not aware" of this event.

Table J-29: Event Participation Aug 10, 2020, 4–6 p.m.

Event Participation- Aug 10, 2020	Number Responding	Percent of Total (n=25)
Yes	4	16%
No	1	4%
Don't Recall	20	80%
Total	25	100%

Of note, three of the four respondents who participated in this event recalled receiving a notification before the event.

Respondents were also asked about their participation in the second savings event held on August 25, 2020, between 4–6 p.m. Most respondents (76%, n = 19) could not recall if they participated while 8% (n = 4) did not participate in this event (see Table J-30).

Table J-30: Event Participation Aug 25, 2020, 4–6 p.m.

Event Participation- Aug 25, 2020	Number Responding	Percent of Total (n = 25)
Yes	2	16%
No	4	8%
Don't Recall	19	76%
Total	25	100%

Two respondents decided not to participate in this event, as they were either unaware of it or joined the program after the initial enrollment period.

Of note, three of the four respondents recalled receiving an event notification while one did not.

J.8.15 Satisfaction

The respondents rated overall satisfaction with the Business Smart Thermostat's program components using a five-point scale where "1" meant "Very dissatisfied" to "5" "Very satisfied." Overall, the respondents were satisfied with the program and its components as Table J-31 shows. The respondents gave the "ease of enrolling" in the program and the “thermostat operation” the highest satisfaction scores of 4.61 and 4.60 respectively.

Table J-31 summarizes the average satisfaction rating for each program component and the percentage of respondents who provided a rating of either "4" or "5" which means "Satisfied."

Table J-31: Satisfaction with Program Components

Satisfaction Component	Average Satisfaction Score	% Satisfied (i.e., "4" or "5" Rating)
Operation of Thermostat (n = 25)	4.60	92%
Ease of Enrolling in BST (n = 21)	4.62	95%
Notification of Savings Event (n = 6)	3.66	67%
Duration of Savings Event (n = 6)	4.00	83%
Business Smart Thermostat Program Overall (n = 22)	4.55	68%

Figure J-12 and Figure J-13 summarize these findings.

Figure J-12: Average Satisfaction Scores for the Business Smart Thermostat Program

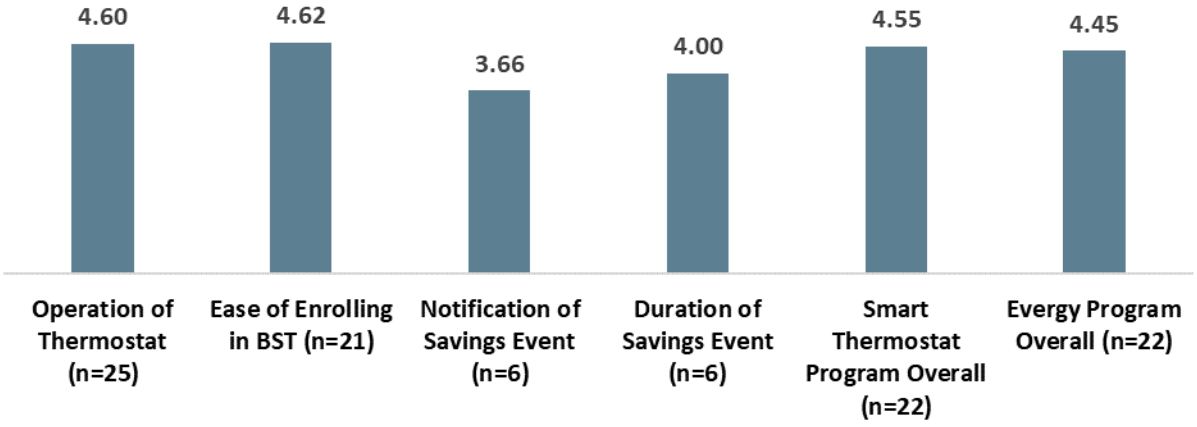
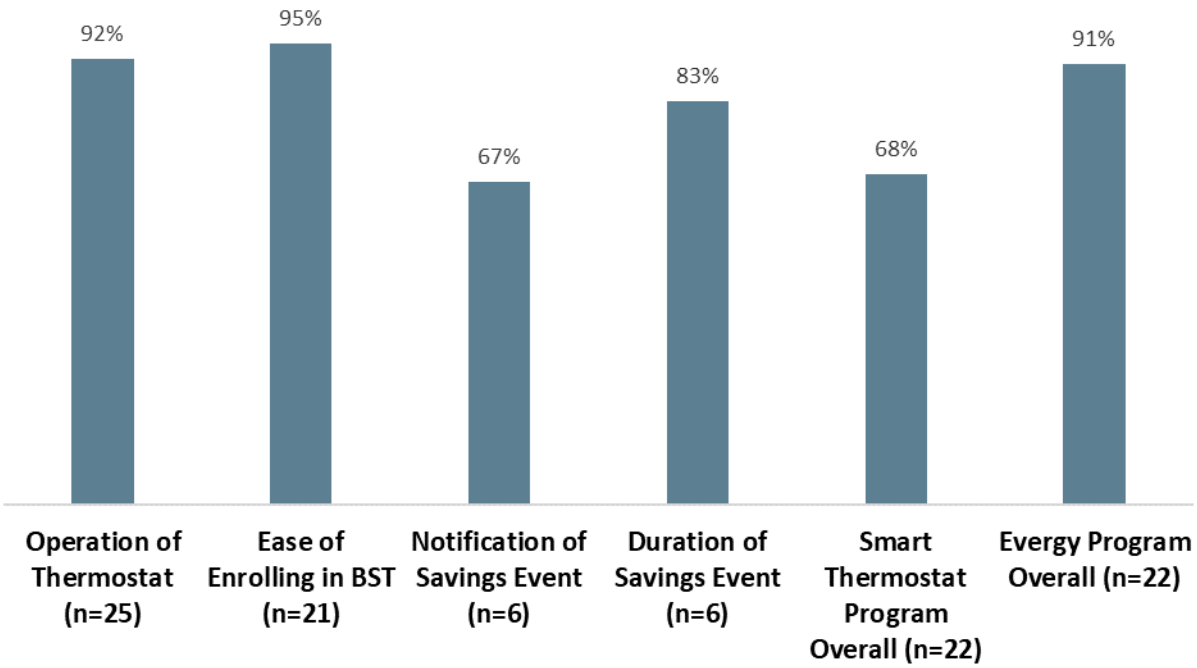


Figure J-13: Average Satisfaction Scores for the Business Smart Thermostat Program



The respondents also provided feedback regarding their reasons for awarding these satisfaction ratings. Selected comments are provided next.

"Energy bill decreased."

"Easy to change from tablet."

"Added the App and pretty simple."

"Nest thermostats are great."

"It's the main brand, and you can control it from a digital"

"Easy to install and great price."

"The person on the phone was awesome."

"Enrolling was easy; however, getting and installing the thermostat was difficult. The trouble was with the actual address of the church versus the address on the account. No mailbox or office at the church."

"Installer super nice."

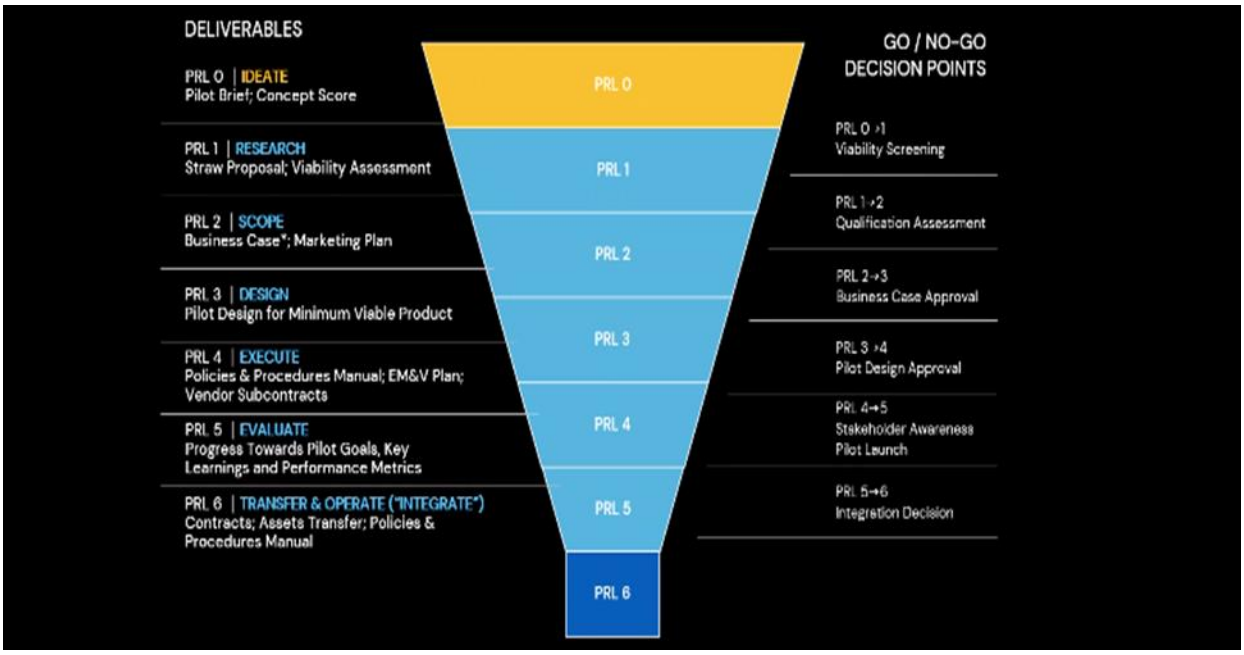
J.9 Conclusions and Recommendations

- Evergy's Business Smart Thermostat program received high satisfaction ratings from program participants. However, the survey respondents indicated they wanted better notification of upcoming DR events. Therefore, Evergy staff should consider additional ways to provide event notification, including sending reminder emails to program participants. Evergy can ensure that its program application process captures and updates participant email addresses.
- Currently, enrollment eligibility for the program is restricted to manufacturers that total less than 30% of market share for smart thermostats. Evergy should engage with other major smart thermostat manufacturers to obtain the required data access permissions to facilitate their enrollment as this is a structural barrier to program scale.

Appendix K Process Evaluation Summary of Evergy Pilot Programs

The Evaluator completed processes analyses on three Evergy pilot programs. Figure K-1 illustrates the Pilot Incubator Funnel that ICF used to vet pilot program concepts for Evergy. This figure highlights the various decision points used to determine if the pilot concept should proceed or stay at the current level. According to ICF staff, the goal is to launch between two and four pilots each year; however, this is not a "fixed goal," as the team explained.

Figure K-1: ICF Vetting Process for New Program Concepts



A significant goal in evaluating these pilot programs is to identify what, if any, energy savings are associated with them. The program design process also identifies the critical metrics needed to estimate the energy savings from each program. Hence, an essential element of the program pilot process is to gather crucial data in the first year of program operations.

K.1 Energy Efficiency Nonprofits Program (EENP)

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

K.1.1 Program Management

The EENP Program is part of the "Products and Services Incubator" within Evergy. ICF implements the pilot program on behalf of Evergy.

The program management role transitioned during 2021; however, all of the critical staff involved in the initial design and first-year operations participated in this in-depth interview.

Two ICF staff members work closely with the utility staff to implement the pilot program from initial concept through program launch and execution. ICF also manages the daily operations of this program.

K.1.2 Program Design

ICF was selected to develop the EENP program based on its extensive experience developing new program plans for other energy organizations. ICF developed the initial program concept, which Evergy shared with its stakeholders. Evergy staff also solicited input from the local nonprofit community and other interested parties.

For the EENP, Evergy staff targeted nonprofit organizations that are part of the larger Commercial & Industrial (C&I) sector. Specifically, the EENP focuses on organizations that provide a homeless shelter or a shelter-type service. The EENP offers nonprofits access to additional energy efficiency funding via rebates to install energy efficiency improvements, which will lower their costs at a time of financial strain.

As the Evergy program manager explained, some nonprofits struggle financially, which became an even more significant concern when the Covid-19 pandemic began. Nonprofits that offer these transitional housing services were overwhelmed with an increased demand for their services, and the program staff recognized that this was an "ideal time to launch this type of pilot."

K.1.3 Program Goals

ICF staff identified 40 to 50 organizations that provide these transitional housing services within Evergy's two service territories and targeted participation rates of five to nine participants each year. This program's incentive budget is $200,000, split evenly between Evergy's Metro and Evergy's West service territories.

However, the Evergy program manager "would like to do more business in the Missouri West service territory, but currently, the Missouri Metro area has the most low-income customers."

K.1.4 Program Operations

Program outreach began in September 2020 when ICF staff mailed letters to this initial target list which explained the pilot program's services. These services include a free walk-through audit to identify energy savings opportunities and installing free measures, such as advanced power strips and low-flow faucet aerators and showerheads.

During the walk-through audits, the ICF staff identifies additional program services available to nonprofits without charge, including HVAC tune-ups, insulation, and air sealing services. Evergy also provides HVAC equipment rebates that are double the amount available to other C&I customers to help organizations make these energy efficiency improvements.

ICF staff also anticipate increasing their outreach activity to target Missouri West nonprofit organizations in 2021.

K.1.5 Program Results

In 2020, ICF staff had ten projects in the pipeline. Nine out of 10 participants received walk-through audits, and two received direct installations of energy savings measures, including lighting upgrades. The remaining eight projects will be completed in 2021.

For the first year, each project will be viewed as a custom installation, given the diversity of the measures installed. Each project will have a detailed report describing the measures and quantities installed, along with estimated savings. Given that these nonprofits may fall into either the Residential or C&I category, the program implementation staff will file the custom reports based on the rate class in the appropriate Technical Reference Manual (TRM).

K.1.6 Communications

Staff from both organizations reported they had an excellent working relationship that included frequent communications about all program activities.

K.1.7 Quality Assurance/Quality Control (QA/QC)

ICF developed a QA/QC protocol for all projects. For example, ICF staff completes a pre and post-inspection to ensure that the lighting meets all of the ENERGY STAR on Lights certifications. The staff also double-checks to ensure that all of the appropriate lighting fixtures were upgraded.

K.1.8 Key Lessons Learned During PY1

Pilot programs offer both utilities and program implementers with immediate feedback that may be used to refine and improve the program offerings going forward. During the

first year, one key lesson program staff learned that this program offering was critically important to the nonprofit community.

"There is an appetite for a program like this. The main reason why these folks weren't participating in the existing program was just simply their ability to put the funds together to invest in something like this." ICF Staff

However, program staff also realized that these organizations serve a different type of customer group, which required modifying their current recruitment and project implementation strategies.

"These are facilities that have very sensitive clientele, and especially in the world of Covid, there are a lot of barriers that we ran into." ICF Staff

For example, there certain parts of their buildings were quarantined due to Covid-19, which required setting up multiple visits to complete a walk-through audit.

"We had to set up a one-stop-shop approach where we take the time to help guide the customer through the process. We try to limit any struggle that they have." ICF Staff

ICF staff worked proactively with both the nonprofit and trade ally personnel to coordinate program installations at a pace that could accommodate each organization's individual needs.

K.2 HVAC Quality Installation (QI) Pilot Program

The HVAC Quality Installation (QI) Program targets HVAC trade allies. The program's objective is to encourage HVAC technicians to complete an additional HVAC servicing level, called QI or Measure Quick, that increases the overall energy savings for HVAC equipment without creating additional tracking and reporting requirements. This pilot program is testing a new technology that will streamline the overall monitoring through a wireless reporting process.

K.2.1 Program Management

An Evergy staff member manages overall program operations while ICF handles the day-to-day program implementation, HVAC training, and related program components.

K.2.2 Program Design

Evergy worked with ICF to design this program using the same vetting process described in Figure 1. The focus is on making the Measure Quick or QI technology more accessible and less difficult for HVAC contractors to use. Other utility programs that incorporate Measure Quick components are "paperwork heavy" and increase the reporting burden for the HVAC contractors. Evergy's program design uses wireless Bluetooth tools "to take the measurements of the HVAC equipment and evaluate its performance.

One critical concern for program staff to determine if the trade allies would be willing to invest in and use the new wireless technology required to complete the QI installations. A secondary concern is how much the trade allies would have to invest in this technology to participate in the program.

This program targets HVAC contractors who are already familiar with the Measure Quick tool and their residential customers who have already participated in an Evergy HVAC rebate program. Evergy program staff view this as a "program enhancement" rather than implementing a full-scale complimentary HVAC program offering.

Participating customers will receive "an energy bonus" for each QI test, which maximizes the energy savings for the customers. According to program staff, this pilot also educates HVAC contractors and expands their knowledge of these systems.

"QI makes sure that the equipment is installed correctly for the customer. It allows us to claim a little energy bonus on each job if it has a quality install it also is a (good) training tool... So it helps train the technicians to become better at their job." – ICF Staff

The overall goal of this program is to complete 200 QI installations during the pilot period.

K.2.3 Program Challenges

Identifying interested contractors has been one of the biggest challenges to rolling out this program throughout Evergy's service territory during 2020. Program staff explained that experienced trade allies are resistant to change and may not be interested in investing in new tools or technologies. HVAC contractors who are moderately successful and operate on thin margins may not want to make this investment. Instead, the program staff explained, the most enthusiastic HVAC contractors are "some of the bigger trade allies who do a lot of work. These tools teach their technicians to work faster."

"The issue is the acceptance of the technology. Technicians own their testing equipment so getting them to invest in a wireless device (is challenging)." ICF Staff

The program staff further explained, "If it is a real HVAC nerd and decide they like it… a trade ally who is obsessed with doing his job right," then he will be interested in this technology.

K.2.4 Program Operations

Evergy launched HVAC QI Pilot Program in the Winter of 2020; however, the program's full launch has been delayed until Spring 2021. ICF has reached out to the four current trade allies that already use the standard Measure Quick tool to educate them about the QI pilot. Evergy also completed several tests before its restart in Spring 2021.

K.2.5 Marketing and Outreach

The program staff explained that this program would not be marketed directly to customers as it is designed to "piggyback" onto the existing Evergy HVAC rebate programs.

K.2.6 Communications

Evergy and ICF program staff have developed an excellent rapport during the program design and roll-out. Evergy provides ICF staff with timely updates, and ICF provides ongoing feedback regarding program operations.

K.2.7 Quality Assurance/Quality Control (QA/QC)

ICF conducts automated QA/QC in Evergy's Vision tracking database, which validates each QI project and matches the companion HVAC project. ICF will run this electronic matching and automatically verify each project once the program ramps ups in 2021. Furthermore, the staff manually verified the initial test jobs and will conduct desk reviews to identify discrepancies going forward.

K.2.8 Estimating Savings

Program staff from both Evergy and ICF are developing the energy savings estimates for the QI technology. The current reference, the Illinois Technical Reference Manual (TRM), uses an "average savings per ton" to estimate savings for a SEER 16 unit. Evergy program staff plan to use that value as a starting point and then refine it based on the data gathered during the pilot period.

K.3 Pay-As-You-Save (PAYS) Pilot

Evergy program staff began developing its Pay-As-You-Save (PAYS) pilot program immediately upon receiving approval from the Missouri Public Service Commission. The Missouri Commission approved the MEEIA Order to establish (PAYS) program with a $10 to $15 million budget and a strict time limit for program operations.

The program manager prepared a list of questions for the Commission staff to ensure that Evergy staff fully understood this program's requirements and timing. The program staff also reached out to other critical stakeholders to solicit feedback regarding the PAYS pilot offering.

For much of 2020, Evergy staff assembled the various components necessary to launch the program. These activities included hiring a new program manager, selecting an implementation contractor through a Request for Proposals (RFP) process, and refining the program design. The program will launch in September 2021.

Evergy is fine-tuning the program's participation and energy savings targets based on feedback from the Commission staff and its stakeholders. The initial participation goals are to provide financing of 1,100 customers through the PAYS tariff. The actual kilowatt (kW) and kilowatt-hour (kWh) savings goals are still under review.

The program is open to residential customers; however, the manager explained, "We're not excluding nor including any specific customers." The utility will set aside funds specifically to target low-income and customers living in multifamily buildings with high energy costs, as directed in the Commission Order.

Appendix L Survey Instruments

L.1 Heating, Cooling and Home Comfort Participant Survey

Client: Evergy
Program: Heating, Cooling, and Home Comfort Program
Program Year: 2020
Group: Participants
Mode: Email

PREDEFINED VARIABLES

Prepopulated variables are shown in all caps enclosed in brackets, e.g., [PREDEFINED VARIABLE]

Variable	Definition
PASSWORD	6-character password
UTILITY	1 = Missouri Metro, 0 = Missouri West
EMAIL	Customer email
DI KIT	1 = measure installed, 0 = measure not installed
LED QUANTITY	1 = measure installed, 0 = measure not installed
FAUCET AERATOR QUANTITY	1 = measure installed, 0 = measure not installed
SHOWERHEAD QUANTITY	1 = measure installed, 0 = measure not installed
SPS QUANTITY	1 = measure installed, 0 = measure not installed
AIR SEALING	1 = measure installed, 0 = measure not installed
CEILING/ATTIC INSULATION	1 = measure installed, 0 = measure not installed
CENTRAL AC	1 = measure installed, 0 = measure not installed
AS_HEATPUMP	1 = measure installed, 0 = measure not installed
GS_HEATPUMP	1 = measure installed, 0 = measure not installed
DUCTLESS MINI-SPLIT HEATPUMP	1 = measure installed, 0 = measure not installed

EMAIL SURVEY MESSAGE

Subject: [PROGRAM NAME] Feedback
Reply To: adm-surveys@admenergy.com
From Name: Evergy

Dear [CUSTOMER NAME],

Thank you for participating in Evergy's Heating, Cooling, and Home Comfort Program. Our records indicate that you received a rebate/discount for purchasing and installing energy-efficient equipment/upgrades for your home and/or received an energy savings kit from Evergy. We are conducting a customer survey and would value your input. Your answers will be anonymous and confidential, and your feedback will help us improve the program. This survey will only take a few minutes to complete and we will send you a **$10 electronic gift card** of your choice upon completion.

Click here to go to the survey
Your password is: [PASSWORD]

If you have questions or require technical assistance, please email us at adm-surveys@admenergy.com. If you wish to no longer receive emails about this survey, please click on the "Unsubscribe" link below. Thank you in advance for your time!

Kind Regards,
Katelan Scherer
ADM Associates / Program Evaluation Contractor to Evergy

QUALIFICATION QUESTIONS

[SHOW Q1 IF AIR SEALING OR CEILING/ATTIC INSULATION OR CENTRAL AC OR AS_HEATPUMP OR GS_HEATPUMP OR DUCTLESS MINI-SPLIT HEATPUMP = 1 AND DI KIT ≠ 0]

1. According to program records, you received a rebate/discount from Evergy for purchasing energy-efficient equipment/upgrades for your home in the past year. Is that correct?
    1. Yes
    2. No [TERMINATE]
    98. Don't know [TERMINATE]

[SHOW Q2 IF DI KIT = 1 AND AIR SEALING OR CEILING/ATTIC INSULATION OR CENTRAL AC OR AS_HEATPUMP OR GS_HEATPUMP OR DUCTLESS MINI-SPLIT HEATPUMP ≠ 0]

2. According to program records, you received an energy savings kit from Evergy. Is that correct?
    1. Yes
    2. No [TERMINATE]
    98. Don't know [TERMINATE]

[SHOW Q3 IF AIR SEALING OR CEILING/ATTIC INSULATION OR CENTRAL AC OR AS_HEATPUMP OR GS_HEATPUMP OR DUCTLESS MINI-SPLIT HEATPUMP = 1 AND DI KIT = 1]

3. According to program records, you received a rebate/discount from Evergy for purchasing energy-efficient equipment/upgrades for your home in the past year and received an energy savings kit from Evergy. Is that correct?
    1. Yes
    2. No [TERMINATE]
    3. Don't know [TERMINATE]

4. Did you have the following energy-efficient equipment/upgrades installed in your home through Evergy's discount/rebate program? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. [SHOW IF DI KIT = 1] Energy savings kit (can include LED lightbulbs, faucet aerators, efficient-flow showerheads, hot water pipe insulation, and advanced power strips)
    2. [SHOW IF AIR SEALING = 1] Air sealing (sealing air leaks in the home, weather sealing)
    3. [SHOW IF CEILING/ATTIC INSULATION = 1] Attic/ceiling insulation
    4. [SHOW IF CENTRAL AC = 1] Central air conditioner
    5. [SHOW IF AS_HEATPUMP = 1] Heat pump
    6. [SHOW IF GS_HEATPUMP = 1] Ground source heat pump
    7. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1] Ductless mini-split heat pump

5. Did you receive a rebate/discount from Evergy for any additional energy-efficient equipment/upgrades for your home that was not previously mentioned?
    1. Yes
    2. No
    98. Don't know

[SHOW Q6 IF Q5 = 1]

6. Which additional energy-efficient equipment/upgrades did you receive a rebate/discount for? (Please select all that apply) [MULTI-SELECT]

1. [SHOW IF DI KIT = 0] Energy savings kit (can include LED lightbulbs, faucet aerators, efficient-flow showerheads, hot water pipe insulation, and advanced power strips)
2. [SHOW IF AIR SEALING = 0] Air sealing (sealing air leaks in the home, weather sealing)
3. [SHOW IF CEILING/ATTIC INSULATION = 0] Attic/ceiling insulation
4. [SHOW IF CENTRAL AC = 0] Central air conditioner
5. [SHOW IF AS_HEATPUMP = 0] Heat pump
6. [SHOW IF GS_HEATPUMP = 0] Ground source heat pump
7. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 0] Ductless mini-split heat pump
96. Other (Please specify) [OPEN-ENDED]

7. How did you <u>first</u> hear about the Evergy rebates/discounts for the energy-efficient equipment and upgrades?
    1. Contractor/Energy Auditor
    2. Online ad
    3. General online search
    4. Evergy website
    5. Spire website
    6. Bill insert
    7. Email
    8. Television ad
    9. Billboard
    10. Social media (i.e., Facebook)
    11. Family, friend, or neighbor (word-of-mouth)
    96. Other source **[OPEN-ENDED]**
    98. Don't know

[SHOW Q8 IF Q7 = 1 – 9 OR 96]

8. How likely would you have been to install the following energy-efficient equipment/upgrades if you had not learned about Evergy's rebates/discounts for the energy-efficient equipment and upgrades from the [ANSWER TO Q7]? [INSERT 1-5 SCALE; 1 = NOT AT ALL LIKELY, 5 = VERY LIKELY, WITH 99 = NOT APPLICABLE]
    1. [SHOW IF DI KIT = 1 AND Q4(1) = 1 OR Q6 = 1] Energy savings kit (can include LED lightbulbs, faucet aerators, efficient-flow shower heads, pipe insulation, water heater tank wrap, and smart power strips)
    2. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Air sealing (sealing air leaks in the home, weather sealing)
    3. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Attic/ceiling insulation
    4. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4] Central air conditioner

5. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5] Heat pump
6. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6] Ground source heat pump
7. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7] Ductless mini-split heat pump
96. [SHOW IF Q6 = 96] Other energy-efficient equipment/upgrades (Please specify)

MEASURE INSTALLATION RATE (ISR)

DIRECT INSTALL (DI KITS)

[SHOW Q9 – Q28 IF DI KIT = 1 AND Q4(1) = 1 OR Q6 = 1]

9. Which of the following energy-efficient equipment was included in your energy savings kit? (Please select all that apply) [MULTI-SELECT]
    1. LED lightbulbs
    2. Faucet aerators
    3. Efficient-flow shower heads
    4. Water heater pipe insulation
    5. Smart power strips
    97. None of these [EXCLUSIVE]
    98. Don't know

[SHOW Q10 IF Q9 = 1]

10. Are all [LED QUANTITY] LED lightbulbs that you received currently installed in your home?
    1. Yes, all of them are currently installed
    2. No, none or only some of them are currently installed
    3. Received a different quantity of LED lightbulbs (Please specify)
    98. Don't know

[SHOW Q11 IF Q10 = 2]

11. How many of the LED lightbulbs that you received are currently installed in your home?
    1. [OPEN-ENDED; NUMERIC VALUE 1 – 20] _____
    2. None of them are currently installed
    98. Don't know

[SHOW Q12 IF Q11 = 1]

12. How many of the LED lightbulbs are installed in each of the following areas in your home? [OPEN-ENDED; NUMERIC VALUE 1 – 20, WITH 98 = DON'T KNOW]
    1. Living room: _____
    2. Bathroom: _____

3. Kitchen: _____
4. Outdoors: _____
5. Family room: _____
6. Bedroom: _____
7. Garage: _____
8. Hallway: _____
9. Office: _____
10. Laundry room: _____
11. Dining Room: _____
96. Other: _____
98. Don't know

[SHOW Q13 IF Q10 = 2]

13. Why weren't all of the LED lightbulbs installed? [MULTI-SELECT]
    1. Waiting for old lightbulbs to burn out
    2. Not the correct wattage for my needs
    3. Too bright
    4. Not bright enough
    5. Do not fit into any fixtures
    96. Other (Please specify)
    98. Don't know

[SHOW Q14 IF Q9 = 2]

14. Are all of the [FAUCET AERATOR QUANTITY] faucet aerator(s) that you received currently installed in your home?
    1. Yes, all of them are currently installed
    2. No, none or only some of them are currently installed
    3. Received a different quantity of faucet aerators (Please specify)
    98. Don't know

[SHOW Q15 IF Q14 = 2]

15. How many of the faucet aerator(s) that you received are currently installed in your home?
    1. Open ended [NUMERIC VALUE 1 – 4]: _____
    2. None of them are currently installed
    98. Don't know

[SHOW Q16 IF Q15 = 1]

16. How many of the faucet aerators are installed in the following rooms in your home? [OPEN-ENDED; NUMERIC VALUE 1 – 4, WITH 98 = DON'T KNOW]
    1. Bathroom: _____
    2. Kitchen: _____
    3. Laundry room: _____
    96. Other: _____
    98. Don't know

[SHOW Q17 IF Q14 = 2]

17. Why weren't all of the faucet aerators installed? [MULTI-SELECT]
    1. Do not fit any faucets
    2. Unable install them myself
    3. Not enough water pressure
    96. Other (Please specify)
    98. Don't know

[SHOW Q18 IF Q9 = 3]

18. Are all of the [SHOWERHEAD QUANTITY] efficient-flow showerhead(s) that you received currently installed in your home?
    1. Yes, all of them are currently installed
    2. No, none or only some of them are currently installed
    3. Received a different quantity of showerheads (Please specify)
    98. Don't know

[SHOW Q19 IF Q18 = 2]

19. How many of the efficient-flow shower head(s) that you received are currently installed in your home?
    1. Open ended [NUMERIC VALUE 1 – 2]: _____
    2. None of them are currently installed
    98. Don't know

[SHOW Q20 IF Q19 = 1]

20. How many of the efficient-flow shower heads are installed in the following rooms in your home? [OPEN-ENDED; NUMERIC VALUE 1 – 2, WITH 98 = DON'T KNOW]
    1. Bathroom: _____
    96. Other: _____
    98. Don't know

[SHOW Q21 IF Q18 = 2]

21. Why weren't all of the efficient-flow shower heads installed? [MULTI-SELECT]
    1. Do not fit any showerheads
    2. Unable install them myself
    3. Not enough water pressure
    96. Other (Please specify)
    98. Don't know

[SHOW Q22 IF Q9 = 4]

22. Is the hot water pipe insulation that you received currently installed in your home?
    1. Yes

2. No
98. Don't know

[SHOW Q23 IF Q22 = 2]

23. Why wasn't the hot water pipe insulation installed? [MULTI-SELECT]
    1. Waiting for someone to install it
    2. Did not fit onto water heater pipes
    3. Hot water pipes were not accessible
    96. Other (Please specify)
    98. Don't know

[SHOW Q24 IF Q22 = 1]

24. Did the hot water pipe insulation replace existing insulation?
    1. Yes
    2. No
    98. Don't know

[SHOW Q25 IF Q9 = 5]

25. Are all of the [SPS QUANTITY] smart power strip(s) that you received currently setup in your home?
    1. Yes, all of them are currently setup
    2. No, none or only some of them are currently setup
    3. Received a different quantity of smart power strips (Please specify)
    98. Don't know

[SHOW Q26 IF Q25 = 2]

26. How many of the smart power strip(s) that you received are currently installed in your home?
    1. Open ended [NUMERIC VALUE 1 – 2]: _____
    2. None of them are currently installed
    98. Don't know

[SHOW Q27 IF Q26 = 1]

27. How many of the smart power strips are setup in each of the following areas in your home? [OPEN-ENDED; NUMERIC VALUE 1 – 2, WITH 98 = DON'T KNOW]
    1. Living room: _____
    2. Office: _____
    3. Garage: _____
    96. Other: _____
    98. Don't know

[SHOW Q28 IF Q25 = 2]

28. Why weren't the smart power strips setup? [MULTI-SELECT]
    1. Already have power strips setup
    2. Did not understand how to set it up
    3. Did not like the look of it
    4. I have no appropriate use for it
    96. Other (Please specify)
    98. Don't know

FREE-RIDERSHIP

DIRECT INSTALL (DI KITS)

[SHOW Q29 – Q33 IF DI KIT = 1 AND Q4(1) = 1 OR Q6 = 1]

29. Before receiving an energy savings kit from Evergy, were you planning to purchase and install any of the following energy-efficient equipment? (Please select all that apply) [MULTI-SELECT]
    1. LED lightbulbs
    2. Faucet aerators
    3. Efficient-flow showerheads
    4. Water heater pipe insulation
    5. Smart power strips
    97. None of the energy-efficient equipment listed [EXCLUSIVE]
    98. Don't know

[SHOW Q30 IF Q29 = 1 - 5]

30. How likely is it that you would have purchased and installed the following energy-efficient equipment if you had not received an energy savings kit from Evergy? [INSERT 1-5 SCALE; 1 = NOT AT ALL LIKELY, 5 = VERY LIKELY, WITH 98 = DON'T KNOW]
    1. [SHOW IF Q29 = 1] LED lightbulbs
    2. [SHOW IF Q29 = 2] Faucet aerators
    3. [SHOW IF Q29 = 3] Efficient-flow showerheads
    4. [SHOW IF Q29 = 4] Water heater pipe insulation
    5. [SHOW IF Q29 = 5] Smart power strips

[SHOW Q31 IF Q29 = 1 - 5]

31. Did you install the following energy-efficient equipment sooner than you would have if you had not received an energy savings kit from Evergy? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. [SHOW IF Q29 = 1] LED lightbulbs
    2. [SHOW IF Q29 = 2] Faucet aerators
    3. [SHOW IF Q29 = 3] Efficient-flow showerheads
    4. [SHOW IF Q29 = 4] Water heater pipe insulation
    5. [SHOW IF Q29 = 5] Smart power strips

[SHOW Q32 IF ANY IN Q31 = 1]

32. When do you think you might have installed the following energy-efficient equipment if you had not received an energy savings kit from Evergy? [INSERT 1 – 6 SCALE; 1 = WITHIN 6 MONTHS OF WHEN YOU RECEIVED IT, 2 = BETWEEN 6 MONTHS AND 1 YEAR, 3 = IN 1 TO 2 YEARS, 4 = IN 2 TO 3 YEARS, 5 = IN MORE THAN 3 YEARS, 6 = NEVER, AND 98 = DON'T KNOW]
    1. [SHOW IF Q31(1) = 1] LED lightbulbs
    2. [SHOW IF Q31(2) = 1] Faucet aerators
    3. [SHOW IF Q31(3) = 1] Efficient-flow showerheads
    4. [SHOW IF Q31(4) = 1] Water heater pipe insulation
    5. [SHOW IF Q31(5) = 1] Smart power strips

33. Before you received an energy savings kit from Evergy, had you ever had the following energy-efficient equipment in your home? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. LED lightbulbs
    2. Faucet aerators
    3. Efficient-flow showerheads
    4. Water heater pipe insulation
    5. Smart power strips

HVAC, HOME ENVELOPE, AND WEATHERIZATION MEASURES

[SHOW Q34 – Q50 IF AIR SEALING = 1 OR CEILING/ATTIC INSULATION = 1 OR CENTRAL AC = 1 OR AS_HEATPUMP = 1 OR GS_HEATPUMP = 1 OR DUCTLESS MINI-SPLIT HEATPUMP = 1]

[SHOW Q34 IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2]

34. Did you know you had air leaks in your home before you participated in Evergy's Heating, Cooling, and Home Comfort Program?
    1. Yes
    2. No

[SHOW Q35 IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3]

35. Did you know you needed more attic insulation, before you participated in Evergy's Heating, Cooling, and Home Comfort Program?
    1. Yes
    2. No

[SHOW Q36 IF (CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4) OR (AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5) OR (GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6) OR (DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7)]

36. Was your HVAC system in working condition before you participated in Evergy's Heating, Cooling, and Home Comfort Program?

1. Yes
2. No

37. Did you plan to purchase the following energy-efficient equipment/upgrades before learning about the discounts/rebates offered by Evergy? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Sealing cracks in your home to reduce air leakage
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Improve your home's efficiency by adding attic/ceiling insulation
    3. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4] Install a central air conditioning system
    4. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5] Install an heat pump
    5. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6] Install a ground source heat pump
    6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7] Install a ductless mini-split heat pump

[SHOW Q38 IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2]

38. Did you seal <u>more</u> areas in your home to reduce air leakage because of the Evergy discount/rebate?
    1. Yes
    2. No
    98. Don't know

[SHOW Q39 IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3]

39. Did you install a higher R value of attic insulation, install a different type of attic insulation (i.e., loose fill, spray foam), or insulate more square footage of your attic because of the Evergy discount/rebate? (Please select all that apply) [MULTI-SELECT]
    1. Installed higher R value of attic insulation
    2. Installed different type of attic insulation (i.e., loose fill, spray foam)
    3. Insulated more square footage of attic
    4. Would have installed same attic insulation without Evergy rebate [EXCLUSIVE]
    98. Don't know

[SHOW Q40 IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4]

40. Did you purchase a <u>more</u> energy-efficient air conditioner than you would have if you had not received the Evergy discount/rebate?
    1. Yes
    2. No
    98. Don't know

[SHOW Q41 IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5]

41. Did you purchase a more energy-efficient heat pump because of the Evergy discount/rebate?
    1. Yes
    2. No
    98. Don't know

[SHOW Q42 IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6]

42. Did you purchase a more energy-efficient ground source heat pump because of the Evergy discount/rebate?
    1. Yes
    2. No
    98. Don't know

[SHOW Q43 IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7]

43. Did you purchase a more energy-efficient ductless mini-split heat pump because of the Evergy discount/rebate?
    1. Yes
    2. No
    98. Don't know

44. Would you have still purchased the following without the Evergy discount/rebate? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Attic/ceiling insulation
    3. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4 AND Q36 = 1] Central air conditioner
    4. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5 AND Q36 = 1] Heat pump
    5. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6 AND Q36 = 1] Ground source heat pump
    6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7 AND Q36 = 1] Ductless mini-split heat pump

45. How likely is it that you would have purchased the following energy-efficient equipment/upgrades without the Evergy discount/rebate? [INSERT 1-5 SCALE; 1 = NOT AT ALL LIKELY, 5 = VERY LIKELY, WITH 98 = DON'T KNOW]
    1. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Attic/ceiling insulation

3. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4 AND Q36 = 1] Central air conditioner
4. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5 AND Q36 = 1] Heat pump
5. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6 AND Q36 = 1] Ground source heat pump
6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7 AND Q36 = 1] Ductless mini-split heat pump

46. Were any of the following energy-efficient equipment and/or upgrades recommended by your contractor/energy auditor during an initial visit to your home? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, WITH 98 = DON'T KNOW AND 99 = NOT APPLICABLE]
    1. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Attic/ceiling insulation
    3. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4 AND Q36 = 1] Central air conditioner
    4. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5 AND Q36 = 1] Heat pump
    5. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6 AND Q36 = 1] Ground source heat pump
    6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7 AND Q36 = 1] Ductless mini-split heat pump

[SHOW Q47 IF ANY IN Q46 = 1]

47. How likely is it that you would have purchased the following energy-efficient equipment and/or upgrades if your contractor/energy auditor had not recommended them? [INSERT 1-5 SCALE; 1 = NOT AT ALL LIKELY, 5 = VERY LIKELY, WITH 98 = DON'T KNOW]
    1. [SHOW IF Q46 (1) = 1] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF Q46 (2) = 1] Attic/ceiling insulation
    3. [SHOW IF Q46 (3) = 1] Central air conditioner
    4. [SHOW IF Q46 (4) = 1] Heat pump
    5. [SHOW IF Q46 (5) = 1] Ground source heat pump
    6. [SHOW IF Q46 (6) = 1] Ductless mini-split heat pump

48. Did you complete the following energy-efficient equipment/upgrades sooner than you would have because of the Evergy discount/rebate? [INSERT OPTIONS DEFINED AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. [SHOW IF AIR SEALING = 1 AND Q4(1) = 1 OR Q6 = 1] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(1) = 1 OR Q6 = 1] Attic/ceiling insulation

3. [SHOW IF CENTRAL AC = 1 AND Q4(1) = 1 OR Q6 = 1] Central air conditioner
4. [SHOW IF AS_HEATPUMP = 1 AND Q4(1) = 1 OR Q6 = 1] Heat pump
5. [SHOW IF GS_HEATPUMP = 1 AND Q4(1) = 1 OR Q6 = 1] Ground source heat pump
6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(1) = 1 OR Q6 = 1] Ductless mini-split heat pump

[SHOW Q49 IF ANY Q48 = 1]

49. If you had not received the Evergy discount/rebate, when might you have completed the following energy-efficient equipment/upgrades? [INSERT 1 – 6 SCALE; 1 = WITHIN 6 MONTHS OF WHEN YOU PURCHASED OR INSTALLED IT, 2 = BETWEEN 6 MONTHS AND 1 YEAR, 3 = IN 1 TO 2 YEARS, 4 = IN 2 TO 3 YEARS, 5 = IN MORE THAN 3 YEARS, 6 = NEVER, AND 98 = DON'T KNOW]
    1. [SHOW IF Q48(1) = 1] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF Q48(2) = 1] Attic/ceiling insulation
    3. [SHOW IF Q48(3) = 1] Central air conditioner
    4. [SHOW IF Q48(4) = 1] Heat pump
    5. [SHOW IF Q48(5) = 1] Ground source heat pump
    6. [SHOW IF Q48(6) = 1] Ductless mini-split heat pump

50. Have any of the energy-efficient equipment/upgrades that you received a discount/rebate for been removed? [INSERT OPTIONS DEFINED AS 1 = STILL INSTALLED AND 2 = REMOVED]
    1. [SHOW IF AIR SEALING = 1 AND Q4(2) = 1 OR Q6 = 2] Air sealing (sealing air leaks in the home, weather sealing)
    2. [SHOW IF CEILING/ATTIC INSULATION = 1 AND Q4(3) = 1 OR Q6 = 3] Attic/ceiling insulation
    3. [SHOW IF CENTRAL AC = 1 AND Q4(4) = 1 OR Q6 = 4] Central air conditioner
    4. [SHOW IF AS_HEATPUMP = 1 AND Q4(5) = 1 OR Q6 = 5] Heat pump
    5. [SHOW IF GS_HEATPUMP = 1 AND Q4(6) = 1 OR Q6 = 6] Ground source heat pump
    6. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 1 AND Q4(7) = 1 OR Q6 = 7] Ductless mini-split heat pump

[SHOW Q51 IF ANY Q50 = 2]

51. Why were the energy-efficient equipment/upgrade removed?
    1. [OPEN-ENDED]

CAPTURING POTENTIAL SPILLOVER EFFECTS

DIRECT INSTALL (DI KITS)

[SHOW Q52 – Q58 IF DI KIT = 1 AND Q4(1) = 1 OR Q6 = 1]

52. Have you purchased any of the following additional energy-efficient equipment since receiving the energy savings kit? (Please select all that apply) [MULTI-SELECT]
    1. LED lightbulbs
    2. Faucet aerators
    3. Efficient-flow showerheads
    4. Water heater pipe insulation
    5. Smart power strips
    97. None of the energy-efficient equipment listed [EXCLUSIVE]
    98. Don't know

[SHOW Q53 IF Q52 = 1, 2, 3, OR 5]

53. How many of each energy-efficient equipment listed did you purchase? [OPEN-ENDED; NUMERIC VALUE 1 – 97, WITH 98 = DON'T KNOW]
    1. LED lightbulbs: _____ [SHOW IF Q52 = 1]
    2. Faucet aerators: _____ [SHOW IF Q52 = 2]
    3. Efficient-flow showerheads: _____ [SHOW IF Q52 = 3]
    4. Smart power strips: _____ [SHOW IF Q52 = 5]

[SHOW Q54 IF Q52 = 1, 2, 3, OR 5]

54. How many of each energy-efficient equipment listed did you install in your home? [OPEN-ENDED; NUMERIC VALUE 1 – 97, WITH 98 = DON'T KNOW]
    1. LED lightbulbs: _____ [SHOW IF Q52 = 1]
    2. Faucet aerators: _____ [SHOW IF Q52 = 2]
    3. Efficient-flow showerheads: _____ [SHOW IF Q52 = 3]
    4. Smart power strips: _____ [SHOW IF Q52 = 5]

[SHOW Q55 IF Q52 = 4]

55. Has the additional hot water pipe insulation been installed in your home?
    1. Yes
    2. No
    98. Don't know

[SHOW Q56 IF Q52 = 1]

56. Were the LED lightbulbs that you purchased discounted or rebated?
    1. Yes
    2. No
    98. Don't know

[SHOW Q57 IF Q52 = 1 - 5]

57. How influential was your experience in receiving an energy savings kit from Evergy in your decision to purchase the additional energy-efficient equipment? [INSERT 1-5 SCALE; 1 = NOT AT ALL INFLUENTIAL, 5 = VERY INFLUENTIAL, WITH 98 = DON'T KNOW]

[SHOW Q58 IF Q52 = 1 - 5]

58. How likely would you have been to purchase the additional energy-efficient equipment if you had not received an energy savings kit from Evergy? [INSERT 1-5 SCALE; 1 = NOT AT ALL LIKELY, 5 = VERY LIKELY, WITH 98 = DON'T KNOW]

ADDITIONAL ENERGY-EFFICIENT MEASURES

59. Were any additional energy-efficient equipment/upgrades recommended by your contractor/energy auditor or during your home energy assessment?
    1. Yes
    2. No
    98. Don't know
    99. Did not work with a contractor/energy auditor or receive a home energy assessment

[SHOW Q60 IF Q59 = 1]

60. What additional energy-efficient equipment/upgrades did the contractor/energy auditor recommend? (Please select all that apply) [MULTI-SELECT]
    1. [SHOW IF DI KIT = 0 AND Q6 ≠ 1] An energy savings kit (can include LED lightbulbs, faucet aerators, efficient-flow showerheads, hot water pipe insulation, and advanced power strips)
    2. [SHOW IF AIR SEALING = 0 AND Q6 ≠ 2] Air sealing (sealing air leaks in the home, weather sealing)
    3. [SHOW IF CEILING/ATTIC INSULATION= 0 AND Q6 ≠ 3] Attic/ceiling insulation
    4. [SHOW IF CENTRAL AC = 0 AND Q6 ≠ 4] Central air conditioner
    5. [SHOW IF AS_HEATPUMP = 0 AND Q6 ≠ 5] Heat pump
    6. [SHOW IF GS_HEATPUMP = 0 AND Q6 ≠ 6] Ground source heat pump
    7. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 0 AND Q6 ≠ 7] Ductless mini-split heat pump
    96. Other (Please specify) [OPEN-ENDED]
    98. Don't know

[SHOW Q61 IF Q60 = 1 - 9 OR 96]

61. Did you complete any of the additional energy-efficient equipment/upgrades? (Please select all that apply) [MULTI-SELECT]

1. [SHOW IF Q60 = 1] Energy savings kit (can include LED lightbulbs, faucet aerators, efficient-flow showerheads, hot water pipe insulation, and advanced power strips)
2. [SHOW IF Q60 = 2] Air sealing (sealing air leaks in the home, weather sealing)
3. [SHOW IF Q60 = 3] Attic/ceiling insulation
4. [SHOW IF Q60 = 4] Central air conditioner
5. [SHOW IF Q60 = 5] Heat pump
6. [SHOW IF Q60 = 6] Ground source heat pump
7. [SHOW IF Q60= 7] Ductless mini-split heat pump

96. [SHOW IF Q60 = 96] Other energy-efficient upgrade
97. None of them [EXCLUSIVE]
98. Don't know

[SHOW Q62 IF Q61 = 1 – 9 OR 96]

62. How influential was your contractor/energy auditor's recommendation or information you learned during your home energy assessment in your decision to install the additional energy-efficient equipment/upgrades in your home? [INSERT 1-5 SCALE; 1 = NOT AT ALL INFLUENTIAL, 5 = VERY INFLUENTIAL, WITH 98 = DON'T KNOW]

63. Have you installed any additional energy-efficient equipment or home improvements in 2020, with or without receiving a discount or rebate? (This includes lightbulbs, home improvements, water heater, etc.)
    1. Yes
    2. No
    98. Don't know

[SHOW Q64 IF Q63 = 1]

64. What additional equipment or home improvements have you purchased in 2020? (Please select all that apply) [MULTI-SELECT]
    1. [SHOW IF DI KIT = 0 AND Q6 ≠ 1] LED lightbulbs
    2. [SHOW IF AIR SEALING = 0 AND Q6 ≠ 2] Air sealing (sealing air leaks in the home, weather sealing)
    3. [SHOW IF CEILING/ATTIC INSULATION= 0 AND Q6 ≠ 3] Attic/ceiling insulation
    4. [SHOW IF AC_REPLACEMENT = 0 AND Q6 ≠ 4] Central air conditioner
    5. [SHOW IF AS_HEATPUMP = 0 AND Q6 ≠ 5] Heat pump
    6. [SHOW IF GS_HEATPUMP = 0 AND OR Q6 ≠ 6] Ground source heat pump
    7. [SHOW IF DUCTLESS MINI-SPLIT HEATPUMP = 0 AND Q6 ≠ 7] Ductless mini-split heat pump
    8. High-efficiency water heater
    9. Smart thermostat

96. Other energy-efficient equipment/upgrade (Please specify) [OPEN-ENDED]
98. Don't know

[SHOW Q65 IF Q64 = 1 - 9 OR 96]

65. Did you receive a rebate for any of the additional equipment/upgrade you purchased and installed in 2020? [INSERT OPTIONS AS 1 = YES, 2 = NO, AND 98 = DON'T KNOW]
    1. LED lightbulbs [SHOW IF Q64 = 1]
    2. Air sealing (sealing air leaks in the home, weather sealing) [SHOW IF Q64 = 2]
    3. Attic/ceiling insulation [SHOW IF Q64 = 3]
    4. Energy-efficient air conditioner [SHOW IF Q64 = 4]
    5. Heat pump [SHOW IF Q64 = 5]
    6. Ground source heat pump [SHOW IF Q64 = 6]
    7. Ductless mini-split heat pump [SHOW IF Q64 = 7]
    8. High-efficiency water heater [SHOW IF Q64 = 8]
    9. Smart thermostat [SHOW IF Q64 = 9]
    96. Other energy-efficient equipment/upgrade [SHOW IF Q64 = 96]

[SHOW Q66 IF ANY IN Q65 = 2]

66. Why didn't you receive a rebate for those items? (Please select all that apply) [MULTI-SELECT]
    1. I didn't know rebates were available
    2. I forgot to apply for a rebate
    3. I didn't have time to apply for a rebate
    4. I didn't want to deal with the application paperwork
    96. Other (Please specify) [OPEN-ENDED]
    98. Don't know

[SHOW Q67 AND Q68 IF Q64 = 1 – 9 OR 96]

67. How would you rate the importance of the discount/rebate and/or energy savings kit from Evergy in your decision to install those additional energy-efficient equipment or home improvements? [INSERT 0-10 SCALE; 1 = NOT AT ALL IMPORTANT, 10 = VERY IMPORTANT, WITH 99 = NOT APPLICABLE]
    1. LED lightbulbs [SHOW IF Q64 = 1]
    2. Air sealing (sealing air leaks in the home, weather sealing) [SHOW IF Q64 = 2]
    3. Attic/ceiling insulation [SHOW IF Q64 = 3]
    4. Central air conditioner [SHOW IF Q64 = 4]
    5. Heat pump [SHOW IF Q64 = 5]

6. Ground source heat pump [SHOW IF Q64 = 6]
7. Ductless mini-split heat pump [SHOW IF Q64 = 7]
8. High-efficiency water heater [SHOW IF Q64 = 8]
9. Smart thermostat [SHOW IF Q64 = 9]
96. Other energy-efficient equipment/upgrade [SHOW IF Q64 = 96]

68. How likely would you have been to install those additional energy-efficient equipment or home improvements if you had not received a discount/rebate and/or energy savings kit from Evergy? [INSERT 0-10 SCALE; 1 = NOT AT ALL LIKELY, 10 = VERY LIKELY, WITH 99 = NOT APPLICABLE]
    1. LED lightbulbs [SHOW IF Q64 = 1]
    2. Air sealing (sealing air leaks in the home, weather sealing) [SHOW IF Q64 = 2]
    3. Attic/ceiling insulation [SHOW IF Q64 = 3]
    4. Central air conditioner [SHOW IF Q64 = 4]
    5. Heat pump [SHOW IF Q64 = 5]
    6. Ground source heat pump [SHOW IF Q64 = 6]
    7. Ductless mini-split heat pump [SHOW IF Q64 = 7]
    8. High-efficiency water heater [SHOW IF Q64 = 8]
    9. Smart thermostat [SHOW IF Q64 = 9]
    96. Other energy-efficient equipment/upgrade [SHOW IF Q64 = 96]

EXPERIENCE WITH PROGRAM/PROJECT

69. Did installing the energy-efficient equipment/upgrades in your home make you more aware of the advantages of energy efficiency? [INSERT 1-5 SCALE; 1 = NO MORE AWARE AND 5 = A LOT MORE AWARE, WITH 99 = NOT APPLICABLE]

70. Is there anything that you do not like about the energy-efficient equipment/upgrades?
    1. Yes (Please specify) [OPEN-ENDED]
    2. No
    98. Don’t know

EVERGY SATISFACTION

71. Did you or someone in your household contact Evergy or ICF (program management company) program staff with questions or concerns regarding installation of energy-efficient equipment/upgrades, the rebate/discount, or any other reason?
    1. Yes
    2. No
    98. Don't know

72. How satisfied or dissatisfied were you with the following aspects of receiving a discount/rebate and/or energy savings kit through Evergy? [INSERT 1-5 SCALE; 1 = VERY DISSATISFIED, 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]
    1. Interactions with Evergy or ICF staff [SHOW IF Q71 = 1]
    2. Interactions with the contractor/energy auditor that installed your home's energy-efficient equipment/upgrades
    3. The installation process or quality of the contractor/energy auditor's work
    4. The home energy assessment performed on your home
    5. The timeliness in receiving the discount/rebate from Evergy
    6. The discount/rebate amount from Evergy
    7. Overall experience with Evergy's Heating, Cooling and Home Comfort Program

[SHOW Q73 IF Q72(1) <3]

73. Why were you dissatisfied with Evergy or ICF staff?
    [OPEN-ENDED]

[SHOW Q75 IF Q72(2) OR Q72(3) <3]

74. Why were you dissatisfied with your contractor/energy auditor or the installation process/quality of work from your contractor/energy auditor?
    [OPEN-ENDED]

[SHOW Q75 IF Q72(4) <3]

75. Why were you dissatisfied with home energy assessment performed on your home?
    [OPEN-ENDED]

[SHOW Q76 IF Q72(5) OR Q72(6) <3]

76. Why were you dissatisfied with receiving the discount/rebate from Evergy?
    [OPEN-ENDED]

[SHOW Q77 IF Q72(7) <3]

77. Why were you dissatisfied with your overall experience with Evergy's Heating, Cooling and Home Comfort Program?
    [OPEN-ENDED]

[SHOW Q78 IF Q72(7) = 99]

78. You indicated that your level of satisfaction with your overall experience with Evergy's Heating, Cooling, and Home Comfort Program was "Not applicable"? Please explain.
    [OPEN-ENDED]

79. Do you have any other comments about the Heating, Cooling and Home Comfort Program, energy efficiency in residences, or about Evergy's services in general?
    1. Yes (Please specify) [OPEN-ENDED]
    2. No comments

EFFECTS OF PANDEMIC

The following questions address how the coronavirus pandemic has affected energy use in your home.

80. Have you noticed a change in your electricity bill since the pandemic?
    1. Yes
    2. No
    98. Don't know
    99. Prefer not to answer

[SHOW Q81 IF Q80 = 1]

81. What changes have you noticed?
    1. Bills increased by about $10 a month or more
    2. Bills increased by less than about $10 a month
    3. Bills decreased by less than about $10 a month
    4. Bills decreased by about $10 a month or more
    98. Don't know
    99. Prefer not to answer

82. Has the pandemic increased or decreased your ability to participate in Evergy's energy-efficiency programs? [INSERT 1-5 SCALE; 1 = GREATLY DECREASED, 5 = GREATLY INCREASED, WITH 98 = DON'T KNOW AND 99 = PREFER NOT TO ANSWER]

DEMOGRAPHICS

Please answer the following questions about your household and residence. Your responses will remain anonymous and are used to assess how well participants in this program resemble Evergy's customer population. You are not required to answer these questions.

83. Do you rent or own your household?
    1. Rent
    9. Own
    98. Don't know
    99. Prefer not to answer

84. How many people, including you, live in your household?
    1. Number of people: [OPEN-ENDED]
    99. Prefer not to answer

85. Which of the following best describes your home?
    1. Single Family Home, detached from any other house
    2. Single-family house attached to one or more other houses (e.g. duplex, row house, or townhome)
    96. Other (Please Specify) [OPEN-ENDED]
    98. Don't know
    99. Prefer not to answer

86. Approximately when was your home built?
    1. Before 1960
    2. 1960 - 1969
    3. 1970 - 1979
    4. 1980 - 1989
    5. 1990 - 1999
    6. 2000 - 2009
    7. 2010 - 2020
    98. Don't know
    99. Prefer not to answer

87. About how many square feet is your home? If you are unsure, an estimate is okay.
    1. Less than 1,000 square feet
    2. 1,000-1,999 square feet
    3. 2,000-2,999 square feet
    4. 3,000-3,999 square feet
    5. 4,000-4,999 square feet
    6. 5,000 or greater square feet
    98. Don't know
    99. Prefer not to answer

88. What is the primary fuel type used to heat your home?
    1. Electricity
    2. Natural Gas
    3. Propane
    96. Other (Please Specify) [OPEN-ENDED]
    98. Don't know
    99. Prefer not to answer

89. What was your total household income before taxes in 2019?
    1. Less than $10,000
    2. $10,000 to less than $20,000
    3. $20,000 to less than $30,000
    4. $30,000 to less than $40,000

5. $40,000 to less than $50,000
6. $50,000 to less than $75,000
7. $75,000 to less than $100,000
8. $100,000 to less than $150,000
9. $150,000 to less than $200,000
10. $200,000 or more
98. Don't know
99. Prefer not to answer

90. What is your highest level of education?
    1. Up to 8th grade
    2. Some high school
    3. High school graduate or GED equivalent
    4. Some college
    5. Associate degree
    6. Bachelor's degree
    7. Master's degree
    8. Professional degree (MD, JD, DDS, DDO)
    9. Doctorate degree (Ph.D., D.Sc.)
    98. Don't know
    99. Prefer not to answer

GIFT CARD INFORMATION

We appreciate you completing this survey on behalf of Evergy's Heating, Cooling, and Home Comfort Program. We would like to send you a $10 electronic gift card to thank you for your time. We will be sending it to [EMAIL]. If you would like us to send your gift card to a different e-mail address, please enter the alternate e-mail address below. You should receive an email with the link to your gift card within 10 days.

91. Please send my electronic gift card to the following email address:
    1. [OPEN-ENDED]
    99. I do not wish to receive a gift card

If you have questions regarding this survey or would like to know the status of your gift card, you can send an email to adm-surveys@admenergy.com. On behalf of Evergy, thank you for participating and have a great day!

L.2 Heating, Cooling and Home Comfort Trade Ally Survey

Client: Evergy
Program: Heating, Cooling, and Home Comfort
Program Year: 2020
Group: Trade allies
Mode: Email

PREDEFINED VARIABLES

Prepopulated variables are shown in all caps enclosed in brackets, e.g., [PREDEFINED VARIABLE]

Variable	Definition
NAME	Trade ally first and last name
BUSINESS NAME	Name of trade ally's business
EMAIL	Trade ally's email
PASSWORD	Unique password

EMAIL SURVEY MESSAGE

Dear [NAME],

ADM Associates is the official contractor hired by Evergy to evaluate their energy-efficiency rebate programs. Evergy maintains a website listing of registered trade allies for this program. This offers customers access to a list of qualified companies who are familiar with the programs. For trade allies, it provides access to program training and additional resources such as marketing assistance and application tracking. [BUSINESS NAME] participated as a trade ally in this program recently and we would like to get some feedback from you regarding your experience with the program.

[Click here to complete survey]

Password: [PASSWORD]

If you would prefer to take the survey over the phone, you can call 775-238-7733 and a representative will be happy to help you.

Kind Regards,
Krista McGee
ADM Associates / Contractor to Evergy

TRADE ALLY COMPANY INFORMATION

1. What services do you offer? Please select all that apply. [MULTI-SELECT]
    1. Heating and air conditioning installation
    2. Insulation
    3. Air sealing
    4. Water heating
    5. Geothermal equipment
    6. Energy Auditor
    96. Other (Please specify) [OPEN-ENDED]
    98. Don’t know

2. How many people does your company employ?
    1. 1 - 5
    2. 6 - 10
    3. 11 - 15
    4. 16 - 20
    5. More than 21 staff (Please specify) [OPEN-ENDED]

3. How many years of experience does your organization have working with utility funded energy-efficiency programs?
    1. 0 - 5 years
    2. 6 - 10 years
    3. 11 - 15 years
    4. 16 - 20 years
    5. 21 - 25 years
    6. More than 25 years
    98. Don’t know

4. What percent of your home energy-efficiency improvement projects are at residential single-family homes and what percent are at multi-family homes?
    1. Residential, single family homes? [NUMERIC VALUE; OPEN-ENDED]
    2. Residential, multi-family homes? [NUMERIC VALUE; OPEN-ENDED]

PROGRAM AWARENESS & INVOLVEMENT

5. How long have you been participating in Evergy's energy-efficiency rebate programs?
    1. [OPEN-ENDED]
    98. Don’t know

6. Why did you decide to participate in the program? Please select all that apply. [MULTI-SELECT]
    1. Suggestion from ICF and/or Evergy representative
    2. To improve home efficiency for customers

3. To be able to pass discounts/rebates onto customers
4. To improve sales
5. To benefit from recognition as a qualified trade ally
96. Other (Please specify) [OPEN-ENDED]
98. Don’t know

7. How professional would you say the ICF program staff are? [INSERT 1-5 SCALE AS 1 = NOT AT ALL PROFESSIONAL TO 5 = VERY PROFESSIONAL, WITH 99 = NOT APPLICABLE]

8. How easy is it to reach ICF staff with questions? [INSERT 1-5 SCALE AS 1 = NOT AT ALL EASY TO 5 = VERY EASY, WITH 99 = NOT APPLICABLE]

9. How well does the ICF staff keep you informed about the program? [INSERT 1-5 SCALE AS 1 = NOT AT ALL INFORMED TO 5 = VERY INFORMED, WITH 99 = NOT APPLICABLE]

10. When trying to communicate with ICF, how quickly do they respond to your emails/phone calls? [INSERT 1-5 SCALE AS 1 = NOT AT ALL QUICKLY TO 5 = VERY QUICKLY, WITH 99 = NOT APPLICABLE]

[SHOW Q11 IF Q8, Q9, OR Q10 <4]

11. What could be improved about communication between you and ICF program staff?
    1. [OPEN-ENDED]

12. Did COVID-19 impact your decision to participate in Evergy's energy-efficiency rebate program in 2020?
    1. Yes
    2. No
    98. Don't know

[SHOW Q13 IF Q12 = 1]

13. How exactly did COVID-19 impact your decision to participate in Evergy's energy-efficiency rebate program in 2020?
    1. [OPEN-ENDED]

14. Did COVID-19 impact the home energy-efficiency improvement projects you completed as part of the program in any way in 2020?
    1. Yes
    2. No
    98. Don't know

[SHOW Q15 IF Q14 = 1]

15. How exactly did COVID-19 impact the home energy-efficiency improvement projects you completed as part of the program in 2020?
    1. [OPEN-ENDED]

PROGRAM PROCEDURES

16. How satisfied or dissatisfied have you been with the following aspects of the program in 2020? [INSERT 1-5 SCALE AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]
    1. The program paperwork
    2. The program measures and/or discounted/rebated equipment offered through Evergy's energy-efficiency rebate program
    3. The discount/rebate payment process and/or application
    4. The Evergy energy-efficiency website

[SHOW Q17 IF ANY OF Q16 <4]

17. What has been less than satisfactory?
    1. [OPEN-ENDED]

[SHOW Q78 IF ANY OF Q16 = 99]

18. You indicated that your level of satisfaction with some of the aspects of the program were "Not applicable"? Please explain.
    1. [OPEN-ENDED]

19. Did you receive any program training in 2020?
    1. Yes
    2. No
    98. Don't know

[SHOW Q20 IF Q19 = 1]

20. How helpful was the training? [INSERT 1-5 SCALE AS 1 = NOT AT ALL HELPFUL TO 5 = VERY HELPFUL, WITH 99 = NOT APPLICABLE]

[SHOW Q21 IF Q20 <3]

21. Can you tell me a bit more about why you gave that rating?

[OPEN-ENDED]

CUSTOMER INTERACTION

22. In 2020, did you tell your customers about Evergy's energy-efficiency rebate program if they weren't already aware of it?
    1. Yes
    2. No
    98. Don't know

[SHOW Q23 IF Q22 = 2]

23. Why did you not tell your customers about Evergy's energy-efficiency rebate program?
    1. [OPEN-ENDED]
24. When do you initially present high efficiency options and equipment to customers?
    1. When we first interact with a customer
    2. Only when the customer requests high efficiency options
    3. We never present high efficiency options
    4. Depends on the situation (Please explain) [OPEN-ENDED]
    98. Don't know
25. What is the primary barrier for customer adoption of high-efficiency options?
    1. Cost of equipment
    2. Return on investment timeline
    3. Discount/rebate amount
    4. Requirement to use a trade ally to install the equipment
    96. Other (Please specify) [OPEN-ENDED]
    98. Don't know
26. What do you think are the main benefits your customers receive by participating in the program? [MULTI-SELECT]
    1. Higher efficiency equipment
    2. Home comfort

3. Savings on equipment
4. Lower utility bills
96. Other (Please specify) [OPEN-ENDED]
98. Don't know

PROGRAM INFLUENCE

27. How important was Evergy's energy-efficiency rebate program, including the discounts/rebates and information provided through the program, in influencing your level of marketing and selling of the energy-efficient measures to Evergy customers during 2020? [INSERT 0 -10 SCALE AS 0 = NOT AT ALL IMPORTANT TO 10 = VERY IMPORTANT, WITH 99 = NOT APPLICABLE]

[SHOW Q28 IF Q27 = 99]

28. You indicated that the influence of Evergy's energy-efficiency rebate program was "Not applicable" on your level of marketing and selling of the energy-efficient measures to Evergy customers during 2020? Please explain.
    1. [OPEN-ENDED]

29. Would you have recommended different equipment types, quantities, or efficiency levels to customers if the program were not available?
    1. Yes
    2. No
    3. Depends (Please specify) [OPEN-ENDED]
    98. Don't know

MARKET

30. Has Evergy's energy-efficiency rebate program affected the number of home energy-efficiency projects you complete? [INSERT 1-5 SCALE AS 1 = DECREASED GREATLY, 2 = DECREASED SOMEWHAT, 3 = NEITHER INCREASED NOR DECREASED, 4 = INCREASED SOMEWHAT, 5 = INCREASEED GREATLY, WITH 99 = NOT APPLICABLE]

31. Do you expect your total number of Evergy's energy-efficiency rebate program projects to increase, decrease, or stay the same in the next 12 months?
    1. Increase
    2. Decrease
    3. Stay the same
    98. Don't know

[SHOW Q32 IF Q31 = 1 OR 2]

32. Why do you think that is?
    1. [OPEN ENDED]

CLOSING

33. What has been the biggest challenge for you as a participating trade ally in Evergy's energy-efficiency rebate program?
    1. Communication with program staff
    2. Understanding the discount/rebate process and/or application
    3. Qualifying customers
    4. Qualifying equipment
    96. Other (Please specify) [OPEN ENDED]
    98. Don't know

[SHOW Q34 IF Q33 = 1, 2, 3, 4, OR 96]

34. Do you have any suggestions for overcoming these challenges?
    1. [OPEN-ENDED]

35. How would you rate your overall satisfaction with Evergy's energy-efficiency rebate program? [INSERT 1-5 SCALE AS 1 = VERY DISSATISFIED AND 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]

[SHOW Q36 IF Q35 <4]

36. Why do you give it that rating?
    1. [OPEN-ENDED]

[SHOW Q37 IF Q35 = 99]

37. You indicated that your level of overall satisfaction with Evergy's energy-efficiency rebate program was "Not applicable"? Please explain.
    1. [OPEN-ENDED]

38. Do you have anything else you want to mention regarding the program?
    1. [OPEN-ENDED]

THANK YOU

Those are all the questions I have for you at this time. I want to thank you for your time in answering questions on behalf of Evergy's energy-efficiency rebate program, have a great day!

L.3 Energy Saving Products General Population Survey

Client: Evergy
Program: Evergy's 2020 General Population Survey
Group: General Customer Population
Mode: Email

INTRODUCTORY MESSAGE

Evergy (formerly Kansas City Power and Light Company) is conducting a survey regarding their customers' energy efficient product purchases. To thank you for your time and thoughts we'll send you a $10 online gift card from your choice of a variety of stores.

We would greatly appreciate you taking a few minutes to provide your feedback. If you have questions or require technical assistance, please reach out to us at adm-surveys@admenergy.com. If you are ready to get started, please click "next" below.

Thank you in advance for your time!

SCREENING

1. What is your current electricity service provider?
    1. Evergy (formerly KCP&L)
    2. Ameren [TERMINATE SURVEY]
    3. 96. Other [OPEN ENDED] [TERMINATE SURVEY]
    4. 98. I Don't Know [TERMINATE SURVEY]

2. Did you purchase LED light bulbs in 2020? We have included example images of the ENERGY STAR® logo and LED light bulbs below to help you remember what each item would look like.

1. Yes
2. No [SKIP TO Q35]
98. I don’t know [SKIP TO Q35]

[DISPLAY Q3 AND Q4 IF Q1 = 1]

3. What type of LED light bulbs did you purchase? We have included an example image of standard and specialty LED light bulbs below to help you remember what they would look like. Please select all that apply. [MULTI-SELECT]
    3. Standard LED bulb(s)
    4. Specialty LED bulb(s)
    5. Other [OPEN ENDED]
    6. I don’t know

4. Where did you buy LED lightbulbs in 2020? [MULTI-SELECT]
    1. Ace Hardware
    2. Batteries Plus
    3. Costco
    4. Do It Best
    5. Dollar General
    6. Dollar Tree
    7. Euston Hardware
    8. Evergy Online Marketplace
    9. Goodwill
    10. Habitat Restore
    11. King City Lumber
    12. Lowe’s
    13. Menards

14. Sam's Club
15. St. Vincent de Paul
16. Target
17. The Home Depot
18. True Value
19. Walmart
96. None of the above
98. I don't know

[DISPLAY Q5 THRU Q34 IF Q4 = 1 – 17]

STANDARD BULBS MEASURE QUESTIONS

[DISPLAY Q5 THRU Q17 IF Q3 = 1]

5. In total, how many standard LED light bulbs did you purchase in 2020? If you are unsure of the exact number, an estimate is okay.
    1. Purchased [NUMERIC OPEN-ENDED]

6. How many of the standard LED light bulbs you purchased in 2020 are currently installed in the following areas? If you are unsure of the exact number, an estimate is okay.
    1. Indoor - Residential [NUMERIC OPEN-ENDED]
    2. Indoor - Multifamily [NUMERIC OPEN-ENDED]
    3. Outdoor – Residential or Multifamily [NUMERIC OPEN-ENDED]
    4. Commercial Space [NUMERIC OPEN-ENDED]

    [INCLUDE VALIDATION-TOTAL CANNOT BE MORE THAN Q5 RESPONSE]

7. How many of each of the following types of light bulbs did you replace with new standard LED light bulbs?
    1. Traditional incandescent/halogen [OPEN-ENDED]
    2. CFLs [OPEN-ENDED]
    3. LED [OPEN-ENDED]
    4. I installed bulbs in fixture or socket where there was none before [OPEN-ENDED]
    98. I don't know

    [INCLUDE VALIDATION-TOTAL CANNOT BE MORE THAN Q6 TOTAL]

8. Why did you buy the standard LED light bulbs? (Please select all that apply) [MULTI-SELECT]
    1. Replace burned out bulbs
    2. Replace working bulbs
    3. Install new light fixture or lamp socket
    4. Stock up
    96. Other (please specify) [OPEN-ENDED]

9. Which is the most important characteristic you consider when purchasing standard light bulbs? [RANDOMIZE 1-8]
    1. Price
    2. Energy efficiency
    3. ENERGY STAR® certification
    4. Brightness of the bulb
    5. How long the bulb lasts
    6. The ability to dim the bulb
    7. The size/shape of the bulb
    8. Color of the light
    96. Other (please specify) [OPEN-ENDED]
    98. I don't know

AWARENESS OF EE INCENTIVE / PROGRAM AWARENESS

10. Were any of the standard LED light bulbs you bought in 2020 were discounted from their normal pricing?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q11 IF Q10 = 1]

11. Were any of the standard LED light bulbs you bought in 2020 were discounted by Evergy?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q12 IF Q11 = 1]

12. Using the scale below, how important was the discount in your decision to buy standard LED light bulbs instead of another type of standard light bulb?

    [INSERT 1-5 SCALE WITH 1 = NOT AT ALL IMPORTANT AND 5 = EXTREMELY IMPORTANT, WITH 98 = I DON'T KNOW, 99 = PREFER NOT TO ANSWER]

COST SENSITIVITY

13. Would you have bought the standard LED light bulbs instead of less efficient standard light bulb if they had cost $1 more per bulb?
    1. Definitely would not have purchased
    2. Probably would not have purchased
    3. Not sure if you would have purchased
    4. Probably would have purchased

5. Definitely would have purchased

[DISPLAY Q14 IF Q13 = 2, 3, 4, OR 5]

14. If the standard LED light bulbs had cost $1 more per bulb would you have bought the same number of bulbs?
    1. I would have bought fewer LED light bulbs
    2. I would have bought the same quantity
    98. I don't know

[DISPLAY Q15 IF Q14 = 1]

15. How many fewer standard LED light bulbs would you have bought if they had cost $1 more per bulb?
    [OPEN-ENDED] [INCLUDE VALIDATION-CANNOT BE MORE THAN Q5 RESPONSE]

16. Had you ever bought standard LED light bulbs before 2020?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q17 IF Q16 = 1]

17. Were the standard LED light bulbs you bought before 2020 discounted from the normal pricing by Evergy/KCP&L?
    1. Yes
    2. No
    98. I don't know

SPECIALTY BULBS MEASURE QUESTIONS

[DISPLAY Q18 THRU Q30 IF Q3 = 2]

18. In total, how many specialty LED light bulbs did you purchase in 2020? If you are unsure of the exact number, an estimate is okay.
    1. Purchased [NUMERIC OPEN-ENDED]

19. How many of the specialty LED light bulbs you purchased in 2020 are currently installed in the following areas? If you are unsure of the exact number, an estimate is okay.
    1. Indoor - Residential [NUMERIC OPEN-ENDED]
    2. Indoor - Multifamily [NUMERIC OPEN-ENDED]
    3. Outdoor – Residential or Multifamily [NUMERIC OPEN-ENDED]
    4. Commercial Space [NUMERIC OPEN-ENDED]

[INCLUDE VALIDATION-TOTAL CANNOT BE MORE THAN Q18 RESPONSE]

20. How many of each of the following types of light bulbs did you replace with new specialty LED light bulbs?
    1. Traditional incandescent/halogen [OPEN-ENDED]
    2. CFLs [OPEN-ENDED]
    3. LED [OPEN-ENDED]
    4. I installed bulbs in fixture or socket where there was none before [OPEN-ENDED]
    98. I don't know

    [INCLUDE VALIDATION-TOTAL CANNOT BE MORE THAN Q19 RESPONSE]

21. Why did you buy the specialty LED light bulbs? (Please select all that apply) [MULTI-SELECT]
    1. Replace burned out bulbs
    2. Replace working bulbs
    3. Install new light fixture or lamp socket
    4. Stock up
    3. Other (please specify) [OPEN-ENDED]

22. Which is the most important characteristic you consider when purchasing specialty light bulbs? [RANDOMIZE 1-8]
    1. Price
    2. Energy efficiency
    3. ENERGY STAR® certification
    4. Brightness of the bulb
    5. How long the bulb lasts
    6. The ability to dim the bulb
    7. The size/shape of the bulb
    8. Color of the light
    97. Other (please specify) [OPEN-ENDED]
    98. I don't know

AWARENESS OF EE INCENTIVE / PROGRAM AWARENESS

23. Were any of the specialty LED light bulbs you bought in 2020 were discounted from their normal pricing?
    4. Yes
    5. No
    98. I don't know

[DISPLAY Q24 IF Q23 = 1]

24. Were any of the specialty LED light bulbs you bought in 2020 were discounted by Evergy?

6. Yes
7. No
98. I don't know

[DISPLAY Q25 IF Q24 = 1]

25. Using the scale below, how important was the discount in your decision to buy specialty LED light bulbs instead of another type of specialty light bulb?

    [INSERT 1-5 SCALE WITH 1 = NOT AT ALL IMPORTANT AND 5 = EXTREMELY IMPORTANT, WITH 98 = I DON'T KNOW, 99 = PREFER NOT TO ANSWER]

COST SENSITIVITY

26. Would you have bought the specialty LED light bulbs instead of a less efficient type of specialty light bulb if they had cost $1.75 more per bulb?
    1. Definitely would not have purchased
    2. Probably would not have purchased
    3. Not sure if you would have purchased
    4. Probably would have purchased
    5. Definitely would have purchased

[DISPLAY Q27 IF Q26 = 2, 3, 4, OR 5]

27. If the specialty LED light bulbs had cost $1.75 more per bulb would have bought the same number of LED light bulbs?
    1. I would have bought fewer LED light bulbs
    2. I would have bought the same quantity
    98. I don't know

[DISPLAY Q28 IF Q27 = 1]

28. How many fewer of the specialty LED light bulbs would you have bought if they had cost $1.75 more per bulb?

    [OPEN-ENDED] [INCLUDE VALIDATION-CANNOT BE MORE THAN Q18 RESPONSE]

29. Had you ever bought specialty LED light bulbs before 2020?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q30 IF Q29 = 1]

30. Were the specialty LED light bulbs you bought before 2020 discounted from the normal pricing by Evergy/KCP&L?
    1. Yes

2. No
99. I don't know

31. How did you first learn about Evergy's lighting discounts? [RANDOMIZE 1-13]
    1. Newspaper/magazine/print media
    2. In-store display
    3. Bill inserts
    4. Message printed on your bill
    5. Evergy website
    6. Friend or relative (word-of-mouth)
    7. TV ad
    8. Evergy representative
    9. Evergy newsletter
    10. Community event
    11. Social media (such as Facebook or Twitter)
    12. Home Energy Report
    13. Salesperson
    14. I wasn't aware that Evergy provided lighting discounts
    96. Other (please specify) [OPEN-ENDED]
    98. I don't know

LEAKAGE EVALUATION

32. Please indicate how long you would be willing to drive (in minutes) to reach each of the following retail location types to purchase light bulbs. [GRID DISPLAY]
    DIY store (e.g., Home Depot, Menards)
    Big box retailer (e.g., Walmart, Target)
    Wholesale membership club (e.g., Costco, Sam's Club)
    Discount variety store (e.g., Dollar Tree, Dollar General)
    Hardware store (e.g., Do It Best, Ace Hardware)
    Specialty retail store (e.g., Batteries Plus)
    Thrift store (e.g., St. Vincent de Paul)
    1. 0-4 minutes
    2. 5-9 minutes
    3. 10-14 minutes
    4. 15-19 minutes
    5. 20-24 minutes
    6. 25-29 minutes
    7. 30-39 minutes
    8. 40-49 minutes
    9. 50-59 minutes
    10. 60 minutes or more
    97. Not applicable

98. I don't know

33. Using the scale below, please rate how satisfied or dissatisfied are you with each of the following?

    [INSERT SCALE AS DEFINED AS 1=VERY DISSATISFIED TO 5=VERY SATISFIED, WITH 98 = I DON'T KNOW]

    1. The savings on your electricity bills since installing the LED light bulbs
    2. Quality of LED light bulbs you purchased
    3. The amount that the LED light bulbs you purchased were discounted

[DISPLAY Q34 IF ANY IN Q33 <3]

34. Why were you dissatisfied with this aspect or aspects of your purchase? [OPEN-ENDED]

SPILLOVER

35. Do you recall purchasing any additional energy efficient items on your own without a discount or rebate in 2020?
    1. Yes
    2. No [SKIP TO Q54]
    98. I don't know [SKIP TO Q54]

[DISPLAY Q36 IF Q35 = 1]

36. What energy efficient items did you purchase in 2020? [MULTISELECT]
    1. ENERGY STAR® appliance
    2. Water heater pipe insulation
    3. Water heater jacket, blanket, or insulation
    4. Low-flow faucet aerators
    5. Low-flow showerheads
    6. ENERGY STAR® room air conditioner
    7. Energy efficient water heater
    8. Energy efficient central air conditioner or heat pump
    9. Smart power strips
    10. Attic insulation
    11. Air sealing (e.g., weather stripping for doors/windows, door sweeps)
    12. Duct sealing
    13. HVAC tune-up
    14. LED Bulbs (without rebates)
    15. Something else (please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q37 IF Q36 = 1 – 11]

37. Why did you *not get* an Evergy incentive, rebate, or discount for that energy saving equipment? (Please select all that apply) [MULTISELECT]
    1. Was not aware there was a rebate available
    2. Did not have the time to complete rebate application
    3. Found out about rebate too late
    4. Did not think my equipment was eligible
    5. Submitted a rebate application that was rejected
    6. For some other reason (please describe) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q38 IF Q36 = 1]

38. What kind of appliance did you purchase? (Please select all that apply) [MULTISELECT]
    1. ENERGY STAR® refrigerator
    2. ENERGY STAR® dishwasher
    3. ENERGY STAR® clothes washer
    4. ENERGY STAR® clothes dryer
    5. Something else (please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q39 IF Q36 = 1]

39. How do you know that the appliance you purchased is energy efficient?
    1. ENERGY STAR® certification
    2. Information from a salesperson
    3. Product marketing
    96. Something else (please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q40 IF Q36 = 2]

40. About how many feet of water heater pipe insulation did you install? If you are unsure, an estimate is okay.
    1. Feet [NUMERIC QUANTITY IN FEET]

[DISPLAY Q41 IF Q36 = 4]

41. How many low-flow faucet aerators did you install? If you are unsure, an estimate is okay.
    1. Quantity [NUMERIC OPEN-ENDED]

[DISPLAY Q42 IF Q36 = 5]

42. How many low-flow showerheads did you install? If you are unsure, an estimate is okay.
    1. Quantity [NUMERIC OPEN-ENDED]

[DISPLAY Q43 IF Q36 = 6]

43. How many ENERGY STAR® room air conditioners did you install? If you are unsure, an estimate is okay.
    1. Quantity [NUMERIC OPEN-ENDED]

[DISPLAY Q44 IF Q36 = 6]

44. Approximately what size (in square feet) is the room in which the ENERGY STAR® air conditioner is installed? If you installed multiple air conditioners, please provide an average room size.
    1. Square feet [NUMERIC OPEN-ENDED]

[DISPLAY Q45 IF Q36 = 7]

45. What type of water heater did you install?
    1. Natural gas storage tank water heater
    2. Electric storage tank water heater
    3. Heat pump water heater
    4. A natural gas tank less water heater
    96. Some other type of water heater (please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q46 IF Q36 = 7]

46. How do you know that the water heater you installed is an energy efficient water heater?
    1. ENERGY STAR® certification
    2. Information from a salesperson
    3. Product marketing
    96. Something else (please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q47 IF Q36 = 9]

47. How many smart power strips did you install?
    1. Quantity [NUMERIC OPEN-ENDED]

[DISPLAY Q48 IF Q36 = 10]

48. Approximately what size (in square feet) is the attic where the insulation is installed?
    1. Square feet [NUMERIC OPEN-ENDED]

[DISPLAY Q49 IF Q36 = 11]

49. What type of air sealing measures did you install?
    [OPEN-ENDED]

[DISPLAY Q50 IF Q36 = 14]

50. How many LED light bulbs did you purchase without a rebate?
    [OPEN-ENDED]

[DISPLAY Q51 IF Q36 = 15]

51. How many other energy efficient items did you install?
    1. Quantity [NUMERIC OPEN-ENDED]

[DISPLY Q52 AND Q53 IF Q2 = 1 AND Q36 = 14 AND (Q11 = 1 OR Q24 = 1)]

52. Using the scale below, how important were the LED lighting rebates from Evergy in your decision to purchase the additional non-rebated LED bulbs you mentioned?

    [SCALE: 1 - (Not at all important), 2 = 2, 3 = 3, 4 = 4, 5 - (Extremely important), 98 = I don't know]

53. Using the scale below, how likely would you have been to purchase the non-rebated LED bulbs if you had not received the rebates from Evergy on your other bulb purchases in 2020?
    [SCALE: 1 – (Not at all likely), 2 = 2, 3 = 3, 4 = 4, 5 – (Extremely likely), 98 = I don't know]

54. Did you have a home energy assessment performed on your home in 2020?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q55 IF Q54 = 1]

55. Do you recall if the home energy assessment was performed by an Evergy representative?
    1. Yes
    2. No (please specify who conducted the assessment) [OPEN-ENDED]
    98. I don't know

[IF Q1 AND Q35 AND Q54 = 2 OR 98, TERMINATE SURVEY]

EFFECTS OF PANDEMIC

The following set of questions assess how the coronavirus pandemic has affected aspects of your daily life as it pertains to energy efficiency. You have the option of responding "prefer not to answer" if you do not wish to respond to a question. As a reminder, your responses will remain anonymous and confidential.

56. Using the scale below, how has the coronavirus pandemic changed the amount of time you spend at home?

    [INSERT 1-5 SCALE, WHERE 1 = GREATLY DECREASED, 3 = DID NOT CHANGE TO 5 = GREATLY INCREASED, WITH 98 = I DON'T KNOW, 99 = I PREFER NOT TO ANSWER]

57. Have you noticed a change in your electricity bill since the coronavirus pandemic began?
    1. Yes
    2. No
    98. I don't know
    99. Prefer not to answer

[DISPLAY Q58 IF Q57 = 1]

58. What changes have you noticed?
    1. Bills increased by $10 a month or more
    2. Bills increased by less than $10 a month
    3. Bills decreased by less than $10 a month
    4. Bills decreased by $10 a month or more
    98. I don't know
    99. Prefer not to answer

59. Have you changed the way you save on energy use in your home since the coronavirus pandemic began?
    1. Yes
    2. No
    98. I don't know
    99. Prefer not to answer

[DISPLAY Q60 IF Q59 = 1]

60. Using the space below, please describe how the coronavirus pandemic has affected your ability to save energy in your home?

    [OPEN-ENDED]

61. Using the scale below, how much has the coronavirus pandemic affected your ability to participate in Evergy's energy efficiency programs?

    [INSERT 1-5 SCALE, WHERE 1 = NOT AT ALL AFFECTED MY ABILITY, 5 = GREATLY AFFECTED MY ABILITY, WITH 98 = I DON'T KNOW, 99 = PREFER NOT TO ANSWER]

DEMOGRAPHICS

Please answer the following questions about your household and residence. Your responses will be used to assess how well participants in this program resemble Evergy's customer population. It is okay to not answer any of these questions.

62. Do you rent or own your home?
    1. Rent
    2. Own
    99. Prefer not to answer

63. Which of the following best describes your home?
    1. Single-family home
    2. Manufactured or mobile home
    3. Duplex or townhome
    4. Apartment or condominium
    96. Other (please specify) [OPEN-ENDED]
    98. I don't know
    99. Prefer not to answer

64. Approximately when was your home built?
    1. Before 1960
    2. 1960 to 1979
    3. 1980 to 1999
    4. 2000 to 2009
    5. 2010 or later
    98. I don't know
    99. Prefer not to answer

65. About how many square feet is your home? If you are unsure, an estimate is okay.
    1. Less than 1,000 square feet
    2. 1,000-1,999 square feet
    3. 2,000-2,999 square feet
    4. 3,000-3,999 square feet
    5. 4,000 square feet or great
    98. I don't know
    99. Prefer not to answer

GIFT CARD INFORMATION

We appreciate your time and would like to send you a $10 electronic gift card to thank you. Please provide an email below where we can send you the gift card. You should receive the electronic gift card within 5-10 business days.

1. Email: [OPEN-ENDED]

THANK YOU MESSAGE

You should be receiving an email with the link to your gift card in 10 days or less. If you have any questions regarding this survey or would like to know the status of your gift card, please send an email to adm-surveys@admenergy.com. On behalf of Evergy, thank you for participating. Have a great day!

DISQUALIFICATION MESSAGE

Disqualification Message: Sorry, but you do not qualify to take this survey. Thank you for your time. This survey is for Evergy customers who purchased qualifying energy efficient products in 2020.

L.4 Income-Eligible Multi-Family Decisionmaker Survey

Client: Evergy
Program: Income-Eligible Multi-Family (IEMF)
Group: Participating MF decisionmakers
Mode: Online

PREDEFINED VARIABLES

Prepopulated variables are shown in all caps enclosed in brackets, e.g., [PREDEFINED VARIABLE]

Variable	Description
CUSTOMER_NAME	Customer Name
MEASURES_ALL	Description of all measures installed
DATE	Approximate date of measure installation
PROPERTY_NAME	Name of the company that owns or manages the property
LED_QTY	Quantity installed
APS_QTY	Quantity installed
AERATOR_QTY	Quantity installed
SHOWERHEAD_QTY	Quantity installed
ASHP_QTY	Quantity installed
TSTAT_QTY	Quantity installed
FAN_QTY	Quantity installed
DRYER_QTY	Quantity installed
CLOTHES_WASHER_QTY	Quantity installed
DISHWASHER_QTY	Quantity installed
OTHER_QTY	Quantity of other measures installed
OTHER_DESC	Description of any other prescriptive and/or custom measures

EMAIL SURVEY MESSAGE

Hello [CUSTOMER_NAME],

Evergy (formerly Kansas City Power and Light Company) is conducting a survey regarding their Income-Eligible Multi-Family program. According to our records, you participated in this program and Evergy is interested in your experience and feedback. Your responses will be kept anonymous and completely confidential. To thank you for your time and thoughts we'll send you a **$10 online gift card** from your choice of a variety of stores.

Click here start the survey: [SURVEY LINK]
Your password is: [PASSWORD]

We would greatly appreciate you taking a few minutes to provide your feedback. If you have questions or require technical assistance, please reach out to us at adm-surveys@admenergy.com. If you wish to no longer receive emails about this survey, please click on the "Unsubscribe" link below. Thank you in advance for your time!

Kind Regards,

ADM Associates / Contractor to Evergy

SCREENING

1. Program records indicate that your property installed [MEASURES_ALL] through the Evergy Multifamily program around [DATE] at the [PROPERTY_NAME] property. Do you recall this?
    1. Yes [SKIP TO Q5]
    2. Yes, but the information is incorrect
    3. I do not recall receiving these measures at [PROPERTY_NAME] property

[DISPLAY Q2 IF Q1 =2]

2. Please indicate below what you think is incorrect about our records.

    [OPEN-ENDED]

[DISPLAY Q3 IF Q1 = 3]

3. Is there someone else we should speak with who might know about the energy-efficient items installed at this property through the Evergy Income-Eligible Multi-Family program?
    1. Yes
    2. No [THANK AND TERMINATE]
    98. I don't know [THANK AND TERMINATE]

[DISPLAY Q4 IF Q3 = 1]

4. Could you please provide the name, phone number, and/or email address of the person at your organization who was most involved in the decision to complete this project?
    1. Name: [OPEN-ENDED]
    2. Phone: [OPEN-ENDED]
    3. Email: [OPEN-ENDED]
    98. I don't know [THANK AND TERMINATE]

5. The first few questions are about [PROPERTY_NAME]. First, is this property independently owned and managed, or is it owned or managed by a company that owns or manages other properties?
    1. Independent
    2. Owned/managed by a company with other properties
    96. Other (Please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q6 IF Q5 = 1]

6. What is your role/title relating to [PROPERTY_NAME]?
    1. Property Owner
    2. President/CEO/COO
    3. General manager
    4. Property facilities/maintenance
    5. Financial manager
    96. Other (Please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q7 IF Q5 <> 1]

7. Which of the following most accurately describes your scope of responsibility?
    1. You are responsible for and work onsite at [PROPERTY_NAME] and no other properties
    2. You are responsible for [PROPERTY_NAME] and split your time among multiple properties
    3. You have corporate or portfolio-level responsibility
    96. Other (Please specify) [OPEN-ENDED]
    98. I don't know

8. Which of the following best describes your authority to make decisions about upgrades or improvements to [PROPERTY_NAME]?
    1. No authority
    2. Authority is limited to improvements below a certain cost
    3. Authority is limited in some other way
    4. Full authority
    98. I don't know

[DISPLAY Q9 IF Q8 = 2]

9. What is the cost limit to your authority to make decisions about upgrades or improvements to [PROPERTY_NAME]? This information will help Evergy in determining how to help multifamily properties get the most from its energy efficiency programs.
    1. Value [NUMERIC OPEN-ENDED]

[DISPLAY Q10 IF Q8 = 2 OR 3]

10. Please describe the limits on your authority to make decisions about upgrades or improvements to [PROPERTY_NAME]?
    1. [OPEN-ENDED]

PROGRAM PARTICIPATION

We are interested in how many units at [PROPERTY_NAME] received improvements through Evergy's Income-Eligible Multi-Family program.

11. How many total units are there at [PROPERTY_NAME]?
    1. Total number of units [NUMERIC OPEN-ENDED]
    98. Don't know

12. To the best of your knowledge, how many of those units received improvements?
    1. Total number of units [NUMERIC OPEN-ENDED]
    98. Don't know

13. To the best of your knowledge, what percentage of the units that received improvements was the tenant home when the improvements were made?
    1. Percentage of units [NUMERIC OPEN-ENDED]
    98. Don't know

[DISPLAY Q14 IF LED_QTY>0]

14. According to our records, the [PROPERTY_NAME] property received a total of [LED_QTY] LED light bulbs in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q15 IF Q14=2]

15. To the best of your knowledge, how many LED light bulbs did that property receive in tenant units?
    1. Number of bulbs [NUMERIC OPEN-ENDED]

[DISPLAY Q16 IF LED_QTY>0]

16. To the best of your knowledge, have any of the installed LED light bulbs in the units been removed by you or anyone else?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q17 IF Q16 = 1]

17. How many LED light bulbs were removed?
    1. Number removed [NUMERIC OPEN-ENDED]
    98. I don't know

18. Why were the LED bulbs removed?

    [OPEN-ENDED]

[DISPLAY Q19 IF SHOWERHEADS_QTY>0]

19. According to program records, the [PROPERTY_NAME] property received a total of [SHOWERHEAD_QTY] low flow showerheads in tenant units. Does this sound correct?
    1. 1. Yes
    2. No
    98. I don't know

[DISPLAY Q20 IF Q19=2]

20. How many low flow showerheads did that property receive in tenant units?
    1. Number of showerheads [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q21 IF SHOWERHEADS_QTY>0]

21. To the best of your knowledge, have any of the installed low-flow showerheads in the units been removed by you or anyone else?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q22 AND Q23 IF Q21 = 1]

22. How many low-flow showerheads were removed?
    3. Number removed [NUMERIC OPEN-ENDED]
    98. I don't know

23. Why were the low-flow showerheads removed?

    [OPEN-ENDED]

[DISPLAY Q24 IF AERATOR_QTY>0]

24. According to program records, the [PROPERTY_NAME] property received a total of [AERATOR_QTY] faucet aerators in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q25 IF Q24=2]

25. To the best of your knowledge, how many faucet aerators did that property receive in tenant units?
    1. Number of aerators [NUMERIC OPEN-ENDED]

98. I don't know

[DISPLAY Q26 IF AERATOR_QTY>0]

26. To the best of your knowledge, have any of the installed faucet aerators in the units been removed by you or anyone else?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q27 AND Q28 IF Q26 = 1]

27. How many faucet aerators were removed?
    1. Number removed [NUMERIC OPEN-ENDED]
    98. I don't know

28. Why were the faucet aerators removed?

    [OPEN-ENDED]

[DISPLAY Q29 IF APS_QTY>0]

29. According to program records, the [PROPERY_NAME] property received a total of [APS_QTY] advanced power strips in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q30 IF Q29=2]

30. To the best of your knowledge, how many advanced power strips did that property receive in tenant units?
    1. Number of advanced power strips [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q31 IF APS_QTY>0]

31. To the best of your knowledge, have any of the installed advanced power strips in the units been removed by you or anyone else?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q32 AND Q33 IF Q31 = 1]

32. How many advanced power strips were removed?
    1. Number removed [NUMERIC OPEN-ENDED]
    98. I don't know

33. Why were the advanced power strips removed?

    [OPEN-ENDED]

[DISPLAY Q34 IF TSTAT_QTY>0]

34. According to program records, the [PROPERY_NAME] property received a total of [TSTAT_QTY] programmable thermostats in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q35 IF Q34=2]

35. To the best of your knowledge, how many programmable thermostats did that property receive?
    1. Number of programmable thermostats [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q36 IF TSTAT_QTY>0]

36. To the best of your knowledge, have any of the installed programmable thermostats been removed by you or anyone else?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q37 AND Q38 IF Q36 = 1]

37. How many programmable thermostats were removed?
    1. Number removed [NUMERIC OPEN-ENDED]
    98. I don't know

38. Why were the programmable thermostats removed?

    [OPEN-ENDED]

[DISPLAY Q39 IF ASHP_QTY>0]

39. According to program records, the [PROPERY_NAME] property received a total of [ASHP_QTY] air source heat pumps in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q40 IF Q39=2]

40. To the best of your knowledge, how many air source heat pumps did that property receive?
    1. Number of air source heat pumps [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q41 IF ASHP_QTY>0]

41. To the best of your knowledge, are all of the installed air source heat pumps still operational?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q42 AND Q43 IF Q41 = 2]

42. How many air source heat pumps are non-operational?
    1. Number not operational [NUMERIC OPEN-ENDED]
    98. I don't know

43. Why are the air source heat pumps non-operational?

    [OPEN-ENDED]

[DISPLAY Q44 IF FAN_QTY>0]

44. According to program records, the [PROPERY_NAME] property received a total of [FAN_QTY] bathroom ventilation fans in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q45 IF Q44=2]

45. To the best of your knowledge, how many bathroom ventilation fans did that property receive?
    1. Number of bathroom ventilation fans [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q44 IF FAN_QTY>0]

46. To the best of your knowledge, are all of the installed bathroom ventilation fans currently operational?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q47 AND Q48 IF Q46 = 2]

47. How many bathroom ventilation fans are not operational?
    1. Number not operational [NUMERIC OPEN-ENDED]
    98. I don't know

48. Why were the bathroom ventilation fans removed?

    [OPEN-ENDED]

[DISPLAY Q49 IF DISHWASHER_QTY>0]

49. According to program records, the [PROPERY_NAME] property received a total of [DISHWASHER _QTY] dishwashers in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q50 IF Q49=2]

50. To the best of your knowledge, how many dishwashers did that property receive?
    1. Number of dishwashers [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q51 IF DISHWASHER_QTY>0]

51. To the best of your knowledge, are all of the installed dishwashers currently operational?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q52 AND Q53 IF Q51 = 2]

52. How many dishwashers are currently not operational?
    1. Number not operational [NUMERIC OPEN-ENDED]
    98. I don't know

53. Why are the dishwashers not operational?

    [OPEN-ENDED]

[DISPLAY Q54 IF DRYER_QTY>0]

54. According to program records, the [PROPERY_NAME] property received a total of [DRYER _QTY] clothes dryers. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q55 IF Q54=2]

55. To the best of your knowledge, how many clothes dryers did that property receive?
    1. Number of clothes dryers [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q56 IF DRYER_QTY>0]

56. To the best of your knowledge, are all of the installed clothes dryers currently operational?
    1. Yes
    2. No

98. I don't know

[DISPLAY Q57 AND Q58 IF Q56 = 2]

57. How many clothes dryers are not operational?
    1. Number not operational[NUMERIC OPEN-ENDED]
    98. I don't know

58. Why are the clothes dryers not operational?

    [OPEN-ENDED]

[DISPLAY Q59 IF CLOTHESWASHER_QTY>0]

59. According to program records, the [PROPERY_NAME] property received a total of [CLOTHESWASHER _QTY] washing machines in tenant units. Does this sound correct?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q60 IF Q59=2]

60. To the best of your knowledge, how many washing machines did that property receive?
    1. Number of washing machines [NUMERIC OPEN-ENDED]
    98. I don't know

[DISPLAY Q61 IF CLOTHESWASHER_QTY>0]

61. To the best of your knowledge, are all of the installed washing machines currently operational?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q62 AND Q63 IF Q61 = 2]

62. How many washing machines are not operational?
    1. Number not operational [NUMERIC OPEN-ENDED]
    98. I don't know

63. Why are the washing machines not operational?

    [OPEN-ENDED]

[DISPLAY Q64 IF OTHER_QTY > 0]

64. According to program records, the [PROPERTY_NAME] property received a total of [OTHER_QTY] [OTHER_DESC] in tenant units. Does this sound correct?
    1. Yes
    2. No

98. I don't know

[DISPLAY Q65 IF Q64 = 2]

65. Please indicate below what is incorrect about our records.

[OPEN-ENDED]

66. To the best of your knowledge, are all of the [OTHER_DESC] currently operational?
    1. Yes
    2. No
    98. I don't know

[DISPLAY Q67 IF Q66=2]

67. Please list how many of [OTHER DESC] are not operational and share why.

[OPEN-ENDED]

68. Were any of the improvements that were made at [PROPERTY_NAME] in common areas?
    1. Yes
    2. No
    97. Not applicable
    98. I don't know

[DISPLAY Q69 IF Q68 = 1]

69. What improvements were made in the common areas at [PROPERTY_NAME]?

[OPEN-ENDED]

70. Were there any additional measures installed in units or common areas at [PROPERTY_NAME]?

[OPEN ENDED]

PROGRAM AWARENESS AND MARKETING

71. How did you first learn about the energy efficiency improvements available through Evergy's Income-Eligible Multifamily program?
    1. Information that came in the mail
    2. Evergy Email
    3. Newspaper or magazine article/ad
    4. Contractor
    5. Word of mouth from friends, relatives, or others
    6. Radio ad
    7. Evergy bill message
    8. Evergy's website
    9. Evergy program staff

96. Other (Please specify) [OPEN-ENDED]
98. I don't know

72. Who completed your program application or paperwork for this project? Please select all that apply. [MULTI-SELECT]
    1. I completed the paperwork/program application
    2. Someone else at my company
    3. An Evergy representative
    4. Contractor / Vendor
    96. Other (Please specify) [OPEN-ENDED]
    97. Not applicable
    98. I don't know

[DISPLAY Q73 IF Q72=1]

73. Using the scale below, how satisfied were you with the process to fill out and submit your application? [INSERT 1-5 SCALE WHERE 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, 98 = DON'T KNOW]

[DISPLAY Q74 IF Q73<3]

74. What could the program have done differently to make the application process easier?

    [OPEN-ENDED]

75. What were the main reason(s) for deciding to complete the in-unit efficiency improvements at the property? Please select all that apply. [MULTI-SELECT]
    1. Improve tenant comfort and satisfaction
    2. Reduce tenant utility bills
    3. Reduce property utility bills
    4. To take advantage of rebates/no-cost efficiency improvements
    5. To replace old or non-functioning equipment
    6. To make the units more attractive to prospective tenants
    96. Other (Please specify) [OPEN-ENDED]
    98. I don't know

[DISPLAY Q76 IF Q75 = 4 AND Q75 <> 1, 2, 3, 6 OR 96]

76. We understand the rebates or no-cost equipment made it possible to carry out the improvements. What were the main reason(s) you wanted to complete the in-unit efficiency improvements in the first place? (Please select all that apply) [MULTI-SELECT]
    1. Improve tenant comfort and satisfaction
    2. Reduce tenant utility bills
    3. Reduce property utility bills
    4. To make the units more attractive to prospective tenants
    96. Other (Please specify) [OPEN-ENDED]
    98. I don't know

PROGRAM FEEDBACK

77. What would be the best way for Evergy to provide information on rebates for energy-saving equipment and improvements?
    1. Email from Evergy
    2. Evergy's Website
    3. Bill inserts
    4. Telephone call
    5. Community Event
    96. Other (Please specify) [OPEN-ENDED]
    97. I prefer not to receive information
    98. I don't know

78. What impacts, if any, has COVID-19 had on your company?
    2. [OPEN-ENDED]

79. In what ways has the current coronavirus pandemic affected your companies' ability to take advantage of or participate in Evergy services and incentives?
    3. [OPEN-ENDED]

SATISFACTION

80. Using the scale below, how would you rate your satisfaction with the following? [RANDOMIZE 1-7] [INSERT 1-5 SCALE DEFINED AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 97 = NOT APPLICABLE]
    1. Interactions you had with Evergy staff
    2. The quality of installation work
    3. The process of having the equipment installed
    4. The performance of the equipment installed
    5. The effort required for the application process
    6. The wait-time to receive the services
    7. Overall program experience

81. Using the scale below, how satisfied or dissatisfied are you with Evergy as your utility company? [INSERT 1-5 SCALE AS DEFINED AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 98 = I DON'T KNOW]

[DISPLAY Q82 IF Q81 <4]

82. Why aren't you satisfied with Evergy as your utility?
    1. [OPEN-ENDED]

PROPERTY CHARACTERISTICS

83. Do tenants pay their own electric bills, or are electricity costs included in the rent?
    1. Tenants pay their own bills
    2. Electricity costs are included as part of the rent

96. There is another type of arrangement (Please describe) [OPEN-ENDED]
98. I don't know

84. Are any of the units at the [PROPERTY_NAME] property receiving some type of federal, state, or other housing assistance?
    1. Yes
    2. No
    98. I don't know
    99. Prefer not to say

[DISPLAY Q85 IF Q84 = 1]

85. Approximately what percent of the units are receiving housing assistance?
    1. Percentage of units [OPEN-ENDED]

86. Do you have any other comments, questions, or feedback to share with Evergy regarding its programs and services? Or any comments or feedback about this survey and the questions in it? If so, could you please share to help us improve in the future?
    1. [OPEN-ENDED]

Those are all the questions we have. We would sincerely like to thank you for your help with this survey and for sharing information about your experience!

L.5 Business Demand Response Survey

Client: Evergy
Program: Income-Eligible Multi-Family (IEMF)
Group: Participating MF decisionmakers
Mode: Online

VARIABLE LIST- to be provided by ADM

Variable	Description
CONTACT NAME	
BUSINESS NAME	
ADDRESS	
TELEPHONE NUMBER	

EMAIL SURVEY MESSAGE

Subject: Invitation to Help Improve Evergy's Business Demand Response (BDR) Program

Hello [CONTACT_NAME],

Thank you for participating in Evergy's Business Demand Response Program. Participants like you help control power costs and reduce greenhouse gas emissions through your actions during peak demand events. Evergy is interested in your feedback about the program and invites you to take an online survey to let us know how we can improve it.

Click here to start the survey {SURVEY LINK}

Your password is: [PASSWORD]

If you have questions or require technical assistance, please contact [CONTACT] at [CONTACT INFO].

Thank you so much for your time.

SCREENING

1. QS1. Our records indicate that your organization participated in Evergy's Business Demand Response (BDR) Program. Is this correct?
    1. Yes
    2. No [TERMINATE]
    98. Don't know [TERMINATE]

2. QS2. Who is your electricity provider?
    1. Evergy
    2. Ameren MO (Thank and Terminate)
    98. Don't Know (Thank and Terminate)

AWARENESS

3. QA1. How did you hear about the Evergy Business Demand Response Program [MULTI-SELECT: MARK ALL THAT APPLY]
    1. Evergy representative
    3. Newspaper/magazine/print media
    4. Utility bill insert
    5. My bill
    6. Evergy Website
    7. Word of mouth (friend, relative, coworker)
    8. HVAC contractor/plumber
    9. TV ad
    10. Retailer/store
    11. Community event
    12. Social media such as Facebook or Twitter
    96. Other
    98. Don't Know

PARTICIPATION

We have just a few questions about your participation in this program.

4. QP1. Why did you decide to participate in the Business Demand Response Program? (Open Ended)

(Possible Answers from Evergy's website)

1. Low-risk: are no financial penalties
2. Customized: We offer a curtailment plan specific to your site
3. Support: BDR team available for technical assistance and event success
4. Insight: participation will offer more insight into actual electrical usage
5. Awareness: Your customers and employees will have more awareness into how your business is taking measures to lower impact on the local environment
6. Savings: Use incentives to fund other energy efficiency projects
7. Environmental Concerns
96. Other (Specify)
98. Don't Know

5. QP2. Did Evergy provide you with a curtailment plan tailored to your business?
    1. Yes
    2. No
    98. Don't Know

6. QP3. What type of actions did you take to reduce or curtail your energy load during these events? (Mark all that apply)
    1. Reschedule shifts to off-peak times
    2. Temporarily shut down equipment, production lines and perform routine maintenance
    3. Reduce motor loads in elevators, compressors, conveyers, etc.
    4. Dim lights in non-critical areas
    5. Reduce cooling loads with small temperature adjustments
    6. Utilize certified self-generation
    96. Something Else (Specify)
    98. Don't Know/Don't Recall

7. QP4. Did your organization participate in the Demand Response Event on August 10, 2020 from 2-6 PM?
    1. Yes (Go to QP7)
    2. No (Go to QP6a)
    98. Don't Know/Don't Recall (Go to QP7)

8. QP4a: Why did you decide not to participate in this event? (Open-Ended)

9. QP5. Prior to calling this event, do you recall receiving a notification for this Demand Response Event via email, text, or phone call?
    1. Yes
    2. No
    98. Don't Know/Don't Recall

10. QP6. Did you participate in the Demand Response Event on August 25, 2020 from 2-6 p.m.?
    1. Yes (Go to QP9)
    2. No (Go to QP8a)
    98. Don't Know/Don't Recall

11. QP6a: Why did you decide not to participate in this event? (Open-Ended)

12. QP7. Prior to calling this event, do you recall receiving a notification for this Demand Response Event via email, text, or phone call?
    1. Yes
    2. No
    3. Don't Know/Don't Recall

13. QP8. Have you received the incentive from Evergy for participating in this program?
    1. Yes

2. No
98. Don't Know

SATISFACTION

We'd like to ask you a few questions about your satisfaction with the Business Demand Response Program.

14. QS1. On a scale of 1-5, where "1" means "Very Dissatisfied" and "5" means "Very Satisfied", how would you rate your satisfaction with the following aspects of the Business Demand Response Program? [INSERT 1-5 SCALE DEFINED AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]
    1. The curtailment plan developed by Evergy
    2. Ease of Enrolling in the Program
    3. Notification of the Demand Response Events
    4. Duration of the Demand Response Events
    5. Amount of Incentive Received for Participation
    6. The Business Demand Response Program Overall
    7. Evergy as your electricity provider

For all responses receiving a "1" or a "5" prompt,

15. QS2. Why did you say that? [OPEN-ENDED]

16. QS3. How likely is your organization to participate in the Business Demand Response Program again in 2021?
    1. "Not at all Likely"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Very Likely"
    98. Don't Know

EFFECTS OF CORONAVIRUS PANDEMIC

The following set of questions inquire over how the coronavirus pandemic may have affected aspects of your daily operations as it pertained to energy efficiency. As a reminder, your responses will remain confidential.

17. QV1. Between May 15th and September 30th of 2020, was your organization affected by the coronavirus pandemic?
    1. Yes
    2. No
    98. Don't know

18. QV2. Using the scale below, to what extent was your home impacted? [INSERT 1-5 SCALE, WHERE 1 = SLIGHTLY IMPACTED AND 5 = GREATLY IMPACTED, WITH 98= I DON'T KNOW]
    1. "Slightly Impacted"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Very Impacted"
    98. Don't Know
    99. Prefer Not to Answer

19. QV3. In what ways has your organization been affected by the coronavirus pandemic that you wish to share? [OPEN-ENDED]

20. QV4. How has the coronavirus pandemic affected your ability to reduce energy usage during events?
    1. "Not Affected My Ability"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Greatly Affected My Ability"
    98. Don't Know
    99. Prefer Not to Answer

21. QV5. Please describe the way the coronavirus pandemic affected your ability to reduce energy usage. [OPEN-ENDED]

BUSINESS DEMOGRAPHICS

We're almost done- I just need to ask you a few final questions for classification purposes only.

22. QD1. What type of organization is this?
    1. Retail Store
    2. Office
    3. Hotel/Motel
    4. Laundromat
    5. Bank/Credit Union/Financial Center
    6. Hospital- skip QD7
    7. School/College/University- Skip QD7
    8. Automobile dealership
    9. Repair shop
    10. Construction/Building
    11. Warehouse
    12. Grocery
    13. Convenience Store
    14. Shopping Center
    15. Restaurant

16. Religious/House of Worship
96. Other (Specify)
99. (Refused)

23. QD2. How many locations does your organization have?
    1. _____number of locations
    98. Don't Know

24. QD3. How many years have you been at this location?
    1. _____years
    98. Don't Know

25. QD4. Do you own or lease the building you are located in?
    1. Own
    2. Rent/Lease
    98. Don't Know

26. QD5. What is the approximate square footage of this location?
    1. _____estimated square footage
    98. Don't Know

27. QD6. Approximately how many full-time employees are at this location?
    1. _____number of full-time employees
    98. Don't Know

28. QD7. What are your approximate gross annual sales at this location?
    1. Less than $50,000
    2. $50,000-$100,000
    3. $100,001-$250,000
    4. $250,001- $500,000
    5. $500,001- $1 million
    6. More than $1 million
    97. Not Applicable
    99. (Refused)

L.6 Residential Demand Response Survey

Client: Evergy
Program(s): Residential Demand Response
Group: Participants in the Residential Demand Response Program
Mode: Fast Feedback (mixed mode- online/phone)

VARIABLE LIST- to be provided by ADM

Variable	Description
CONTACT NAME	
BUSINESS NAME	
ADDRESS	
TELEPHONE NUMBER	

EMAIL SURVEY MESSAGE

Hello [CONTACT_NAME],

Thank you for participating in Evergy's Thermostat Program. Participants like you help control power costs and reduce greenhouse gas emissions through your actions during energy savings events. Evergy is interested in your feedback about the program and invites you to take an online survey to let us know how we can improve it.

Click here to start the survey {SURVEY LINK}
Your password is: [PASSWORD]

If you have questions or require technical assistance, please contact [CONTACT] at [CONTACT INFO].

Thank you so much for your time.

SCREENING

1. QS1. Our records indicate that your household participated in Evergy's Residential Thermostat Program. Is this correct?
    1. Yes
    2. No [TERMINATE]
    98. Don't know [TERMINATE]

2. QS2. Who is your electricity provider?
    1. Evergy
    2. Ameren MO (Thank and Terminate)
    98. Don't Know (Thank and Terminate)

AWARENESS

3. QA1. How did you hear about Evergy's Residential Thermostat Program [MULTI-SELECT: MARK ALL THAT APPLY]
    1. Newspaper/magazine/print media
    2. Utility bill insert
    3. My bill
    4. Evergy Website
    5. Word of mouth (friend, relative, coworker)
    6. HVAC contractor/plumber
    7. TV ad
    8. Evergy representative
    9. Retailer/store
    10. Community event
    11. Social media such as Facebook or Twitter
    12. Home Energy Report
    96. Other
    98. Don't Know

PARTICIPATION

We have just a few questions about your participation in this program.

4. QP1. When did you enroll in the program? Your best guess is fine.
    1. Before June 2020
    2. Between June 1 and August 30, 2020
    98. Don't Know/Don't Recall

5. QP2. Was your residential thermostat installed:
    1. By myself/ family member (Self-installed/ Bring Your Own)
    2. By an installation contractor
    98. Don't know/Don't recall

6. QP3: Why did you decide to participate in the Residential Thermostat Program? (Open Ended)

7. QP4. Did your household participate in the August 10 Energy Savings Event from 4-6 p.m.?
    1. Yes (Go to QP5)
    2. (Go to QP4a)
    98. Don't Know/Don't Recall (Go to QP6)

If QP4 = 2

8. QP4a: Why did you decide not to participate in this event? (Open-Ended)
9. QP5. Prior to calling this event, do you recall receiving a notification about this event?
    1. Yes
    2. No
    98. Don't Know/Don't Recall
10. QP6. Did you participate in the August 25 Energy Savings Event from 4-6 p.m.?
    1. Yes (Go to QP7)
    2. No (Go to QP6a)
    98. Don't Know/Don't Recall

If QP6 = 2

11. QP6a: Why did you decide not to participate in this event? (Open-Ended)
12. QP7. Prior to calling this event, do you recall receiving a notification from about this event?
    1. Yes
    2. No
    98. Don't Know/Don't Recall

SATISFACTION

We'd like to ask you a few questions about your satisfaction with the Residential Thermostat Program.

13. QS1. On a scale of 1-5, where "1" means "Very Dissatisfied" and "5" means "Very Satisfied", how would you rate your satisfaction with the following aspects of the Residential Thermostat Program? [INSERT 1-5 SCALE DEFINED AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]
    1. The operation of your thermostat
    2. Ease of Enrolling in the Program
    3. Notification of the Energy Savings Events
    4. Duration of the Energy Savings Events
    5. The Residential Thermostat Program Overall
    6. Evergy as your electricity provider

For all responses receiving a "1" or a "5" prompt,

14. QS2. Why did you say that? [OPEN-ENDED]

EFFECTS OF CORONAVIRUS PANDEMIC

The following set of questions inquire over how the coronavirus pandemic may have affected aspects of your daily operations as it pertained to energy efficiency. As a reminder, your responses will remain confidential.

15. QV1. Between May 15th and September 30th of 2020, was your household affected by the coronavirus pandemic?
    1. Yes
    2. No
    98. Don't know

16. QV2.Using the scale below, to what extent was your home impacted? [INSERT 1-5 SCALE, WHERE 1 = SLIGHTLY IMPACTED AND 5 = GREATLY IMPACTED, WITH 98= I DON'T KNOW]
    1. "Slightly Impacted"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Greatly Impacted"
    98. Don't Know
    99. Prefer Not to Answer

17. QV3.In what ways has your home been affected by the coronavirus pandemic that you wish to share? [OPEN-ENDED]

18. QV4.How has the coronavirus pandemic affected your ability to participate in energy savings events?
    1. "Not Affected My Ability"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Greatly Affected My Ability"
    98. Don't Know
    99. Prefer Not to Answer

19. QV5.Please describe the way the coronavirus pandemic affected your ability to participate in energy savings events? [OPEN-ENDED]

HOME DEMOGRAPHICS

20. QD1. Which of the following best describes your home?
    1. Manufactured or mobile home
    2. Single-family home
    3. Duplex or townhouse
    4. Apartment or condominium
    96. Other (please specify)

98. Don’t know

21. QD2. When was your home built?
    1. Before 1960
    2. 1960-1979
    3. 1980-1999
    4. 2000-2009
    5. 2010 or later
    98. Don't know

22. QD3. Do you own or rent your home?
    1. Own
    2. Rent
    99. Prefer not to answer

23. QD4. What is the main fuel used to heat your home?
    1. Electricity
    2. Natural gas
    3. Propane
    4. Oil
    96. Other (Please specify)
    98. Don’t know

24. QD5. Including yourself, how many people are living in your household? (NUMBER OF PEOPLE IN THE HOME) (OPEN-ENDED)

25. QD6. Is your annual household income over or under [CUTOFF]?

    If Q = D6(1) CUTOFF = $25,500
    If Q = D6(2) CUTOFF = $34,500
    If Q = D6(3) CUTOFF = $43,400
    If Q = D6(4) CUTOFF = $52,400
    If Q = D6(5) CUTOFF = $61,400
    If Q = D6(6) CUTOFF = $70,300
    If Q = D6(7) CUTOFF = $79,300
    If Q = D6(8) CUTOFF = $88,200
    If Q = D6(9) CUTOFF = $97,200
    If Q = D6(10) CUTOFF = $106,200
    If Q = D6(11) CUTOFF = $115,100
    If Q = D6(12) CUTOFF = $124,000
    If Q = D6(13) CUTOFF = $133,000

    1. Over
    2. Under
    98. Don’t know
    99. Prefer not to answer

Thank you for participating in this survey.

L.7 Business Smart Thermostats Survey

Client: Evergy

Program(s): Business Smart Thermostat

Group: Participants in the Business Smart Thermostat Program

Mode: Fast Feedback (mixed mode- online/phone)

VARIABLE LIST- to be provided by ADM

Variable	Description
CONTACT NAME	
BUSINESS NAME	
ADDRESS	
TELEPHONE NUMBER	

EMAIL SURVEY MESSAGE

Subject: Invitation to Help Improve Evergy's Business Smart Thermostat Program

Hello [CONTACT_NAME],

Thank you for participating in Evergy's Business Smart Thermostat Program. Participants like you help control power costs and reduce greenhouse gas emissions through your actions during energy savings events. Evergy is interested in your feedback about the program and invites you to take an online survey to let us know how we can improve it.

Click here to start the survey {SURVEY LINK}

Your password is: [PASSWORD]

If you have questions or require technical assistance, please contact [CONTACT] at [CONTACT INFO].

Thank you so much for your time

SCREENING

1. QN1. Our records indicate that you participated in Evergy's Smart Thermostat Program. Is this correct?
    1. Yes
    2. No [TERMINATE]
    98. Don't know [TERMINATE]

2. QN2.Who is your electricity provider?
    1. Evergy
    2. Ameren MO (Thank and Terminate)
    98. Don’t Know (Thank and Terminate)

AWARENESS

3. QA1. How did you hear about the Evergy’s Business Thermostat Program [MULTI-SELECT: MARK ALL THAT APPLY]
    1. Evergy representative
    2. Newspaper/magazine/print media
    3. Utility bill insert
    4. My bill
    5. Evergy Website
    6. Word of mouth (friend, relative, coworker)
    7. HVAC contractor/plumber
    8. TV ad
    9. Retailer/store
    10. Community event
    11. Social media such as Facebook or Twitter
    96. Other
    98. Don’t Know

PARTICIPATION

We have just a few questions about your participation in this program.

4. QP1. When did you or your organization enroll in the program? Your best guess is fine.
    1. Before June 2020
    2. Between June 1 and August 30, 2020
    98. Don’t Know/Don’t Recall

5. QP2. Was your business thermostat installed:
    1. By myself/ someone from my organization (Self-installed/ Bring Your Own)
    2. By an installation contractor
    98. Don’t know/Don’t recall

6. QP3: Why did you decide to participate in the Business Thermostat Program? (Open Ended)

7. QP4. Did your business participate in the August 10 Energy Savings Event from 4-6 p.m.?
    1. Yes (Go to QP5)
    2. No (Go to QP4a)
    98. Don’t Know/Don’t Recall (Go to QP6)

8. QP4a: Why did you decide not to participate in this event? (OPEN-ENDED)
9. QP5. Prior to calling this event, do you recall receiving a notification about this event?
    1. Yes
    2. No
    98. Don't Know/Don't Recall
10. QP6. Did you participate in the August 25 Energy Savings Event from 4-6 p.m.?
    1. Yes (Go to QP7)
    2. No (Go to QP6a)
    98. Don't Know/Don't Recall
11. QP6a: Why did you decide not to participate in this event? (OPEN-ENDED)
12. QP7. Prior to calling this event, do you recall receiving a notification about this event?
    1. Yes
    2. No
    98. Don't Know/Don't Recall

SATISFACTION

We'd like to ask you a few questions about your satisfaction with the Business Smart Thermostat Program.

QS1. On a scale of 1-5, where "1" means "Very Dissatisfied" and "5" means "Very Satisfied", how would you rate your satisfaction with the following aspects of the Smart Thermostat Program? [INSERT 1-5 SCALE DEFINED AS 1 = VERY DISSATISFIED TO 5 = VERY SATISFIED, WITH 99 = NOT APPLICABLE]

1. The operation of your thermostat
2. Ease of Enrolling in the Program
3. Notification of the Energy Savings Events
4. Duration of the Energy Savings Events
5. The Smart Thermostat Program Overall
6. Evergy as your electricity provider

For all responses receiving a "1" or a "5" prompt,

13. QS2. Why did you say that? [OPEN-ENDED]

EFFECTS OF CORONAVIRUS PANDEMIC

The following set of questions inquire over how the coronavirus pandemic may have affected aspects of your daily operations as it pertained to energy efficiency. As a reminder, your responses will remain confidential.

14. QV1. Between May 15th and September 30th of 2020, was your organization affected by the coronavirus pandemic?
    1. Yes
    2. No
    98. Don't know

15. QV2. Using the scale below, to what extent was your organization impacted? [INSERT 1-5 SCALE, WHERE 1 = SLIGHTLY IMPACTED AND 5 = GREATLY IMPACTED, WITH 98= I DON'T KNOW]
    1. "Slightly Impacted"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Very Impacted"
    98. Don't Know
    99. Prefer Not to Answer

16. QV3. In what ways has your organization been affected by the coronavirus pandemic that you wish to share? [OPEN-ENDED]

17. QV4. How has the coronavirus pandemic affected your ability to participate in energy savings events.
    1. "Not Affected My Ability"
    2. [Scaled Selection]
    3. [Scaled Selection]
    4. [Scaled Selection]
    5. "Greatly Affected My Ability"
    98. Don't Know
    99. Prefer Not to Answer

18. QV5. Please describe the way the coronavirus pandemic affected your ability to participate in energy savings events. [OPEN-ENDED]

BUSINESS DEMOGRAPHICS

We're almost done- I just need to ask you a few final questions for classification purposes only.

19. QD1. What type of business is this?
    1. Retail Store
    2. Office
    3. Hotel/Motel

4. Laundromat
5. Bank/Credit Union/Financial Center
6. Hospital - Skip QD7
7. School/College/University- Skip QD7
8. Automobile dealership
9. Repair shop
10. Construction/Building
11. Warehouse
12. Grocery
13. Convenience Store
14. Restaurant
15. Religious/House of Worship - Skip QD7
96. Other (Specify)
99. (Refused)

20. QD2. How many locations does your business have?
    1. _____number of locations
    98. Don't Know

21. QD3. How many years have you been at this location?
    1. _____years
    98. Don't Know

22. QD4. Do you own or lease the building you are located in?
    1. Own
    2. Rent/Lease
    98. Don't know

23. QD5. What is the approximate square footage of this location?
    1. _____estimated square footage
    98. Don't Know

24. QD6. Approximately how many full-time employees are at this location?
    1. _____number of full-time employees
    98. Don't Know

25. QD7. What are your approximate gross annual sales at this location?
    1. Less than $50,000
    2. $50,000-$100,000
    3. $100,001-$250,000
    4. $250,001- $500,000
    5. $500,001- $1 million
    6. More than $1 million
    99. (Refused)

Appendix M Business Demand Response CBLs

The following table contains the CBLs tested on each customer.

Days in Lookback Window	Days Selected from Lookback Window	Day Type	Hours Used to Determine Baseline Days	Load Adjustment[23]	Load Adj. Min	Load Adj. Max
4	3	Any weekday	2-6pm	None	NA	NA
4	3	Any weekday	2-6pm	Usage Based - Additive	0.8	1.2
4	3	Any weekday	2-6pm	Usage Based - Additive	0.7	1.3
4	3	Any weekday	2-6pm	Usage Based - Additive	NA	NA
4	3	Any weekday	2-6pm	Usage Based - Multiplicative	0.8	1.2
4	3	Any weekday	2-6pm	Usage Based - Multiplicative	0.7	1.3
4	3	Any weekday	2-6pm	Usage Based - Multiplicative	NA	NA
4	3	Any weekday	2-6pm	Weather Based[24]	NA	NA
9	2	Any weekday	2-6pm	None	NA	NA
9	2	Any weekday	2-6pm	Usage Based - Additive	0.8	1.2
9	2	Any weekday	2-6pm	Usage Based - Additive	0.7	1.3
9	2	Any weekday	2-6pm	Usage Based - Additive	NA	NA
9	2	Any weekday	2-6pm	Usage Based - Multiplicative	0.8	1.2
9	2	Any weekday	2-6pm	Usage Based - Multiplicative	0.7	1.3
9	2	Any weekday	2-6pm	Usage Based - Multiplicative	NA	NA
9	2	Any weekday	2-6pm	Weather Based	NA	NA
10	3	Any weekday	2-6pm	None	NA	NA
10	3	Any weekday	2-6pm	Usage Based - Additive	0.8	1.2
10	3	Any weekday	2-6pm	Usage Based - Additive	0.7	1.3
10	3	Any weekday	2-6pm	Usage Based - Additive	NA	NA
10	3	Any weekday	2-6pm	Usage Based - Multiplicative	0.8	1.2
10	3	Any weekday	2-6pm	Usage Based - Multiplicative	0.7	1.3
10	3	Any weekday	2-6pm	Usage Based - Multiplicative	NA	NA
10	3	Any weekday	2-6pm	Weather Based	NA	NA
2	2	Any weekday	2-6pm	None	NA	NA
2	2	Any weekday	2-6pm	Usage Based - Additive	0.8	1.2
2	2	Any weekday	2-6pm	Usage Based - Additive	0.7	1.3
2	2	Any weekday	2-6pm	Usage Based - Additive	NA	NA
2	2	Any weekday	2-6pm	Usage Based - Multiplicative	0.8	1.2
2	2	Any weekday	2-6pm	Usage Based - Multiplicative	0.7	1.3
2	2	Any weekday	2-6pm	Usage Based - Multiplicative	NA	NA
2	2	Any weekday	2-6pm	Weather Based	NA	NA
7	5	Any weekday	12-8pm	None	NA	NA
7	5	Any weekday	12-8pm	Usage Based - Additive	0.8	1.2
7	5	Any weekday	12-8pm	Usage Based - Additive	0.7	1.3
7	5	Any weekday	12-8pm	Usage Based - Additive	NA	NA
7	5	Any weekday	12-8pm	Usage Based - Multiplicative	0.8	1.2
7	5	Any weekday	12-8pm	Usage Based - Multiplicative	0.7	1.3
7	5	Any weekday	12-8pm	Usage Based - Multiplicative	NA	NA
7	5	Any weekday	12-8pm	Weather Based	NA	NA
10	5	Any weekday	12-3pm	None	NA	NA
10	5	Any weekday	12-3pm	Usage Based - Additive	0.8	1.2
10	5	Any weekday	12-3pm	Usage Based - Additive	0.7	1.3
10	5	Any weekday	12-3pm	Usage Based - Additive	NA	NA
10	5	Any weekday	12-3pm	Usage Based - Multiplicative	0.8	1.2
10	5	Any weekday	12-3pm	Usage Based - Multiplicative	0.7	1.3

[23] The hours used for load adjustment will be 10am-12pm for testing models and the two hours prior to event notification for modeling events.

[24] ADM plans to use hourly weather data downloaded through NOAA from the Kansas City International Airport. The adjustment will be a linear correction term with facility demand as the dependent variable and the drybulb temperature as the independent variable.

Days in Lookback Window	Days Selected from Lookback Window	Day Type	Hours Used to Determine Baseline Days	Load Adjustment[23]	Load Adj. Min	Load Adj. Max
10	5	Any weekday	12-3pm	Usage Based - Multiplicative	NA	NA
10	5	Any weekday	12-3pm	Weather Based	NA	NA
3	3	Similar day of week	2-6pm	None	NA	NA
3	3	Similar day of week	2-6pm	Usage Based - Additive	0.8	1.2
3	3	Similar day of week	2-6pm	Usage Based - Additive	0.7	1.3
3	3	Similar day of week	2-6pm	Usage Based - Additive	NA	NA
3	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
3	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
3	3	Similar day of week	2-6pm	Usage Based - Multiplicative	NA	NA
3	3	Similar day of week	2-6pm	Weather Based	NA	NA
8	2	Similar day of week	12-3pm	None	NA	NA
8	2	Similar day of week	12-3pm	Usage Based - Additive	0.8	1.2
8	2	Similar day of week	12-3pm	Usage Based - Additive	0.7	1.3
8	2	Similar day of week	12-3pm	Usage Based - Additive	NA	NA
8	2	Similar day of week	12-3pm	Usage Based - Multiplicative	0.8	1.2
8	2	Similar day of week	12-3pm	Usage Based - Multiplicative	0.7	1.3
8	2	Similar day of week	12-3pm	Usage Based - Multiplicative	NA	NA
8	2	Similar day of week	12-3pm	Weather Based	NA	NA
5	3	Similar day of week	2-6pm	None	NA	NA
5	3	Similar day of week	2-6pm	Usage Based - Additive	0.8	1.2
5	3	Similar day of week	2-6pm	Usage Based - Additive	0.7	1.3
5	3	Similar day of week	2-6pm	Usage Based - Additive	NA	NA
5	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
5	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
5	3	Similar day of week	2-6pm	Usage Based - Multiplicative	NA	NA
5	3	Similar day of week	2-6pm	Weather Based	NA	NA
4	3	Similar day of week	2-6pm	None	NA	NA
4	3	Similar day of week	2-6pm	Usage Based - Additive	0.8	1.2
4	3	Similar day of week	2-6pm	Usage Based - Additive	0.7	1.3
4	3	Similar day of week	2-6pm	Usage Based - Additive	NA	NA
4	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
4	3	Similar day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
4	3	Similar day of week	2-6pm	Usage Based - Multiplicative	NA	NA
4	3	Similar day of week	2-6pm	Weather Based	NA	NA
6	4	Similar day of week	12-8pm	None	NA	NA
6	4	Similar day of week	12-8pm	Usage Based - Additive	0.8	1.2
6	4	Similar day of week	12-8pm	Usage Based - Additive	0.7	1.3
6	4	Similar day of week	12-8pm	Usage Based - Additive	NA	NA
6	4	Similar day of week	12-8pm	Usage Based - Multiplicative	0.8	1.2
6	4	Similar day of week	12-8pm	Usage Based - Multiplicative	0.7	1.3
6	4	Similar day of week	12-8pm	Usage Based - Multiplicative	NA	NA
6	4	Similar day of week	12-8pm	Weather Based	NA	NA
7	5	Similar day of week	2-6pm	None	NA	NA
7	5	Similar day of week	2-6pm	Usage Based - Additive	0.8	1.2
7	5	Similar day of week	2-6pm	Usage Based - Additive	0.7	1.3
7	5	Similar day of week	2-6pm	Usage Based - Additive	NA	NA
7	5	Similar day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
7	5	Similar day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
7	5	Similar day of week	2-6pm	Usage Based - Multiplicative	NA	NA
7	5	Similar day of week	2-6pm	Weather Based	NA	NA
3	2	Same day of week	12-8pm	None	NA	NA
3	2	Same day of week	12-8pm	Usage Based - Additive	0.8	1.2
3	2	Same day of week	12-8pm	Usage Based - Additive	0.7	1.3
3	2	Same day of week	12-8pm	Usage Based - Additive	NA	NA
3	2	Same day of week	12-8pm	Usage Based - Multiplicative	0.8	1.2
3	2	Same day of week	12-8pm	Usage Based - Multiplicative	0.7	1.3
3	2	Same day of week	12-8pm	Usage Based - Multiplicative	NA	NA
3	2	Same day of week	12-8pm	Weather Based	NA	NA
4	2	Same day of week	2-6pm	None	NA	NA
4	2	Same day of week	2-6pm	Usage Based - Additive	0.8	1.2
4	2	Same day of week	2-6pm	Usage Based - Additive	0.7	1.3
4	2	Same day of week	2-6pm	Usage Based - Additive	NA	NA

Days in Lookback Window	Days Selected from Lookback Window	Day Type	Hours Used to Determine Baseline Days	Load Adjustment[23]	Load Adj. Min	Load Adj. Max
4	2	Same day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
4	2	Same day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
4	2	Same day of week	2-6pm	Usage Based - Multiplicative	NA	NA
4	2	Same day of week	2-6pm	Weather Based	NA	NA
4	3	Same day of week	2-6pm	None	NA	NA
4	3	Same day of week	2-6pm	Usage Based - Additive	0.8	1.2
4	3	Same day of week	2-6pm	Usage Based - Additive	0.7	1.3
4	3	Same day of week	2-6pm	Usage Based - Additive	NA	NA
4	3	Same day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
4	3	Same day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
4	3	Same day of week	2-6pm	Usage Based - Multiplicative	NA	NA
4	3	Same day of week	2-6pm	Weather Based	NA	NA
4	4	Same day of week	2-6pm	None	NA	NA
4	4	Same day of week	2-6pm	Usage Based - Additive	0.8	1.2
4	4	Same day of week	2-6pm	Usage Based - Additive	0.7	1.3
4	4	Same day of week	2-6pm	Usage Based - Additive	NA	NA
4	4	Same day of week	2-6pm	Usage Based - Multiplicative	0.8	1.2
4	4	Same day of week	2-6pm	Usage Based - Multiplicative	0.7	1.3
4	4	Same day of week	2-6pm	Usage Based - Multiplicative	NA	NA
4	4	Same day of week	2-6pm	Weather Based	NA	NA
3	3	Same day of week	12-8pm	None	NA	NA
3	3	Same day of week	12-8pm	Usage Based - Additive	0.8	1.2
3	3	Same day of week	12-8pm	Usage Based - Additive	0.7	1.3
3	3	Same day of week	12-8pm	Usage Based - Additive	NA	NA
3	3	Same day of week	12-8pm	Usage Based - Multiplicative	0.8	1.2
3	3	Same day of week	12-8pm	Usage Based - Multiplicative	0.7	1.3
3	3	Same day of week	12-8pm	Usage Based - Multiplicative	NA	NA
3	3	Same day of week	12-8pm	Weather Based	NA	NA
5	3	Same day of week	12-3pm	None	NA	NA
5	3	Same day of week	12-3pm	Usage Based - Additive	0.8	1.2
5	3	Same day of week	12-3pm	Usage Based - Additive	0.7	1.3
5	3	Same day of week	12-3pm	Usage Based - Additive	NA	NA
5	3	Same day of week	12-3pm	Usage Based - Multiplicative	0.8	1.2
5	3	Same day of week	12-3pm	Usage Based - Multiplicative	0.7	1.3
5	3	Same day of week	12-3pm	Usage Based - Multiplicative	NA	NA
5	3	Same day of week	12-3pm	Weather Based	NA	NA