AEG

Evergy 2023 DSM Market Potential Study

Prepared for: Evergy

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TABLE OF CONTENTS

1 | Introduction

Evergy Services, Inc. (Evergy) engaged Applied Energy Group (AEG) to conduct a Demand-Side Management (DSM) Market Potential Study. The DSM Market Potential Study was conducted to support Evergy's Missouri Integrated Resource Plan (IRP) and Missouri Energy Efficiency Investment Act (MEEIA) Cycle 4 regulations, specifically to satisfy the demand-side analysis requirements of the Missouri resource planning regulations.

Evergy provides clean, safe, and reliable energy to 1.7 million customers in Kansas and Missouri through its operating subsidiaries, Evergy Kansas Central, Evergy Metro, and Evergy Missouri West. The DSM Market Potential Study evaluated energy efficiency, demand response, and demand-side rates for Every's Missouri jurisdictions, Every Metro and Evergy Missouri West.

The key objectives of the study included the following:

- Perform a comprehensive analysis that complies with the statutory requirements of the Missouri Public Service Commission (PSC).
- Provide credible and transparent estimation of the technical, economic, and achievable energy efficiency (EE), demand response (DR), and demand-side rate (DSR) potential by year over the next 20 years for Every Metro and Evergy Missouri West.
- Conduct a reliable, accurate, and useful residential appliance saturation survey to inform projections of current and future energy consumption and associated DSM potential.
- Develop a portfolio of energy efficiency and demand response IRP bundles utilizing the potential results.
- Support Evergy's Demand-Side Resource Analysis under 4 CSR 240-22.050 for the 2023 IRP filing.

1.1 Stakeholder Engagement

AEG facilitated a series of workshops with Evergy stakeholders to solicit feedback on key deliverables throughout the study. Evergy stakeholders included representatives from a variety of organizations with an interest in utility-sponsored DSM activities within the state of Missouri, including representatives from the Missouri PSC, Sierra Club, National Resource Defense Council (NRDC), Renew Missouri, and Missouri Office of Public Counsel (OPC), among others. The table below provides an overview of the workshops offered to stakeholders throughout the study.

Date	Workshop	Topics Covered
5/25/2022, 5/26/2022	Stakeholder Kickoff Meeting and Strategic Issues Forum	• Potential study objectives, analysis approach, and methodology • Project timeline • Measure list and source hierarchy
9/26/2022	Draft Energy Efficiency Potential Results Workshop	• Initial draft results of the energy efficiency potential analysis • Residential Appliance Saturation Survey results
10/17/2022	Draft Demand Response and Demand-Side Rates Potential Workshop	• Initial draft results of the demand response and demand-side rate potential analysis
10/27/2022	Draft DSM Potential Results Workshop	• Revised results of the DSM Potential Study

1.2 Report Contents

The report is divided into two chapters:

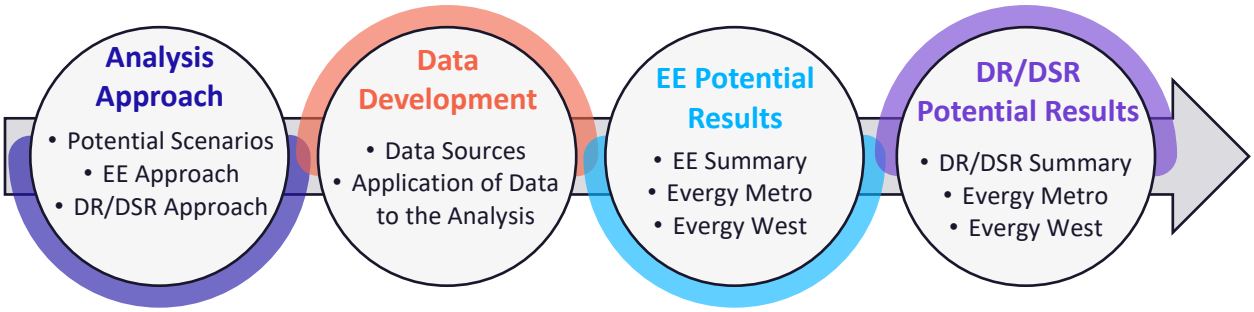
- **Chapter 2 – DSM Potential Study** describes the analysis and results of the energy efficiency, demand response, and demand-side rates potential.
- **Chapter 3 – DSM Energy Efficiency IRP Bundle Development** describes the IRP bundle development for energy efficiency resources.

1.3 Abbreviations and Acronyms

Acronym	Explanation
ADR	Automatic Demand Response
AEO	U.S. EIA Annual Energy Outlook
C&I	Commercial and Industrial
CBECS	U.S. EIA Commercial Building Energy Consumption Survey
DEEM	AEG's Database of Energy Efficiency Measures
DHW	Domestic Hot Water
DLC	Direct Load Control
DOE	U.S. Department of Energy
DR	Demand Response
DSR	Demand-Side Rate
DSM	Demand Side Management
EE	Energy Efficiency
EIA	U.S. Energy Information Administration
EUI	Energy Use Index
EV	Electric Vehicle
GW/GWh	Gigawatt/Gigawatt hour
IRP	Integrated Resource Plan
MAP	Maximum Achievable Potential
MEEIA	Missouri Energy Efficiency Investment Act
NWPCC	Northwest Power and Conservation Council
NRDC	National Resource Defense Council
OPC	Office of Public Counsel
PSC	Public Service Commission
RAP	Realistic Achievable Potential
RASS	Residential Appliance Saturation Survey
RECS	U.S. EIA Residential Energy Consumption Survey
RTF	NWPCC Regional Technical Forum
SAE	Statistically Adjusted End-use
TOU	Time-of-Use Rate
TRC	Total Resource Cost Test
TRM	Technical Reference Manual
UEC	Unit Energy Consumption

2 | DSM Potential Study

This chapter presents the DSM Market Potential Study in four sections:



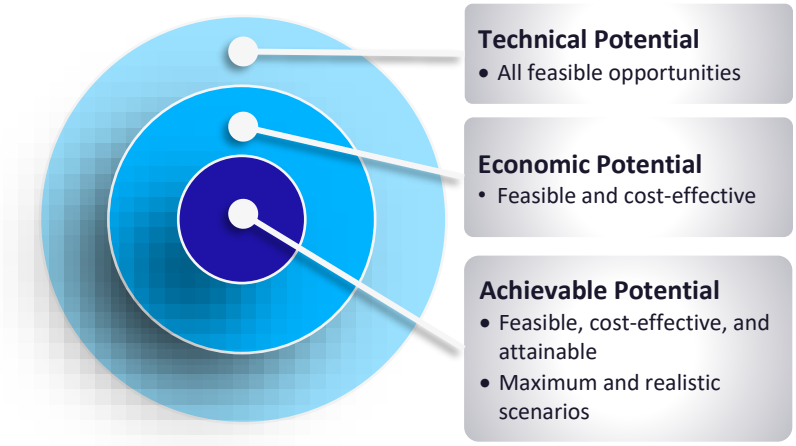
2.1 Analysis Approach

This section describes AEG's approach to estimating the potential for energy efficiency, demand response, and demand-side rates. We begin with an overview of the potential scenarios assessed in the DSM Market Potential Study, then detail the analysis approach by resource.

2.1.1 Potential Scenarios

It is standard practice to estimate three different levels of potential, as described and illustrated in Figure 2-1. The calculation of each level of potential is described later in this chapter.

Figure 2-1 Potential Scenarios



- **Technical Potential** considers all feasible potential, regardless of cost or potential customer uptake. Technical potential is a theoretical construct, assuming that all equipment is upgraded to the most efficient option at the time of replacement and that all retrofit measures are installed over time, regardless of what might be achievable in the market.
- **Economic Potential** includes all cost-effective opportunities without adjusting for expected customer uptake. Measure-level cost-effectiveness was measured by the Total Resource Cost (TRC) Test.
- **Achievable Potential** estimates of the potential that could be cost-effectively acquired under a given set of conditions, considering expected customer participation levels.
    - *Maximum Achievable Potential* is a subset of economic potential that attempts to identify maximum savings realized under ideal market, implementation, and customer preference conditions.
    - *Realistic Achievable Potential* is a subset of economic potential that reflects expected program participation given barriers to customer acceptance, non-ideal implementation conditions, and limited program budgets.

Table 2-1 identifies the resources assessed in each potential scenario. Of note:

- Demand response and demand-side rate resources do not exist in the absence of utility programs, and estimating technical and economic potential does not provide meaningful information on the available resource size. Therefore, these resources are excluded from the technical and economic potential scenarios.

Table 2-1 Resources Considered by Potential Scenario

Scenario	Energy Efficiency	Demand Response	Demand-Side Rates
Technical Potential	√		
Economic Potential	√		
Maximum Achievable Potential	√	√	√
Realistic Achievable Potential	√	√	√

2.1.2 Energy Efficiency Analysis Approach

Energy efficiency resources reduce the energy required to power end-use technologies while providing the same level of service to the customer. AEG used a bottom-up approach to perform the potential analysis, following these major steps:

1. **Residential Appliance Saturation Survey (RASS)**. Conducted primary market research of Evergy's residential customers in their Missouri and Kansas service territories.
2. **Market Characterization**. Performed a market characterization to describe electricity use for the study's base year for the residential, commercial, and industrial sectors (2021). The market characterization included utility data, primary data collected from the RASS, and secondary data sources.
3. **Baseline Projection.** Developed a reference baseline projection of electricity consumption by jurisdiction, sector, segment, end-use, and technology for 2022 through 2043 without future DSM programs.
4. **Measure Development.** Defined and characterized energy efficiency measures to be applied to sectors, segments, and end-uses.
5. **Calculation of Energy Efficiency Potential.** Estimated technical, economic, maximum achievable, and realistic achievable energy efficiency potential at the measure level for 2024 through 2043.

2.1.2(a) Residential Appliance Saturation Survey

AEG performed primary market research of Evergy's residential customers in their Missouri and Kansas service territories. Separate surveys were conducted in each of the four regions of the service area, including: Missouri West, Missouri Metro, Kansas Metro, and Kansas Central. The survey sample was stratified by usage and net metering status within each area. The initial sample consisted of 18,000 mail customers and 46,000 email customers. Due to a low response rate, another 80,003 email customers were added to the sample. Survey results were used to develop the market characterizations for the potential study, especially for segmentation, use per household, and appliance saturations.

The RASS can be found in ***Exhibit A. RASS Results***.

2.1.2(b) Energy Efficiency Market Characterization

To estimate the potential impacts of energy efficiency, it is first necessary to understand how much energy is used today and what equipment is currently in service. The market characterization began with a segmentation of each jurisdiction's footprint to quantify electricity use by sector, segment, end-use application, and the

current set of technologies in use in 2021. For this, we relied on information from Evergy and the RASS, augmented with secondary sources. The segmentation scheme is presented in Table 2-2.

- **Opt-Out Customers.** Some of Evergy's largest Commercial and Industrial customers are eligible to opt-out of the utility's energy efficiency program and manage their energy independently. To reflect this situation, AEG separated opt-out customers into a segment and removed them from the potential, as they will not contribute savings to Evergy's program portfolio.

Table 2-2 Overview of Energy Efficiency Segmentation Scheme

Dimension	Segmentation Variable	Description
1	Jurisdiction	Evergy Metro, Evergy Missouri West
2	Sector	Residential, Commercial, Industrial
3	Segment	**Residential:** Single Family, Single Family – Low Income, Multi-Family, Multi-Family – Low Income **Commercial:** Large Office, Small Office, Retail, Restaurant, Grocery, School, College, Healthcare, Lodging, Data Center, Warehouse, Miscellaneous, Opt-Out **Industrial:** Food Production, Chemicals/Pharmaceuticals, Electronic Equipment, Primary Metals, Stone/Clay/Glass, Transportation Equipment, Rubber/Plastics, Waste/Wastewater, Other Industrial, Opt-Out
4	Vintage	Existing and new construction
5	End-uses	Cooling, space heating, lighting, water heater, motors, etc. (as appropriate by sector)
6	Appliances/End-Uses and Technologies	Energy efficiency technologies, such as lamp and fixture type, central air conditioner type, motors by application, etc.
7	Equipment Efficiency for New Purchases	Baseline and higher-efficiency options as appropriate for each technology

With the segmentation scheme defined, AEG performed a high-level market characterization of electricity sales and customers by jurisdiction, sector, and segment in the base year. Then detailed market profiles were developed to fully describe electricity consumption in the base year at each level of the segmentation.

2.1.2(c) Energy Efficiency Baseline Projection

The baseline projection describes forecasted energy consumption in the absence of future Evergy DSM programs and provides the foundation against which potential savings are measured. AEG developed a reference baseline in alignment with Evergy's anticipated annual customer growth by sector and incorporated current and known future building codes and equipment efficiency standards to avoid overstating the potential that could be realized through new programs. AEG checked the baseline projection against each jurisdiction's official load forecast for reasonableness. However, the baseline projection was developed as an independent projection for the potential model to ensure that baseline assumptions were consistent with those used to assess measure savings and applicability.

2.1.2(d) Energy Efficiency Measure Development

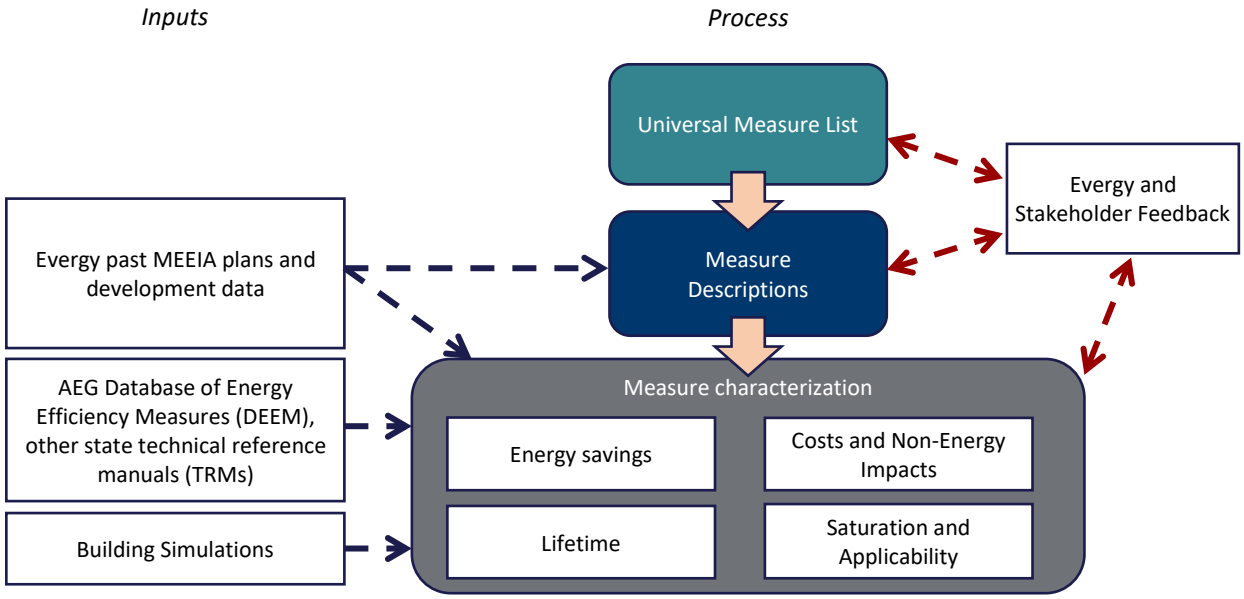
The framework for assessing savings, costs, and other attributes of energy efficiency measures involves the following:

- Identifying the list of energy efficiency measures to include in the analysis.
- Determining their applicability to each market sector and segment.
- Fully characterizing each measure.

- Preparing for integration with the greater potential modeling process.

Figure 2-2 outlines the framework for measure analysis.

Figure 2-2 Approach for Energy Efficiency Measure Assessment



AEG compiled robust lists of energy efficiency measures for each customer sector. The measure lists covered all major types of end-use equipment as well as devices and actions that reduce energy consumption when installed or implemented. Particular focus was given to including the latest available data on emerging technologies from AEG's in-depth research and participation in technical working groups nationwide.

After the lists were finalized, AEG identified the most appropriate source for each parameter and assembled information for all measures to reflect equipment performance, incremental costs, and lifetimes. AEG created a comprehensive measure characterization database to summarize the data. These characteristics form the basis for determining measure-level savings and cost-effectiveness as well as the subsequent build-up to the sector-level potential by scenario. Table 2-3 presents the measure source hierarchy.

Table 2-3 Energy Efficiency Measure Source Hierarchy

Priority Level	Resource	Details/Examples
1	Evergy program data	Reports, Evaluations, Installation Data
2	Well-Vetted Sources Within Region	Illinois Technical Reference Manual (TRM), Missouri TRM
3	National Department of Energy (DOE) Sources	Annual Energy Outlook, ENERGY STAR, DOE Technical Documents, etc.
4	Well-Vetted Sources Outside Region	State-wide technical reference documents, etc.
5	AEG Technical Research	Various Resources, as Required

The modeled measures fall into two types based on their application:

- **Equipment measures** are efficient energy-consuming equipment that save energy by providing the same service with a lower energy requirement than a standard unit. An example is a residential central air conditioner (SEER 18) that replaces a standard efficiency central air conditioner (SEER 14). For equipment measures, many efficiency levels may be available for a given technology, ranging from the baseline unit to the most efficient commercially available product. These measures are applied on a stock-turnover basis

and, in general, are referred to as lost opportunity measures because once a purchase decision is made, there will not be another opportunity to improve the efficiency of that equipment (absent early replacement at increased cost) until the end of its useful life.

- **Non-equipment measures** save energy by reducing the need for delivered energy but do not involve replacing or purchasing major end-use equipment (such as an air conditioner or water heater). Measure installation is not tied to equipment reaching the end of useful life, so these are generally categorized as "retrofit" measures. An example is insulation that modifies a household's space heating consumption but does not change the heating system efficiency. The existing insulation can be upgraded without waiting for existing equipment to malfunction and save energy used by the heating system. Non-equipment measures typically fall into one of the following categories:
  - Building shell (windows, insulation, roofing material)
  - Equipment controls (smart thermostats, lighting motion controls, water heater setback)
  - Equipment maintenance (heat pump commissioning, setpoint adjustments)
  - Displacement measures (destratification fan to reduce the use of HVAC systems)
  - Whole-building design (advanced new construction design)
  - Commissioning, retro-commissioning, and energy management
  - Behavioral actions

2.1.2(e) Calculation of Energy Efficiency Potential

AEG's approach to estimating energy efficiency potential aligns with industry-standard practice and terminology. Energy efficiency potential is estimated by developing an alternate projection of energy consumption if efficient measures are adopted and calculating the difference from the baseline projection. In these alternate projections, measures are adopted only where they are applicable (e.g., insulation will only save electricity in homes with electric heating or cooling) and where they are not already installed (e.g., if a home already has high levels of insulation, there is no potential associated with installing insulation). For this study, AEG estimated four levels of potential:

Technical Potential

The calculation of technical potential is a straightforward algorithm, aggregating the full, energy-saving effects of all individual energy efficiency measures included in the study at their maximum theoretical deployment levels, adjusting for technical applicability, stacking of measures, and interactive effects. Equipment replacement measures are naturally constrained by the lifetime and decay rate of the units being replaced. While all retrofit resources could theoretically be acquired in the first year, this would skew the potential for equipment measures and provide an inaccurate picture of measure-level potential. Therefore, the study assumes these opportunities will occur over 20 years, a common timeframe for complete retrofit realization in potential studies.

Stacking of Measures. It is important to consider interactions between measures when applied within the same space to avoid double counting, which could result in savings greater than 100% of equipment consumption. These interactions are automatically handled within LoadMAP; for these measures, the baseline is modified for each subsequent measure. First, LoadMAP computes the total savings of each measure on a standalone basis, then assigns a stacking priority such that "integrated" or "stacked" savings are calculated as a percent reduction to the running total of baseline energy remaining in each end-use after the previous measures have been applied. This ensures that the available baseline energy shrinks in proportion to the number of measures applied, as it would in reality. The stacking priority is based on the levelized cost of conserved energy, such that the most economical measures that are more likely to be cost-effective and offered to customers through programs will be the first to be applied to the modeled population.

Related and Exclusive Measures. AEG's modeling approach also accounts for the exclusivity of certain measure options. For instance, if a SEER 18 central air conditioner is installed in a single-family home, the model will not allow that same home to install another central air conditioning until the new option has reached the end of its useful life. For non-equipment measures, base saturations and applicability are defined such that measures do not overlap. For example, we model two applications of ceiling insulation – the first assumes the installation of insulation where there previously was none, while the second upgrades pre-existing insulation if it falls under a certain threshold. AEG leveraged a variety of resources to estimate the appropriate remaining markets for measures, including the 2022 RASS, market research from Evergy's past potential study reports, the US Energy Information Administration's (EIA) Residential Energy Consumption Survey (RECS) and Commercial Building Energy Consumption Survey (CBECS), and utility-provided program achievements.

Economic Potential

To estimate economic potential, AEG performed measure-level cost-effectiveness screening each year of the analysis using the TRC test. Costs included the full or incremental cost of the measure (depending on the application) and an assumed program administration cost. Benefits included (1) the avoided cost of electric generation, transmission, and generation; and (2) quantifiable water and operations and maintenance savings.

AEG's LoadMAP model performs the cost-effectiveness screening dynamically and on an annual basis, considering changing savings, costs, and benefits over time. Thus, measures can pass the economic screen for some, but not all, of the years in the forecast.

It is important to note the following about the economic screen:

- Cost-effectiveness was assessed at the measure level based on gross savings (i.e., not adjusted for potential free-ridership), reflecting that the potential study is attempting to assess cost-effectiveness without assuming or prescribing specific acquisition strategies or delivery mechanisms. Net-to-gross adjustments are applied during the development of program offerings.
- The economic evaluation of each measure was conducted relative to a baseline condition, such as minimum federal standard equipment or average existing building shell conditions.
- The economic evaluation was conducted only for measures applicable to each building type and vintage. Thus, measures deemed not applicable to a building type and vintage were excluded for that application.

Achievable Potential

To develop achievable potential estimates, AEG applied market adoption rates for each measure to estimate the percentage of customers that may elect to adopt each measure. The market adoption rates consider barriers such as imperfect information, supplier constraints, technology availability, and individual consumer preferences. Market adoption rates intend to establish a path to full market maturity for each measure or technology group and ensure resource planning stays within acquisition capabilities.

Customer adoption rates were applied to economic potential to estimate two levels of achievable potential:

- **Realistic Achievable Potential**. AEG established a base take rate from measure and program interest questions in surveys AEG has performed in nearby territories, which asked residential and business participants about their willingness to adopt or install several different kinds of measures under business-as-usual incentives. To capture adoption over time, AEG applied diffusion curves to the base adoption rates, reflecting the time required to develop stand-up programs, build customer awareness, and address potential barriers to participation. The curve's endpoint is calculated with a multiplier on the base rate and is constructed as a near-ideal case of customer participation. It still assumes business-as-usual incentives but posits optimal delivery structure, marketing, customer awareness, financial situation, and non-energy differences based on AEG's research into customer adoption rates and how these factors influence program participation. By combining the best-case factors from each category, AEG developed a combined lift factor for each segment.

- **Maximum Achievable Potential.** Similar to realistic achievable, AEG calculated a maximum adoption rate that included ideal program considerations and the additional lift possible from enhanced incentives (up to 100% of incremental cost). Maximum achievable adoption rates were held constant throughout the study, as they already represent the best-case adoption for each measure.

2.1.3 Demand Response/Demand-Side Rate (DR/DSR) Analysis Approach

In contrast to energy efficiency, where customers may choose to install energy-efficient technologies in the absence of utility programs, DR/DSR does not exist outside of utility offerings. Therefore, AEG relied on a programmatic view of DR/DSR to assess the potential as opposed to the technology view used to assess the potential from energy efficiency measures.

AEG used a bottom-up approach to perform the DR/DSR analysis, following these major steps:

1. **Market Characterization.** The segmentation included jurisdiction, sector, and customer size. Key assumptions around equipment saturations and customer counts align with the Energy Efficiency Market Characterization.
2. **Program Characterization.** AEG developed a comprehensive set of program options for the analysis, including direct load control, grid-interactive, manual, and rate-based options.
3. **Baseline Peak and Customer Forecasts.** AEG developed a reference baseline peak projection and customer growth forecast using the class-level MW and customer growth forecasts provided by Evergy.
4. **Potential Estimates.** Technical and economic potential is not meaningful because DR/DSR does not exist in the absence of utility programs. Instead, AEG estimated DR/DSR potential for five achievable potential scenarios based upon several assumptions, including:
    - Retention rates on the opt-out Time-of-Use (TOU) rate,
    - Programmatic parameters, including participation and costs, and
    - Adjustments to DR impacts to account for interactions with DSR.

2.1.3(a) DR/DSR Market Characterization

AEG segmented Evergy's customers by jurisdiction, sector, and customer size. Commercial and industrial (C&I) customers were segmented based on their non-coincident peak load, reflecting how programs are generally offered to customers. In general, the DR/DSR segmentation aligns with the energy efficiency segmentation, which allows the DR/DSR analysis to incorporate and properly weight segment-level saturations of enabling technologies (such as central cooling systems and water heating) and factor in the adoption of efficient equipment when determining customer eligibility for program options. Table 2-4 presents the segmentation scheme.

Table 2-4 Overview of DR/DSR Segmentation Scheme

Dimension	Segmentation Variable	Description		
1	Jurisdiction	Evergy Metro, Evergy Missouri West		
2	Sector	Residential, Commercial, Industrial		
3	Size (by maximum peak demand)	**Residential:** all customers		
		C&I:	Small C&I	≤30 kW
			Medium C&I	>30 kW and ≤500 kW
			Large C&I	>500 kW and ≤1,000 kW
			Extra-large C&I	>1,000 kW

2.1.3(b) DR/DSR Program Characterization

Unlike energy efficiency, DR/DSR does not exist in the absence of utility programs. Therefore, AEG characterized a set of program options to reflect how Evergy might acquire DR/DSR potential. Table 2-5 provides a list of the DR/DSR program options considered and notes which Evergy is currently offering to customers.

Table 2-5 Overview of DR/DSR Program Options Assessed

Program Option	Eligible Customers	Description	Currently Offered
Demand Response			
Firm Curtailment/Tariff	Medium C&I, Large C&I, Extra-Large C&I	Customers volunteer a specific amount of capacity during economic or emergency events called by the utility in return for a financial incentive. Customers must reduce to a specific level (i.e., a firm service level). Penalties apply for non-performance. Response times are usually 15 to 30 minutes.	√
C&I Automatic DR (ADR)	All C&I	Participating customers respond automatically to events using existing ADR-enabled equipment (BMS/EMS) or one purchased with incentives provided by the program.	
Residential Behavioral DR	Residential	Voluntary demand reductions in response to targeted behavioral messaging. Requires AMI technology.	
HVAC Direct Load Control (DLC)	Residential, Small C&I, Medium C&I	DLC switch installed on heating and/or cooling equipment.	
Domestic Hot Water Heater (DHW) DLC	Residential, Small C&I, Medium C&I	DLC switch installed on customer's equipment.	
Grid-Interactive Water Heaters	Residential, Small C&I, Medium C&I	CTA-2045 or other integrated communication port	
Connected Homes DLC	Residential	Internet-enabled control of operational cycles of white goods appliances, electronics, and lighting. Controlled by a central smart hub or smart speaker.	
Electric Vehicle (EV) Managed Charging	Residential	Control EV charging using (1) vehicle telematics and APIs through a third-party vendor or (2) traditional DLC of EV chargers.	
Connected Thermostat DLC	Residential, Small C&I, Medium C&I	Internet-enabled control of thermostat set points.	√
Smart Solar PV Inverter	Residential	Internet-enabled control that responds to grid fluctuations. Control can execute complex functions that support grid maintenance, including active power curtailment, voltage controls, and frequency controls.	
Battery Energy Storage DLC	Residential, All C&I	Internet-enabled control of battery charging and discharging.	√
Thermal Energy Storage DLC	All C&I	Internet-enabled control of thermal charging and discharging.	
Demand-Side Rates			
Critical Peak Pricing Rate	C&I	Charges customers higher rates during a particular block of hours that occurs only on event days.	
Time-Related Pricing Rate	Large C&I, Extra-Large C&I	Hourly rates vary by season and day-type based on historical locational marginal prices. Customers benefit from having visibility to hourly pricing for predefined periods. Requires AMI technology.	
TOU Rate	Residential	Charges customers higher rates during particular blocks of hours that occur every day (typically 2-3 blocks).	

TOU Rate for EV Owners	Residential	Customers must own and charge an EV. The EV would be an "enabling technology" that would enable customers to shift usage and demand off-peak during periods of higher rates.

AEG characterized each program option by:

- Defining the eligible pool of customers by controllable equipment,
- Gathering estimates of participation and peak demand reductions, and
- Assessing competition with other program options.

The following sections describe these steps in detail.

Controllable Equipment

Most program options rely either on grid-interactive technologies or separate equipment (e.g., a switch) that allows Evergy or a third-party to control load during an event. AEG developed forecasts of controllable equipment adoption through the energy efficiency assessment. Table 2-6 provides the program options dependent on controllable equipment.

Table 2-6 DR Enabling Equipment by Program Option

Source	Controllable Equipment	Program Option
Energy Efficiency Assessment	Central Air Conditioner, Heat Pump, Rooftop Units, Electric Furnace	HVAC DLC, Connected Thermostat DLC
	Connected Thermostat	Connected Thermostat DLC
	Electric Water Heater	DHW DLC, Grid-Interactive Water Heaters[1]
	Home Energy Management System	Smart Homes DLC
	Electric Vehicle Connected Charger	EV Managed Charging
	Batteries[2]	Battery Energy Storage DLC

AEG assumed that the advanced metering infrastructure (AMI) rollout was complete. Therefore, program options were not limited with regards to metering infrastructure.

Participation and Peak Impacts

If the program option is a current Evergy offering, AEG used actual participation rates and third-party evaluated savings. For program options not currently offered, AEG compiled secondary data to define the following parameters for each program option:

- **Steady-State Participation Rate**: the percentage of eligible customers expected to participate in the program option once it is fully up and running.
- **Peak Load Reduction:** the expected impact for an average participant during a system peak event.

For DR programs, AEG relied primarily on evaluation reports covering Evergy's existing program options (Residential and Business Demand Response), studies performed for other utilities in the Southwest Power Pool, and other nationally-cited research when more regional content was not available.

[1] AEG assumed that a conservative portion of electric water heaters were grid-interactive.

[2] To estimate the saturation of batteries, AEG used the solar PV saturation provided through the energy efficiency study as an upper bound.

For DSR programs, AEG developed estimates for customer eligibility, participation, and impacts for each rate option based on an extensive review of enrollment in full-scale, time-varying rates offered in the United States published by the Brattle Group[3] and benchmarked those results against findings from regional utilities.

Because Evergy needs to design, contract for, and market new offerings, most program options are expected to take several years to grow to their steady-state participation rate. AEG relied on the observed ramp rates from existing programs to forecast this growth. In the absence of an existing program, AEG referenced similar program options or assumed constant incremental growth through the ramp period. Most programs were assumed to fully mature in about five years.

Competition Between DR Program Options

Some of the program options target the same peak load. For example, the HVAC DLC and Connected Thermostat DLC programs target central cooling load in the summer. To avoid double-counting DR potential for these competing resources, AEG worked with Evergy to develop a program hierarchy or "loading order." In general, the hierarchy prioritized customers for existing programs over other DR resources by removing participants of programs higher in the hierarchy from the pool of customers eligible for programs lower in the hierarchy. Figure 2-3 provides an example of this loading order for Evergy's programs.

Figure 2-3 Example DR/DSR Program Option Hierarchy

	Program Option	Residential	Commercial	Industrial
Loaded First	Firm Curtailment		X	X
	Connected Thermostats	X	X	
	Domestic Hot Water Heater DLC	X	X	
	Grid-Interactive Water Heaters	X	X	
	EV Managed Charging	X		
	Smart EV	X		
	Connected Homes DLC	X		
	HVAC DLC	X	X	
	C&I Automatic DR		X	X
	Battery Energy Storage DLC	X	X	
	Smart Solar PV Inverter	X		
	Thermal Energy Storage DLC		X	X
	Critical Peak Pricing		X	X
	Time-Related Pricing		X	X
Loaded Last	Residential Behavioral DR	X		

Not all program options compete for the same peak load. AEG allowed dual enrollment in program options targeting separately metered equipment (e.g., EV Managed Charging) or distinct end uses (e.g., Connected Thermostat DLC and DHW DLC).

2.1.3(c) DR/DSR Baseline Peak and Customer Forecast

AEG developed the baseline peak demand forecast as follows:

1. Allocated system peak demand to each sector using base-year hourly peak demand data. Evergy provided customer forecasts by territory.
2. Segmented the non-residential peak load and customer forecasts by size based on an analysis of Evergy billing data.
3. Removed the peak demand savings potential generated through energy efficiency adoption forecasted in the MAP and RAP scenarios. The removal of the demand savings from the energy efficiency analysis was

[3] The Brattle Group (October 2021). *PC44 Time of Use Pilots: End of Pilot Evaluation*. Prepared for Maryland Public Service Commission. Available online: https://www.brattle.com/wp-content/uploads/2021/12/PC44-Time-of-Use-Pilots-End-of-Pilot-Evaluation.pdf

done to reduce any possible double counting and to account for energy efficiency savings before the DSR/DR savings are estimated.[4]

4. Adjusted the peak demand baseline to reflect the estimated impacts of the mandatory TOU rate under various retention scenarios (discussed below). This adjustment lowers the impacts of DR programs to account for the preexisting impact (and interaction) from the TOU rate.

[4] The interactions between potential demand-side rates, demand response options (DSR/DR) and the demand-side programs were accounted for through the integration of the demand-side program potential assessment results into the demand-side rate and demand response option analysis.

2.1.3(d) DR/DSR Potential Estimation

AEG estimated DR/DSR potential for two main scenarios:

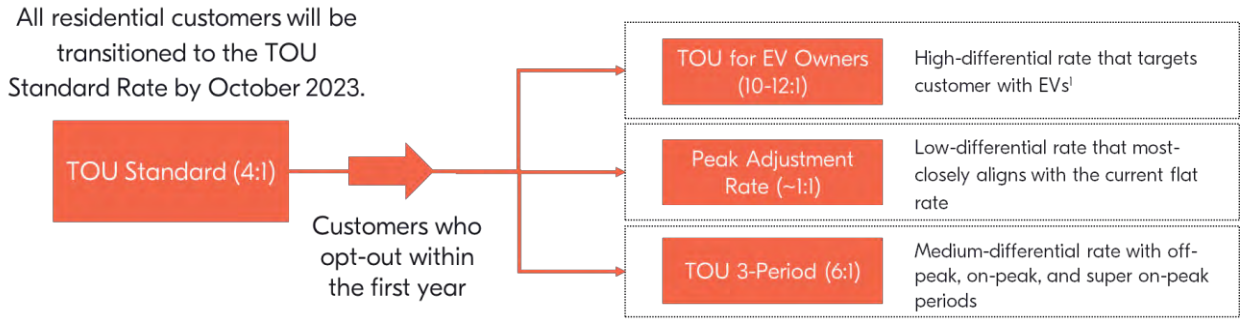
- **Maximum Achievable Potential (MAP)** included all cost-effective programs, incorporated growth in Evergy's existing programs to benchmarked participation levels (with associated increases in costs), and tested sensitivities around the forthcoming mandatory TOU rate for residential customers (see the MAP Scenario section below for details)
- **Realistic Achievable Potential (RAP)** included all cost-effective programs (based on the MAP results), restricted participation in Evergy's existing programs to current achieved levels, and tested sensitivities to participation in non-TOU program options.

MAP Scenario

During the potential assessment, Evergy received an order from the Missouri PSC to transition all residential customers to mandatory TOU rates by October 1, 2023.[5] In response to the order, AEG and Evergy modified the MAP analysis to focus on the effect that customer retention in the default TOU Standard rate would have on other DR and DSR program options. Specifically, we expect the average residential customer's peak demand to drop as they respond to pricing signals, which will reduce the amount of demand available for other program options to impact during peak hours.

As shown in Figure 2-4, Evergy plans to offer four residential TOU rates. Residential customers will be placed on the TOU Standard rate and then have the option to move to one of three other TOU rates. AEG assumed that (1) customers who opt out of the TOU Standard rate would do so within the first year, and (2) the majority would move into the Peak Adjustment Rate because of its familiarity and relatively low risk, especially since Evergy will not be offering any bill protection.

Figure 2-4 TOU Rates Descriptions



[1] The TOU EV rate will be open to all customers; however, since Evergy designed the rate for owners of EVs, AEG limited participation to this sub-population of customers.

Research shows that higher rate differentials (i.e., the difference in on-peak to off-peak rates) tend to elicit stronger customer responses and lead to larger decreases in on-peak hour consumption than rates with lower pricing differentials.[6] Therefore, the effect of Evergy's mandatory TOU rates on residential customer peak demand will be driven by the TOU Standard rate's ability to retain customers and which TOU rate opt-out customers choose to move towards.

[5] File No. ER-2022-0129. In the Matter of Evergy Metro, Inc. d/b/a Evergy Missouri Metro's Request for Authority to Implement a General Rate Increase for Electric Service.

File No. ER-2022-0130. In the Matter of Evergy Missouri West, Inc. d/b/a Evergy Missouri Metro's Request for Authority to Implement a General Rate Increase for Electric Service.

[6] The Brattle Group (October 2021). *PC44 Time of Use Pilots: End of Pilot Evaluation*. Prepared for Maryland Public Service Commission. Available online: https://www.brattle.com/wp-content/uploads/2021/12/PC44-Time-of-Use-Pilots-End-of-Pilot-Evaluation.pdf

AEG assumed a conservative retention rate of 50% to estimate MAP and then tested the sensitivity of impacts and program costs to changes in the TOU retention rate as shown in Table 2-7. For each sensitivity, AEG estimated the weighted impacts of the mandatory TOU rates, reduced the peak demand baseline forecast by the TOU impact, and then adjusted the impact assumptions for the other DR/DSR program options. The sensitivities also included increased costs of educating customers to support the increased retention in the TOU Standard rate.

Table 2-7 MAP Sensitivity Analysis

Sensitivity	(1) TOU Standard	(2) TOU for EV Owners	(3) TOU Peak Adjustment Rate	(4) TOU 3-Period
MAP	**50% of all residential customers**	**20% of EV owners who opt out of TOU Standard**	**95% of remaining TOU Standard opt-outs**	**All other TOU Standard opt-outs**
MAP Medium-Retention	70% of all residential customers	50% of EV owners who opt out of TOU Standard	95% of remaining TOU Standard opt-outs	All other TOU Standard opt-outs
MAP High - Retention	85% of all residential customers	100% of EV owners who opt out of TOU standard	95% of remaining TOU Standard opt-outs	All other TOU Standard opt-outs

RAP Scenario

The RAP scenario differed from the MAP scenario by:

- Lowering the peak demand baseline by the peak demand reductions generated through energy efficiency technology adoption forecasted through the energy efficiency RAP potential assessment (as opposed to the MAP scenario, which made the same adjustment using the energy efficiency MAP potential assessment).
- Restricting participation in existing programs to levels currently achieved.
- Dampening the impacts of the mandatory TOU rates for the first few years to simulate a learning curve whereby customers become more effective at responding appropriately to pricing signals over time.

Like the MAP scenario, the RAP scenario assumed low retention in the TOU Standard rate. However, sensitivities around RAP focused on the effects of increasing or decreasing participation in the remaining DR and DSR program options. Table 2-8 shows that RAP Plus increased participation in non-TOU program options by 10% while RAP Minus decreased participation by 15% (including for the TOU Standard rate). AEG did not adjust marketing or incentive cost assumptions for the RAP Minus and RAP Plus scenarios.

Table 2-8 RAP Sensitivity Analysis

Sensitivity	Participation Adjustments	Cost Adjustments	TOU Standard Retention	TOU Impacts
RAP	**n/a**	**n/a**	**50% of all residential customers**	**4-year learning curve[1]**
RAP Plus	10% increase from RAP	No cost adjustment	50% of all residential customers	4-year learning curve[1]
RAP Minus	15% decrease from RAP	No cost adjustment	43% of all residential customers (15% decrease from RAP)	4-year learning curve[1]

[1]25% of impacts realized in Year 1, 50% of impacts realized in Year 2, 75% of impacts realized in Year 3, and 100% of impacts realized by Year 4 of being on a TOU rate.

DR/DSR Potential Estimation

AEG calculated the potential for each program option across the scenarios by first estimating participation in each year of the forecast period (via enabling equipment saturations, participation rates, and removing

participation from programs higher in the program hierarchy) and multiplying it by the per-customer peak reductions.

The estimated potential includes impacts from existing and planned resources that Evergy already includes in its IRP model. AEG calibrated the impacts for these program options to meet Evergy's planned targets and then removed them from the total estimated potential so as not to double-count existing and planned resources. However, any associated growth in these program options was included as new, incremental potential.

AEG performed an economic screen based on each program's potential estimated in isolation (i.e., ignoring competition between resources) for the MAP scenario. These impacts represented the maximum potential achievable for each program, suggesting that if a program was not cost-effective under these near-perfect circumstances, it would not be a cost-effective option in a more restrictive case.

2.2 Data Development

This section details the key data sources used to complete this study and how the sources were applied. AEG prioritized Evergy-specific data, supplemented by regional and national data sources. Where possible, data were adapted to local conditions (e.g., using local weather and local sources for measure data).

2.2.1 Data Sources

The data sources are organized into the following categories:

- Evergy data
- Residential Appliance Saturation Survey (discussed in Section 2.1.2(a))
- Regional and national data sources
- AEG's databases and analysis tools
- Other secondary data and reports

2.2.1(a) Evergy Data

Our highest priority data sources for this study were those specific to Evergy and their customers, including:

- **Evergy Customer Data:** Evergy provided customer-level billing data for all sectors, including segment identifiers to parse out the various housing types and business types.
- **Load Research Data:** Load profiles and Statistically Adjusted End-use (SAE) outputs for residential and commercial customer types.
- **Avoided Costs:** Hourly avoided costs, which were combined with the hourly load profiles to produce appropriately shaped avoided costs for different end uses and customer types. The application of avoided costs is discussed further in section 2.2.2(a).
- **Discount Rate:** Evergy provided the discount rate to be used in economic NPV calculations.
- **Program Data & Evaluation:** Evergy provided evaluation results and program achievements for the last MEEIA cycle for energy efficiency and demand response, which AEG used to benchmark potential estimates and update key inputs to measures.
- **Previous potential study reports.**
- **Planned Program Achievements:** Evergy provided their planned resources for existing DR/DSR program options, which AEG calibrated to and benchmarked against other jurisdictions for reasonableness.

2.2.1(b) Regional and National Data Sources

- **2020 EIA Residential Energy Consumption Survey (RECS)** was partially released in 2022 and provided data on statewide equipment saturations. Missouri-specific results were used to benchmark the RASS results and fill gaps on equipment saturations not covered by the RASS.
- **2012 EIA Commercial Buildings Energy Consumption Survey (CBECS)** provides data on regional equipment saturations and intensities by building type.[7]
- **U.S. DOE Solid State Lighting Forecast Report (2019)** is a key source of input data for the AEG lighting model, including future projections of efficacy and cost by lighting type.
- **Evaluations, potential assessments, and other studies for DR/DSR programs run by regionally-located utilities**, including Ameren Missouri, Oklahoma Gas & Electric, Arizona Public Service, PSO Oklahoma, provided input assumptions and benchmarking. AEG referenced and benchmarked against nationally-cited studies, such as the 2021 Bonneville Power Administration Demand Response Potential Assessment, when regional sources were unavailable, less granular, or too tailored to the utility.
- **2016 KCP&L DSR research conducted by the Brattle Group**[8] (and the 2021 update to the Brattle Group's Arc of Price Responsiveness Curve[9]) provided impact and participation assumptions for time-varying rates based on the pricing differential between on-peak and off-peak periods based on a meta-analysis of evaluation and pilot studies across the country.

2.2.1(c) AEG Data

AEG maintains several databases and modeling tools that we use for forecasting and potential studies. Relevant data from these tools have been incorporated into the analysis and deliverables for this study.

- **AEG Energy Market Profiles.** For more than ten years, AEG has maintained profiles of end-use consumption for the residential, commercial, and industrial sectors. These profiles include market size, fuel shares, unit consumption estimates, annual energy use by fuel (natural gas and electricity), customer segment, and end-use for ten regions in the U.S. The EIA surveys (RECS, CBECS, and MECS), as well as state-level statistics and local customer research, provide the foundation for these regional profiles.
- **AEG's Database of Energy Efficiency Measures (DEEM).** AEG maintains an extensive database of efficient measure data for our studies. Our database draws upon reliable sources, including various state TRMs, the EIA Technology Forecast Updates – Residential and Commercial Building Technologies – Reference Case, DOE Technical Standard Documents, ENERGY STAR documentation, and AEG technical and market research.
- **Recent studies.** AEG has conducted more than 60 potential studies in the last five years. We checked input assumptions and analysis results against these studies within the region and across the country.

2.2.1(d) Other Secondary Data and Reports

A variety of secondary data sources and reports were used for this study, including:

- **2021-2022 EIA Annual Energy Outlook (AEO).** The AEO presents yearly energy projections and analyses.
- **American Community Survey.** The U.S. Census American Community Survey is an ongoing survey that provides data every year on household characteristics.
- **State and Regional TRMs:** These documents and databases provided well-cited estimates of energy and peak demand savings and algorithms, measure costs, and effective useful life for different jurisdictions

[7] The data release of the 2018 CBECS was incomplete at the time of this study.

[8] Memo submitted by the Brattle Group to the KCP&L Rate Analysis Team on July 1, 2016 identified rate options for consideration along with impact and participation assumptions. Not publicly available.

[9] https://www.brattle.com/wp-content/uploads/2021/12/PC44-Time-of-Use-Pilots-End-of-Pilot-Evaluation.pdf

across the United States and were used, including the Illinois TRM, Arkansas TRM, the Northwest Power and Conservation Council's (NWPCC) Regional Technical Forum (RTF) and 2021 Power Plan measure analysis workbooks, the California electronic TRM, and the Michigan Energy Measures Database, among others.

- **Other relevant resources:** Reports and measure data from the U.S. DOE (e.g., Technical Standard Documents), EPA ENERGY STAR specifications and data packages, Consortium for Energy Efficiency, and the American Council for an Energy-Efficient Economy. AEG also leverages case studies, academic and white papers, and project implementation data to true up cost and savings estimates for our technical and market research.

2.2.2 Application of Data to the Analysis

This section provides additional detail on how each of the data sources described above were used for each step of the study.

2.2.2(a) Data Application for Market Characterization

To disaggregate the top-level electric loads for Evergy into sectors and segments, AEG first used Evergy's detailed billing data to develop the residential survey sample and appropriate weighting groups. The RASS results were combined with the billing data segment identifiers to create percentages to distribute the total customers and electric load for residential. A similar process was used for nonresidential totals; however, the market research data portion leveraged the work done in past Evergy studies.

2.2.2(b) Data Application for Market Profiles

The specific data elements for the market profiles and the key data sources are shown in Table 2-9. To develop the market profiles for each segment, we used the following approach:

1. Develop control totals for each segment. These include market size, segment-level annual electricity use, and annual intensity. Control totals were based on actual utility sales and customer-level information.
2. Develop existing appliance saturations and the energy characteristics of appliances, equipment, and buildings using RASS survey results, trends from 2020 RECS, 2012/2018 CBECS, the 2021 AEO model for the East North Central region, and the American Community Survey.
3. Ensure calibration to actual base-year electricity sales in each jurisdiction, sector, and segment.
4. Compare and cross-check with other recent AEG studies.
5. Work with Evergy to verify the data aligns with their knowledge and experience.

Table 2-9 Data Applied for the Market Profiles

Model Inputs	Description	Key Sources
Market Size	Base-year residential dwellings, commercial floor space and industrial employees	Utility electric sales Utility customer account database 2022 RASS 2020 American Community Survey
Annual Intensity	Residential: Annual use per household Commercial: Annual use per square foot Industrial: Annual use per employee	Utility customer account database 2022 RASS 2020 American Community Survey 2020 RECS, 2012/2018 CBECS and MECS Prior Evergy study market profiles Other recent studies
Appliance/Equipment Saturations	Fraction of dwellings / floor space / employees with equipment/technology	Prior Evergy study market profiles/survey data 2022 RASS RECS 2020 CBECS 2012/2018 AEO 2021 2020 American Community Survey
UEC/EUI for Each End-Use Technology	**UEC**: Annual energy use in homes and buildings that have the technology **EUI:** Annual energy use per square foot/employee for a technology in floor space that has the technology	Building Simulations SAE data provided by Evergy AEO 2021 Technical data Engineering analysis AEG DEEM Recent AEG studies
Appliance/Equipment Age Distribution	Age distribution for each technology	2022 RASS Prior Evergy study Recent AEG studies
Efficiency Options for Each Technology	List of available efficiency options and annual energy use for each technology	Utility program data AEO 2021 Various state/regional TRMs EIA Building Technologies Reference Case AEG DEEM Recent AEG studies

2.2.2(c) Data Application for EE Baseline Projection

Table 2-10 summarizes the LoadMAP model inputs required to develop the baseline projection. These inputs are required for each segment within each sector, as well as for new construction and existing dwellings/buildings.

Table 2-10 Data Applied for the Baseline Projection in LoadMAP

Model Inputs	Description	Key Sources
Customer Growth Forecasts	Forecasts of new meter installation by sector	Utility growth forecast
Equipment Purchase Shares for Baseline Projection	Estimates of consumer behavior in the reference case regarding natural adoption of efficiency (above baseline) equipment	2021 AEO Purchase data ENERGY STAR sales and penetration data 2022 RASS

- **Equipment Standards.** The baseline projection incorporates known current and future equipment standards as of August 2022 for the residential, commercial, and industrial sectors. Table 2-11 and Table 2-12 extend through 2025, after which all standards are assumed to hold steady.

  Building Codes for New Construction. Missouri does not have a statewide building energy code; however, several localities have adopted their own. AEG's assumptions in modeling for new construction generally reflect a mix of IECC 2015 and 2018 with some amendments, reflective of the codes covering the largest of these jurisdictions.

Table 2-11 Residential Electric Equipment Standards

End Use	Technology	2021	2022	2023	2024	2025
Cooling	Central AC	SEER 13.0		SEER 14.0		
	Room AC	CEER 10.9				
Cool/Heating	Air-Source Heat Pump	SEER 14.0 / HSPF 8.2		SEER 15.0 / HSPF 8.8		
Water Heating	Water Heater (≤55 gallons)	EF 0.92				
	Water Heater (>55 gallons)	EF 2.05 (Heat Pump Water Heater)				
Lighting	General Service	EISA Compliant (18.6 lm/W)		EISA Compliant (45.0 lm/W)		
	Linear Fluorescent	T8 (80.0 lm/W lamp)				
Appliances	Refrigerator & Freezer	25% more efficient than the 1997 Final Rule (62 FR 23102)				
	Clothes Washer	IMEF 1.84 / WF 4.7				
	Clothes Dryer	UCEF 2.29				
Miscellaneous	Furnace Fans	ECM				

Table 2-12 Commercial and Industrial Electric Equipment Standards

End Use	Technology	2021	2022	2023	2024	2025
Cooling	Chillers	2016 ASHRAE 90.1				
	Roof Top Units	IEER 12.9		IEER 14.8		
	PTAC	EER 10.4				
Cool/Heating	Heat Pump	IEER 12.8 / COP 3.3		IEER 14.1 / COP 3.4		
	PTHP	EER 10.4 / COP 3.1				
Ventilation	All	Constant Air Volume/Variable Air Volume				
Lighting	General Service	EISA Compliant (18.6 lm/W)				
	Linear Lighting	T8 (80.0 lm/W lamp)				
	High Bay	High-Efficiency Ballast (56.0 lm/W lamp)				
Refrigeration	Walk-In	EERE–2010–BT–STD–0003				
	Reach-In	EERE–2010–BT–STD–0003				
	Glass Door	EERE–2010–BT–STD–0003				
	Open Display	EERE–2010–BT–STD–0003				
	Icemaker	EERE-2010-BT-STD-0037				
Motors	All	Expanded EISA 2007				
Miscellaneous		N/A				

2.2.2(d) Energy Efficiency Measure Data Application

Table 2-13 details the energy-efficiency data inputs to the potential analysis and identifies the key sources used for each.

Table 2-13 Data Inputs for EE Measure Characteristics

Model Inputs	Description	Key Sources
Energy Impacts	The annual reduction in consumption attributable to each specific measure. Savings were developed as a percentage of the energy end-use that the measure affects.	Evergy Program & Evaluation Data DOE and EPA Data Illinois TRM V10 NWPCC/RTF Measure Data California eTRM AEG's DEEM and Research Other Secondary Sources
Costs	**Equipment Measures**: Includes the full cost of purchasing and installing the equipment on a per-household, per-square-foot, or per employee basis for the residential, commercial, and industrial sectors, respectively. **Non-Equipment Measures:** Existing buildings – full installed cost. New Construction - the costs may be either the full cost of the measure, or as appropriate, it may be the incremental cost of upgrading from a standard level to a higher efficiency level.	Evergy Program Data DOE and EPA Data Illinois TRM V10 NWPCC/RTF Measure Data California eTRM AEG's DEEM and Research AEO 2021 Other Secondary Sources
Measure Lifetimes	Estimates derived from the technical data and secondary data sources that support the measure demand and energy savings analysis.	Illinois TRM V10 NWPCC/RTF Measure Data AEG's DEEM and Research AEO 2021 Other Secondary Sources
Applicability	Estimate of the percentage of dwellings in the residential sector, square feet in the commercial sector, or employees in the industrial sector where the measure is applicable and where it is technically feasible to implement.	CBECS 2012/2018 RECS 2020 ENERGY STAR Market Data AEG DEEM Other Secondary Sources
On Market / Off Market Availability	Expressed as years for equipment measures to reflect when the equipment technology is available or no longer available in the market.	AEG appliance standards and building codes analysis

2.2.2(e) DR/DSR Program Data Application

Table 2-14 details the demand response inputs to the potential study analysis and identifies the key sources used for each.

Table 2-14 Data Inputs for DR/DSR Program Characteristics

Model Inputs	Description	Key Sources
Program Costs	Program costs consist of marketing and administrative, including program setup; equipment (e.g., technology required to control an electric water heater); labor and installation associated with installing new equipment or monitoring; and participation incentive.	Evergy's historical DR program incentives Review of programs in other jurisdictions
Hourly Avoided Costs	Avoided generation capacity and T&D capacity costs were provided by Evergy	Evergy
Participation	Programs achieve steady state participation after reaching full maturity, with earlier years following an S-curve of participation growth.	Evergy's historical and planned DR program participation Review of programs in other jurisdictions Industry expert judgement
Eligibility	Customers are eligible to participate in certain programs if they have the applicable technology; for example, an electric vehicle is a requirement for participation in an EV DR program. Eligibility rates are 100% for certain programs that don't require additional eligibility considerations.	Utility saturation data AEG appliance saturation analysis
Program Impacts	Existing program evaluations, planned program targets, and a review of operating programs in other jurisdictions	Evergy evaluations Review of programs in other jurisdictions
Customer Counts	Customer growth forecasts for residential and C&I provided by the utility. Commercial customers counts were allocated into small and large classes based on usage data from billing analysis.	Utility customer forecasts AEG billing data analysis

2.2.2(f) Avoided Cost Application

Evergy provided hourly load profiles (MW load in each hour of the typical year) for thirteen different sector and end use combinations (e.g. Large Commercial Cooling), and hourly avoided costs for the study period. AEG first converted the hourly load profiles to an index shape so that each hour is represented as a % of total load for the year, then multiplied these percent shapes by the hourly avoided costs to produce a stream of annual avoided cost values for each sector/end use combination. Finally, AEG deflated the annual values so that all values would be in real base-year dollars, which is necessary for the LoadMAP model. The capacity value ($ per kW-yr), which is a separate value stream for peak demand savings, was brought in as provided by Evergy except for setting the inflation rate to zero so that again, the model would have values in real dollar terms.

2.3 Energy Efficiency Potential Results

This section presents the cumulative potential from energy efficiency resources in absolute terms and relative to AEG's baseline projection. These savings draw upon forecasts of future consumption absent Evergy energy efficiency program activities. While the baseline projection accounted for past Evergy energy efficiency resource acquisition, the identified estimated potential is inclusive of (not in addition to) planned future program impacts.

We present summary-level potential for Evergy Metro and Evergy West. Detailed energy efficiency potential by sector, segment, and end use are presented in ***Exhibit B_Evergy West Potential Results*** and ***Exhibit C_Evergy Metro Potential Results***.

2.3.1 Evergy Metro Energy Efficiency Potential Summary

- **Technical Potential**, which reflects the adoption of all energy efficiency measures regardless of cost or customer preferences, is a theoretical upper bound on savings. Jurisdiction-wide cumulative savings for Evergy Metro in 2033 are 1,532 GWh, or 17.7% of the baseline projection.
- **Economic Potential** represents the amount of technical potential identified as cost-effective based on the TRC test. Cumulative savings in 2033 are 759 GWh, or 8.8% of the baseline projection.
- **Maximum Achievable Potential**, reflecting ideal conditions and high incentive levels, is estimated to be 430 GWh in 2033, or 5% of the baseline projection.
- **Realistic Achievable Potential**, accounting for additional barriers that might be experienced during program implementation, is estimated to be 275 GWh in 2033, or 3.2% of the baseline projection.

Table 2-15 summarizes Evergy Metro's energy efficiency potential for select years in GWh and as a percentage of the baseline projection.

Table 2-15 Cumulative Energy Efficiency Potential, Select Years (GWh) – Evergy Metro

	2024	2025	2026	2029	2033
Baseline Projection (GWh)	8,645	8,664	8,670	8,677	8,666
Cumulative Savings (GWh)					
Realistic Achievable Potential	26	53	81	164	275
Maximum Achievable Potential	43	88	134	265	430
Economic Potential	79	161	246	479	759
Technical Potential	179	356	531	1,001	1,532
Cumulative as % of Baseline					
Realistic Achievable Potential	0.3%	0.6%	0.9%	1.9%	3.2%
Maximum Achievable Potential	0.5%	1.0%	1.5%	3.1%	5.0%
Economic Potential	0.9%	1.9%	2.8%	5.5%	8.8%
Technical Potential	2.1%	4.1%	6.1%	11.5%	17.7%

Figure 2-5 shows the cumulative realistic achievable potential for select years, and Figure 2-6 shows forecasted sales under each potential case relative to the baseline projection.

Figure 2-5 Cumulative Energy Efficiency Potential, Select Years – Evergy Metro

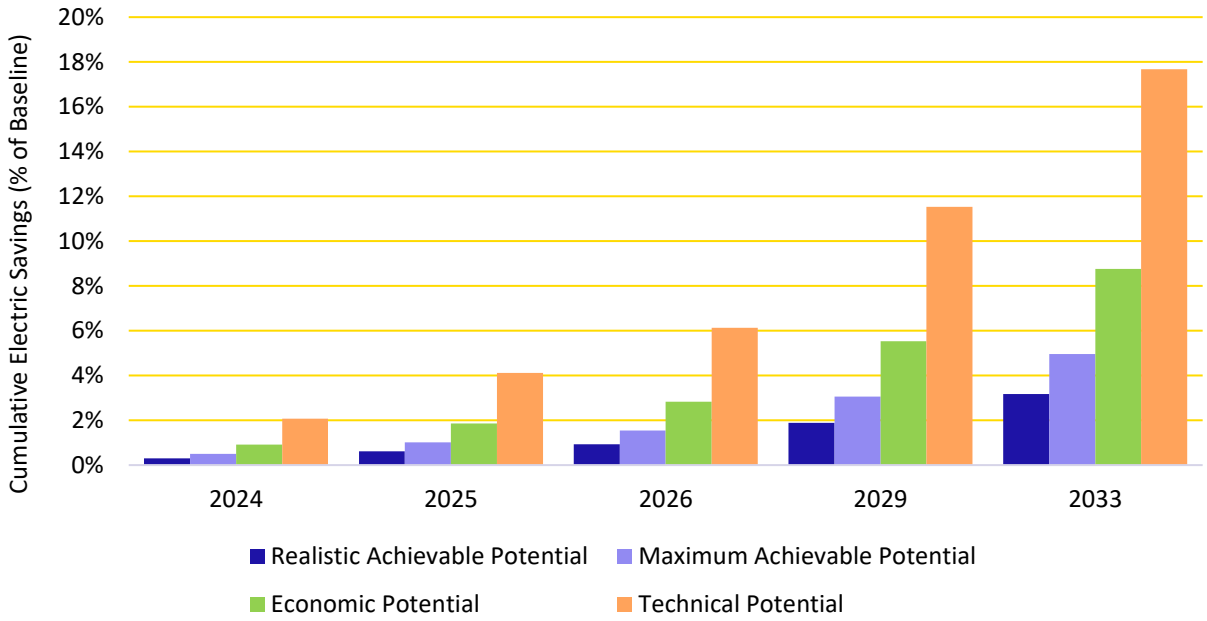


Figure 2-6 Annual Forecasted Sales by Energy Efficiency Case – Evergy Metro

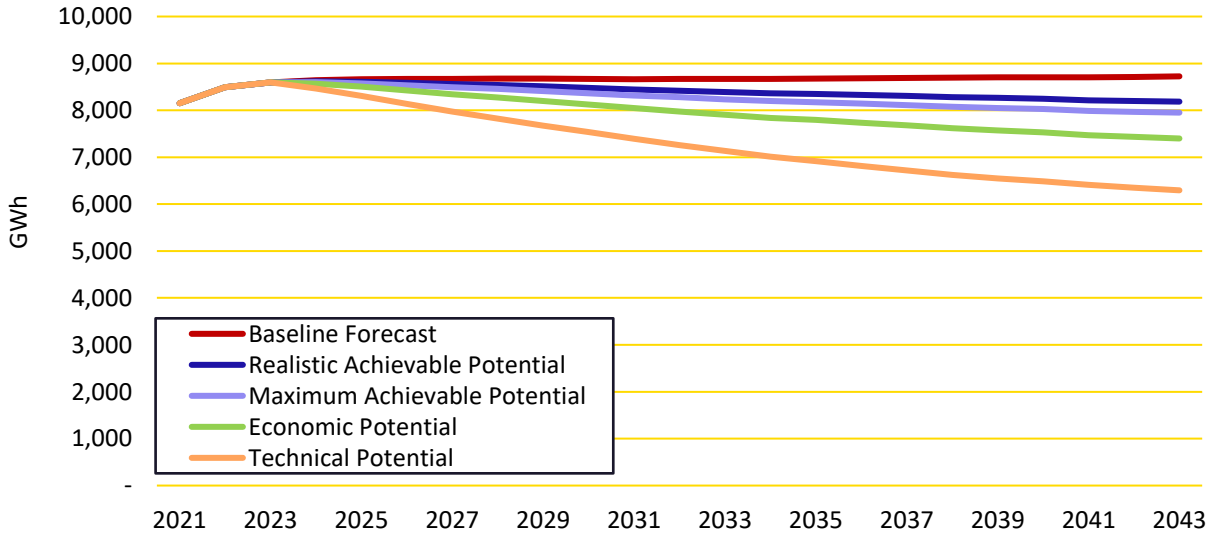


Table 2-16 presents top energy efficiency measures for Evergy Metro in 2026 for the Realistic Achievable Potential case, where the majority of savings come from linear and other LED interior lighting upgrades, particularly in the commercial and industrial sectors.

Table 2-16 Top Energy Efficiency Measures, Realistic Achievable Potential, 2026 (GWh) – Evergy Metro

Rank	Measure Name	Cumulative Savings (MWh)	% of Total
1	Commercial - Linear Lighting (LED 2020 (109 lm/W system) w/ Controls)	16,233	20.0%
2	Commercial - Retrocommissioning (Periodic recommissioning of building systems)	6,455	8.0%
3	Commercial - RTU (IEER 18.0 - ENERGY STAR (4.0))	5,917	7.3%
4	Commercial - Exempted Lighting (LED 2020 (95 lm/W))	4,296	5.3%
5	Commercial - Ventilation - Demand Controlled (Outdoor air controlled based on occupancy to meet ASHRAE 62.1)	4,082	5.0%
6	Residential - Central AC (SEER 18.0 (CEE Tier 2))	3,653	4.5%
7	Commercial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	3,200	3.9%
8	Commercial - Server (ENERGY STAR (3.0))	2,656	3.3%
9	Residential - Connected Thermostat - ENERGY STAR (1.0) (Networked Installed)	2,118	2.6%
10	Residential - Ducting - Repair and Sealing (Sealed)	2,070	2.5%
11	Industrial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,066	2.5%
12	Industrial - Linear Lighting (LED 2020 (109 lm/W system))	1,334	1.6%
13	Commercial - Ventilation - Variable Speed Control (VSD on fan motor)	1,297	1.6%
14	Residential - Ducting - Repair and Sealing - Aerosol (G.17 Aerosol Duct Sealing)	1,276	1.6%
15	Commercial - Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	1,086	1.3%
16	Commercial - POS Terminal (ENERGY STAR (7.1))	1,057	1.3%
17	Commercial - HVAC - Maintenance (Tune-up of unitary HVAC systems)	986	1.2%
18	Residential - Building Shell - Liquid-Applied Weather-Resistive Barrier	958	1.2%
19	Residential - Room AC - Recycling (Unit Removed)	948	1.2%
20	Residential - Refrigerator (CEE Tier 3 (20% above standard))	915	1.1%
	Total of Top 20 Measures	**62,602**	**77.1%**
	Total Savings - All Measures	**81,184**	**100.0%**

2.3.2 Evergy West Energy Efficiency Potential Summary

- **Technical Potential**, which reflects the adoption of all energy efficiency measures regardless of cost or customer preferences, is a theoretical upper bound on savings. Jurisdciction-wide cumulative savings for Evergy West in 2033 are 1,871 GWh, or 21% of the baseline projection.
- **Economic Potential** represents the amount of technical potential that is identified as cost-effective based on the TRC test. Cumulative savings in 2033 are 876 GWh, or 9.8% of the baseline projection.
- **Maximum Achievable Potential**, reflecting ideal conditions and high incentive levels, is estimated 477 GWh in savings in 2033, or 5.3% of the baseline projection.
- **Realistic Achievable Potential**, accounting for additional barriers that might be experienced during program implementation, is estimated to be 313 GWh in 2033, or 3.5% of the baseline projection.

Table 2-17 summarizes Evergy West's energy efficiency potential for select years in GWh and as a percentage of the baseline projection.

Table 2-17 Cumulative Energy Efficiency Potential, Select Years (GWh) – Evergy West

	2024	2025	2026	2029	2033
Baseline Projection (GWh)	8,818	8,849	8,868	8,907	8,926
Cumulative Savings (GWh)					
Realistic Achievable Potential	28	58	88	181	313
Maximum Achievable Potential	47	95	143	286	477
Economic Potential	90	181	274	540	876
Technical Potential	216	429	639	1,217	1,871
Cumulative as % of Baseline					
Realistic Achievable Potential	0.3%	0.7%	1.0%	2.0%	3.5%
Maximum Achievable Potential	0.5%	1.1%	1.6%	3.2%	5.3%
Economic Potential	1.0%	2.0%	3.1%	6.1%	9.8%
Technical Potential	2.4%	4.9%	7.2%	13.7%	21.0%

Figure 2-7 shows the cumulative realistic achievable potential for select years, and Figure 2-8 shows the forecasted energy efficiency potential relative to the baseline projection.

Figure 2-7 Cumulative Energy Efficiency Potential, Select Years) – Evergy West

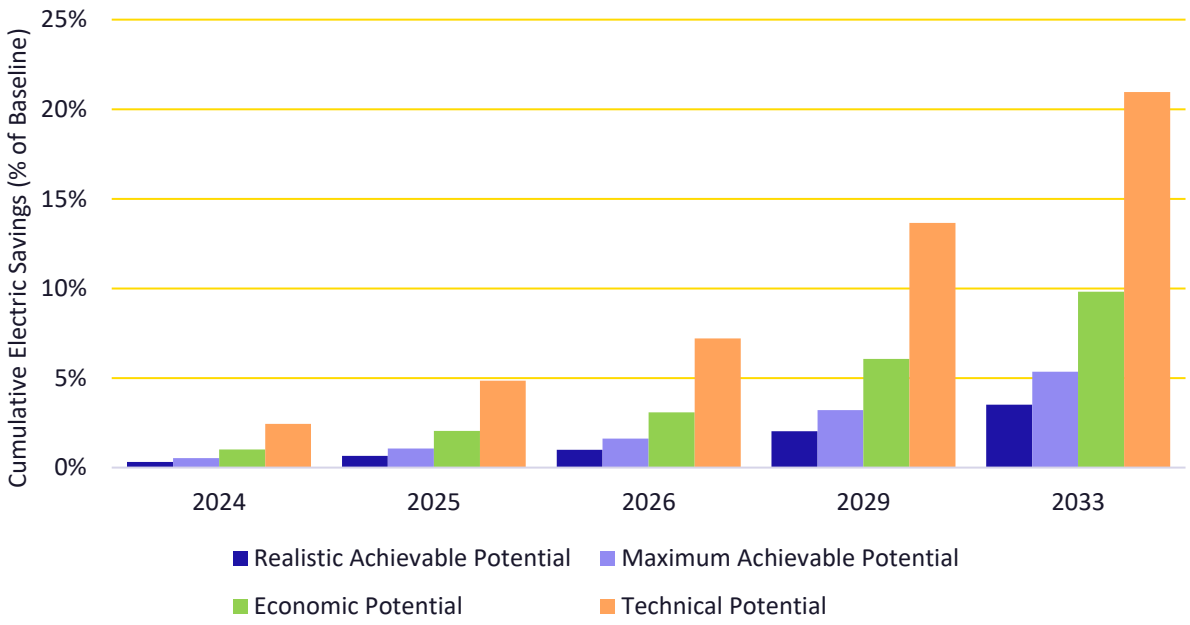


Figure 2-8 Annual Forecasted Sales by Energy Efficiency Case – Evergy West

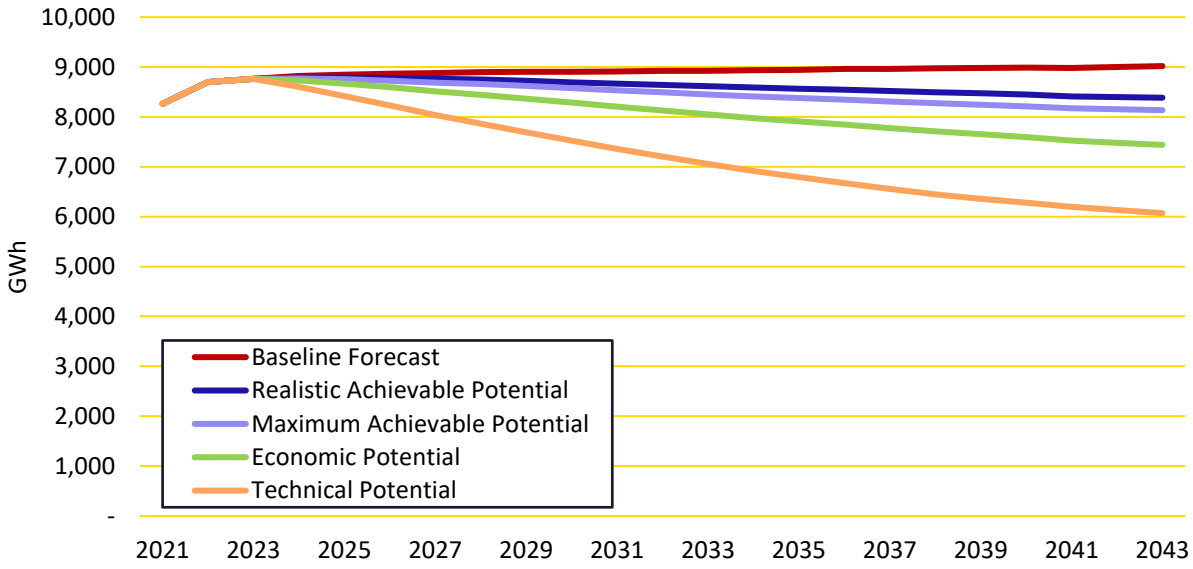


Table 2-18 presents top energy efficiency measures for Evergy West in 2026.

Table 2-18 Top Energy Efficiency Measures, 2026 (GWh) – Evergy West

Rank	Measure Name	Cumulative Savings (MWh)	% of Total
1	Commercial - Linear Lighting (LED 2020 (109 lm/W system) w/ Controls)	11,743	13.4%
2	Commercial - Retrocommissioning (Periodic recommissioning of building systems)	5,224	6.0%
3	Commercial - RTU (IEER 18.0 - ENERGY STAR (4.0))	5,010	5.7%
4	Residential - Central AC (SEER 18.0 (CEE Tier 2))	4,210	4.8%
5	Residential - Ducting - Repair and Sealing (Sealed)	3,818	4.4%
6	Residential - Furnace - Conversion to Air-Source Heat Pump	3,496	4.0%
7	Residential - Connected Thermostat - ENERGY STAR (1.0) (Networked Installed)	3,199	3.6%
8	Residential - Insulation - Floor Upgrade (R-30)	3,162	3.6%
9	Commercial - Ventilation - Demand Controlled (Outdoor air controlled based on occupancy to meet ASHRAE 62.1)	3,016	3.4%
10	Residential - Air-Source Heat Pump (SEER 16.0 / HSPF 9.2 (ENERGY STAR 6.1))	2,809	3.2%
11	Commercial - Exempted Lighting (LED 2020 (95 lm/W))	2,790	3.2%
12	Commercial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,729	3.1%
13	Residential - Ducting - Repair and Sealing - Aerosol (G.17 Aerosol Duct Sealing)	2,489	2.8%
14	Industrial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,437	2.8%
15	Residential - Central Heat Pump - Controls and Commissioning (Central Heat Pump with auxiliary heat control strategy, lockout settings, and other parameters)	1,949	2.2%
16	Residential - Building Shell - Liquid-Applied Weather-Resistive Barrier	1,659	1.9%
17	Industrial - Linear Lighting (LED 2020 (109 lm/W system))	1,532	1.7%
18	Residential - Water Heater - Drainwater Heat Recovery	1,438	1.6%
19	Commercial - Server (ENERGY STAR (3.0))	1,384	1.6%
20	Residential - Insulation - Ducting (R-8)	1,185	1.4%
	Total of Top 20 Measures	**65,278**	**74.4%**
	Total Savings - All Measures	**88,320**	**100.0%**

2.4 Demand Response / Demand-Side Rates Potential Results

This section presents the results of the DR and DSR potential analysis. We present summary-level summer peak potential for Evergy Metro and Evergy West. Detailed potential by program option and winter peak is presented in ***Exhibit B_Evergy West Potential Results*** and ***Exhibit C_Evergy Metro Potential Results***.

2.4.1 Evergy Metro DR/DSR Potential Summary

Table 2-19, Figure 2-9, and Figure 2-10 show the baseline projection and achievable potential for MAP and RAP scenarios in the DR/DSR potential for Evergy Metro. In 2033, achievable potential reaches an estimated 8% of baseline peak demand (147 MW in the RAP scenario and 155 MW in the MAP scenario, at generation). Potential generated through the mandatory TOU rates, maintenance of existing programs, and new DR/DSR resources all contribute to these estimates of achievable potential. The potential shown here does not include peak demand savings generated by energy efficiency adoption.

Because the MAP scenario tested the effects of the mandatory TOU rate, differences between RAP and MAP scenarios are minimal and lead to small differences in savings potential in the later years. Both scenarios exhibit similar trends over time, where potential increases in the first few years as the programs grow and then plateau as they reach maturity. However, the RAP scenario experiences a sharper increase in potential in those first

years because of the TOU mandatory rates: AEG de-rated impacts from the TOU rates for the years few years of the study to simulate a learning curve, assuming that the longer the customers are on the rates, the better that customers will respond the rates' pricing signals. We did not apply a learning curve to the MAP scenario.

Table 2-19 Cumulative DR/DSR Potential, Select Years (Summer MW @ Generator) – Evergy Metro

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,841	1,845	1,848	1,864	1,885
Achievable Potential (MW)					
RAP	89	115	135	144	147
MAP	117	135	150	152	155
Achievable Potential (% of Baseline)					
RAP	5%	6%	7%	8%	8%
MAP	6%	7%	8%	8%	8%

Figure 2-9 DR/DSR Summer Potential by Scenario – Evergy Metro

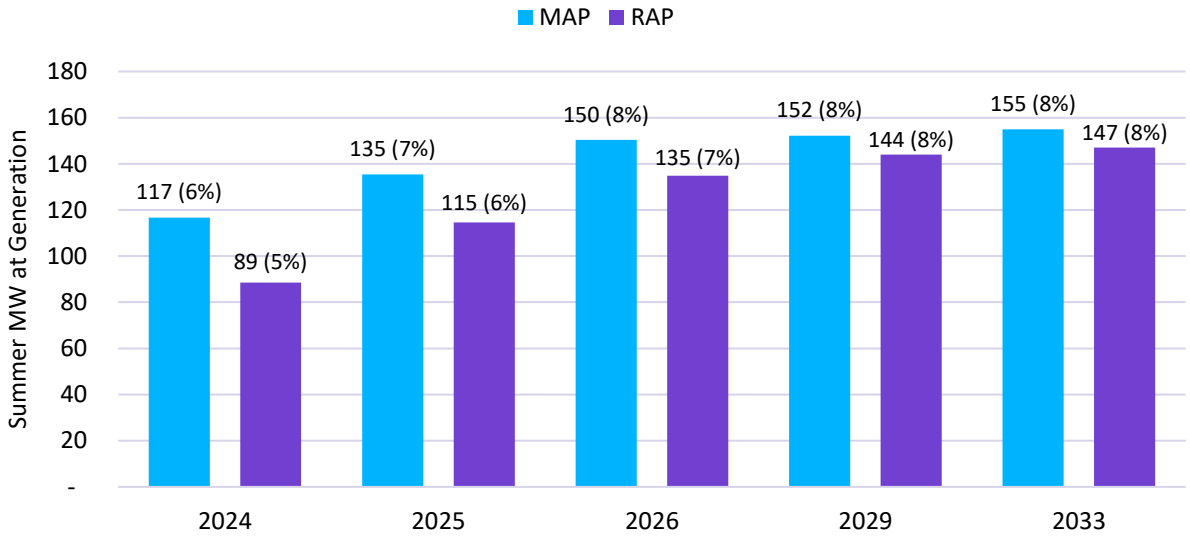
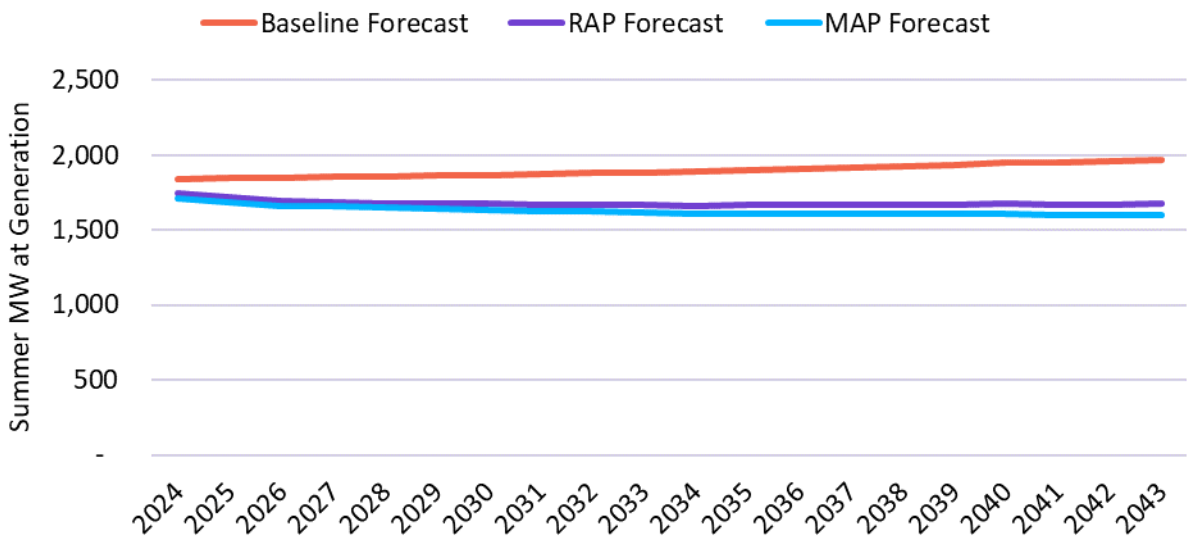


Figure 2-10 Annual DR/DSR Potential – Evergy Metro



2.4.1(a) Sensitivity Analysis – Evergy Metro

As discussed in Section 2.1.3, AEG used the MAP scenario to test sensitivities to the mandatory TOU rate the Missouri PSC ordered Evergy to transition residential customers to by October 1, 2023. As expected, potential increases with the level of TOU Standard retention, the TOU rate customers will first be opted onto. While Evergy plans to offer TOU rates with higher rate differentials than the TOU Standard rate, we assume that the majority of customers who opt out of the TOU Standard rate will move to the Peak Adjustment Rate, which has such a low-rate differential that impacts are negligible. However, in 2033, differences between the MAP scenario (based on a 50% TOU Standard retention rate) and MAP High Retention (based on an 85% TOU Standard retention rate) remain small, 15 MW and less than a one-percent change relative to the baseline peak demand.

Table 2-20 MAP DR/DSR Sensitivity Results, Select Years (Summer MW) – Evergy Metro

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,841	1,845	1,848	1,864	1,885
Achievable Potential (MW)					
MAP	**117**	**135**	**150**	**152**	**155**
MAP - Medium Retention	127	144	159	161	163
MAP - High Retention	135	151	165	167	170
Achievable Potential (% of Baseline)					
MAP	**6%**	**7%**	**8%**	**8%**	**8%**
MAP - Medium Retention	7%	8%	9%	9%	9%
MAP - High Retention	7%	8%	9%	9%	9%

AEG focused the RAP scenario sensitivity analysis on the effects of increasing or decreasing participation in the DR/DSR program options. At the extremes represented by RAP Minus and RAP Plus, DR/DSR potential changes 32 MW in Evergy Metro (1.7% of baseline peak demand) in 2033.

Table 2-21 RAP DR/DSR Sensitivity Results, Select Years (Summer MW) – Evergy Metro

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,841	1,845	1,848	1,864	1,885
Achievable Potential (MW)					
RAP Minus	76	98	116	124	127
RAP	**89**	**115**	**135**	**144**	**147**
RAP Plus	97	124	146	155	159
Achievable Potential (% of Baseline)					
RAP Minus	4%	5%	6%	7%	7%
RAP	**5%**	**6%**	**7%**	**8%**	**8%**
RAP Plus	5%	7%	8%	8%	8%

2.4.2 Every West DR/DSR Potential Summary

Table 2-22, Figure 2-11, and Figure 2-12 show the estimated achievable potential from DR/DSR for Evergy West. Potential as a percentage of baseline peak demand is slightly higher than Evergy Metro, with both RAP and MAP scenarios producing an achievable potential of 10% (204 MW and 208 MW at generation, respectively). Excepting existing programs, for which AEG calibrated to actual program achievements, AEG used the same impact and participation assumptions for Evergy West and Every Metro. Therefore, differences in savings are largely driven by differences in customer composition and peak demand.

Table 2-22 Cumulative DR/DSR Potential, Select Years (Summer MW) – Evergy West

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,962	1,970	1,979	2,009	2,049
Achievable Potential (MW)					
RAP	128	161	187	201	204
MAP	162	184	202	206	208
Achievable Potential (% of Baseline)					
RAP	7%	8%	9%	10%	10%
MAP	8%	9%	10%	10%	10%

Figure 2-11 DR/DSR Summer Potential by Scenario – Evergy West

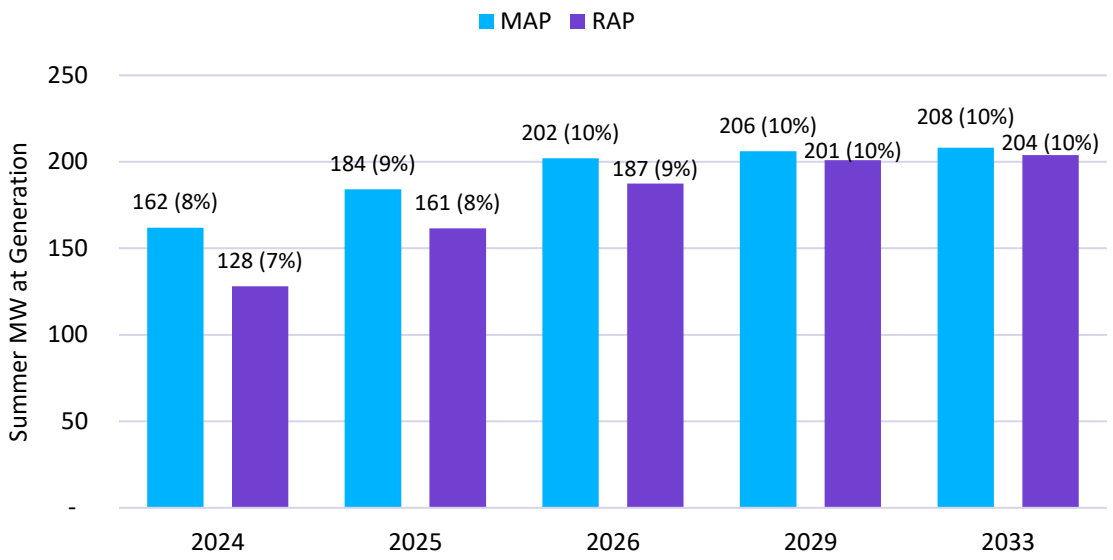
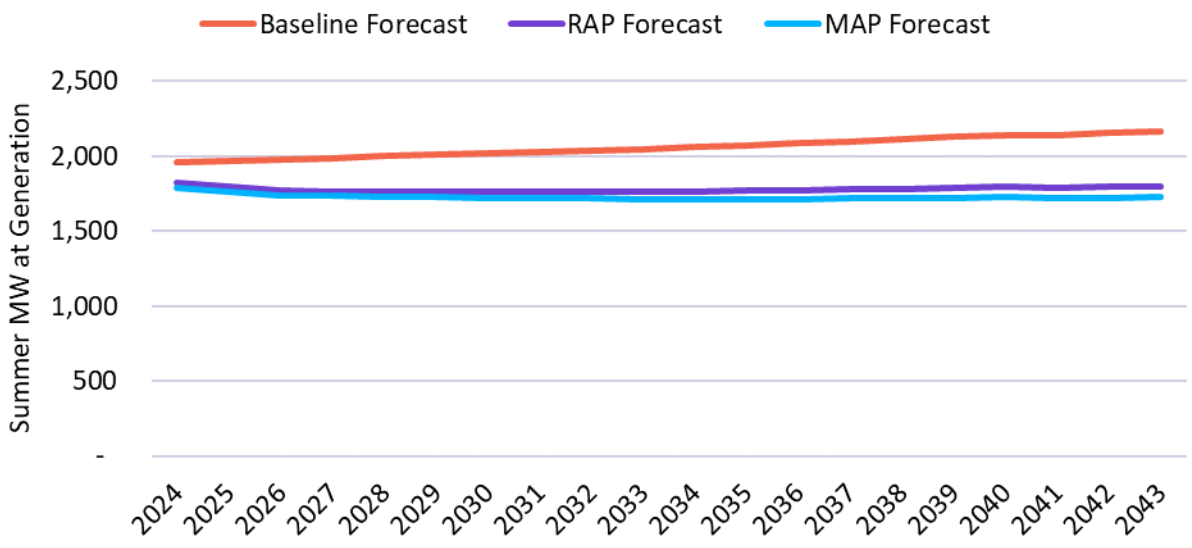


Figure 2-12 Annual DR/DSR Summer Potential – Evergy West



2.4.2(a) Sensitivity Analysis – Evergy West

MAP potential sensitivity analysis for Evergy West resulted in similar findings to Evergy Metro. Potential increases with the level of TOU Standard retention, but by 2033, the increases from the MAP scenario remain small and represent, at most, not even a one-percent change relative to the baseline peak demand.

Table 2-23 MAP DR/DSR Sensitivity Results, Select Years (Summer MW) – Evergy West

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,962	1,970	1,979	2,009	2,049
Achievable Potential (MW)					
MAP	**162**	**184**	**202**	**206**	**208**
MAP - Medium Retention	175	195	213	217	219
MAP - High Retention	185	204	222	225	227
Achievable Potential (% of Baseline)					
MAP	**8%**	**9%**	**10%**	**10%**	**10%**
MAP - Medium Retention	9%	10%	11%	11%	11%
MAP - High Retention	9%	10%	11%	11%	11%

Results from the sensitivity analysis around RAP potential remain similar for Evergy West as observed for Evergy Metro. At the extremes represented by RAP Minus and RAP Plus, DR/DSR potential changes a total of 44 MW in Evergy West (2.3% of baseline peak demand) in 2033.

Table 2-24 RAP DR/DSR Sensitivity Results, Select Years (Summer MW) – Evergy West

	2024	2025	2026	2029	2033
Baseline Projection (MW)	1,962	1,970	1,979	2,009	2,049
Achievable Potential (MW)					
RAP Minus	110	138	161	173	176
RAP	**128**	**161**	**187**	**201**	**204**
RAP Plus	140	175	203	217	220
Achievable Potential (% of Baseline)					
RAP Minus	6%	7%	8%	9%	9%
RAP	**7%**	**8%**	**9%**	**10%**	**10%**
RAP Plus	7%	9%	10%	11%	11%

3 | DSM Energy Efficiency IRP Bundle Development

The final step of the 2023 IRP engagement was to develop a portfolio of energy efficiency and demand response IRP bundles utilizing the potential results to support Evergy's Demand-Side Resource Analysis under 4 CSR 240-22.050 for the 2023 IRP filing. Section 3 details the approach and results for the development of the energy efficiency bundles. The demand response and demand side rate resources for the 2023 IRP filing are detailed in Section 2.1.3 and Section 2.4.

3.1 Analysis Approach

This section describes the analysis approach taken for the study and the data sources used to develop the DSM Energy Efficiency IRP Bundles.

3.1.1 Overview of Analysis Approach

AEG used a bottom-up approach to develop the IRP bundles, incorporating the findings from the measure-level EE potential. The analysis conducted for the energy efficiency potential study reflects a measure-level approach to cost-effectiveness and potential estimation. In order to meet the rules set forth under 4 CSR 240-22.050, an additional set of steps were required to combine measures into program bundles based on target market and delivery method, as well as to assign program costs.

AEG developed the program bundles using the maximum and realistic achievable measure-level potential results, working closely with Evergy to develop cost-effective bundles. Multiple program bundle scenarios were developed to support Evergy's Demand-Side Resource Analysis under 4 CSR 240-22.050 for the 2023 IRP filing.

The DSM bundles were specifically developed for the 2023 IRP analysis. While the results of the IRP analysis can inform program designs in future MEEIA filings, program design for future implementation should be tailored to the current needs and market conditions within the Evergy service territory. Therefore, the DSM savings and budgets developed for the 2023 IRP process may differ from the actual implementation of specific current and future Evergy DSM programs.

3.1.2 IRP Bundle Design Approach

As required by 4 CSR 240-22.050, Evergy must achieve all cost-effective demand-side savings. AEG utilized measure and participation data from the comprehensive DSM Potential Study to inform and develop the proposed DSM IRP Bundles Design.

As part of the potential study, AEG:

- Developed a comprehensive list of EE measures
- Characterized each measure with energy and demand savings, incremental cost, service life, and other performance factors.
- Screened the measures for cost-effectiveness dynamically, taking into account changing savings and cost data over time. Thus, some measures pass the economic screen (i.e., a TRC benefit-cost ratio greater than or equal to 1.0) for some — but not all — of the years in the projection.

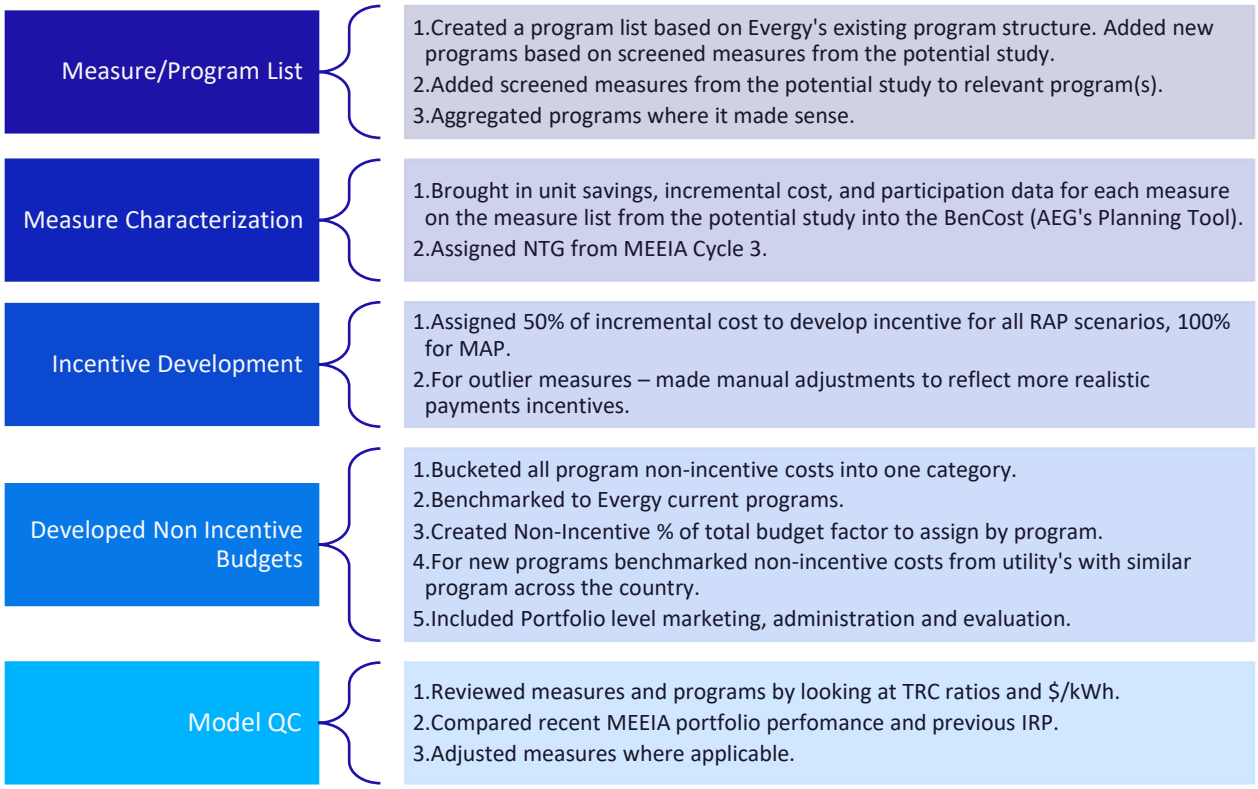
The DSM Potential Study measure-level MAP and RAP results served as the foundation for the development of the bundles. In order to maintain alignment, results from the potential study were exported into the DSM Bundles Design. The measures were vetted for inclusion in a DSM program bundle and re-screened for cost-effectiveness. Measures were added to bundles as they became cost-effective throughout the timeframe.

There are several differences between measure-level and bundled savings and general considerations to note that occur when translating the measure-level potential to bundles. These differences and considerations are as follows:

- May include multiple efficiency levels for a specific technology over the projection.
- May exclude some measures with very small potential or implementation challenges, such as stoves, microwaves, monitors, laptops, and TVs.
- Addition of administrative & delivery costs may render certain measures or bundles not cost-effective.
- Participation rates adjusted to reflect different IRP scenarios.
- Net to gross and realization rates impact savings.

Figure 3-1 outlines the framework for developing the IRP Bundles.

Figure 3-1 Analysis Framework



All bundles were designed with cost-effective measures. Measures were bundled based on the end-use, sector, and implementation strategy. Incentive costs and non-incentive costs were assigned to bundles. Options were rescreened after measure bundling and cost assignment. Cost effectiveness at the option level was balanced with implementation considerations.

3.1.2(a) Utility Program Review

AEG reviewed ed current programs and recently filed plans for utilities across the country. The review informed the design of the bundles and identified new opportunities.

AEG took the following steps in the review:

1. Compared potential study results to other utility offerings to assess new opportunities that filled gaps in the current MEEIA portfolio.
2. Searched for utilities with comparable programs targeting a new measure or customer segment.

3. Assessed the applicability of each option for the IRP bundle development and potential future MEEIA application.
4. Added measures to existing bundles (i.e., LED Grow Lights for Indoor Agriculture) or created new programs (i.e., Residential New Construction) that integrated learnings from the review and

Results of the utility program review can be accessed in **Exhibit D_Evergy Utility Program Review.**

3.1.2(b) Cost-Effectiveness Screening

The Total Resource Cost Test (TRC) is the primary method of assessing the cost-effectiveness of energy efficient measures and bundles, considering the effects on both participating and non-participating customers. The TRC test is a widely accepted methodology that has been used across the United States for over twenty-five years. TRC measures the net costs and benefits of an energy efficiency bundle as a resource option based on the total costs of the bundle, including both the participant's and the utility's costs.

In total, five benefit-cost tests were utilized to analyze bundle design cost-effectiveness from different perspectives:

- Participant Cost Test quantifies the benefits and costs to the customer due to bundle participation.
- Ratepayer Impact Measure measures what happens to a customer's rates due to changes in utility revenues and operating costs.
- Utility Cost Test measures the net costs of a bundle as a resource option based on the costs incurred by the program administrator, excluding any net costs incurred by the participant.
- Societal Cost Test measures the effects of a bundle on society as a whole.

The cost-effectiveness analysis was performed using Evergy-specific data. The input data gathered for the model included:

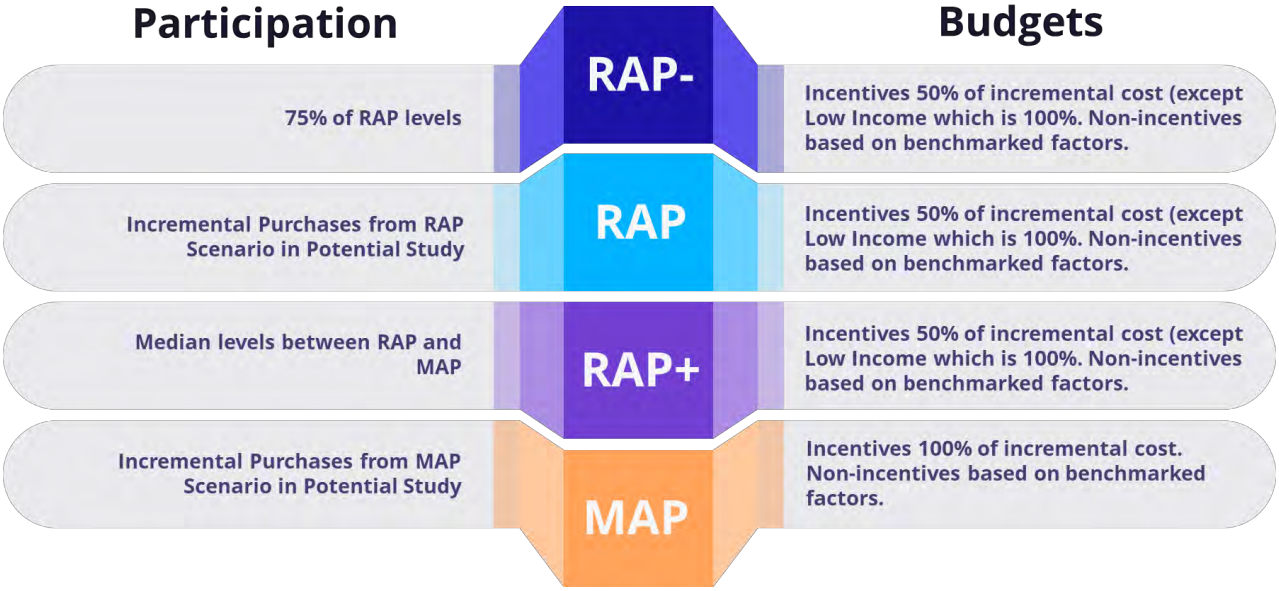
Table 3-1 Cost-Effectiveness Model Inputs

General Inputs	Specific-Project Inputs
Retail Rate ($/kWh)	Utility Project Costs (Administrative & Incentives)
Commodity Cost ($/kWh)	Direct Participant Project Costs ($/Participant)
Demand Cost ($/kW-Year)	Measure Life (Years)
Discount Rate (%)	kW/Participant Saved (Net and Gross)
Inflation Rate (%)	Number of Participants
Line Losses (%)	

3.1.2(c) Bundle Design Scenarios

Based on the RAP and MAP potential scenario results from the DSM Potential Study, AEG developed four portfolios comprised of cost-effective measures. Each of these portfolios was considered during the integration phase of Evergy's IRP process to determine which DSM portfolio was optimal based on Evergy's supply options:

Figure 3-2 Bundle Design Scenarios



3.2 DSM Portfolio Framework

This section describes several components that are considered when developing and implementing DSM bundles. Key considerations, such as budget flexibility, marketing plans, and evaluation plans, are important for designing budgets and selecting delivery methods.

3.2.1 Bundle Offerings

Bundle eligibility has been defined broadly to make bundles as inclusive as possible. In general, participation guidelines are designed to include all customer sectors and end uses.[10] Bundle offerings were intending to be broad program designs in order to allow for maximum flexibility for future MEEIA program offerings.

3.2.2 Outreach, Marketing and Communications

Outreach, marketing and communications are critical mechanisms for ensuring customers and trade allies are aware of, and participate in, the portfolio of bundles. The DSM bundle portfolio relies on a combination of education and customer incentives to advance energy efficiency. The bundles have been designed to maximize participation given industry best practices. Educating customers and trade allies on the benefits of energy efficiency can help speed the adoption of energy efficient measures and promote market transformation.

Customer incentives are the primary mechanism for bundle delivery. Through this mechanism, customers receive rebates to purchase energy efficient equipment and services through existing market actors including contractors, equipment dealers and retailers. To achieve the portfolio's long-term savings goals, it is necessary for Evergy and the implementation contractors to engage customers, trade allies, and state and local agencies. Targeting trade allies and leveraging relationships with stakeholders increases awareness and promotes the market adoption of high efficiency equipment/systems.

DSM bundle outreach, marketing and communication activities may include a mix of:

- Evergy website should act as a central location and portal for customer and trade ally participation, providing up-to-date access on DSM bundles, incentive offerings, rebate applications, etc.

[10] Customer sectors account for only those sectors that pay the DSIM charge.

- Television, radio, print, direct mail, and magazine advertisements.
- News story press releases resulting in newspaper and television news stories.
- Brochures and literature.
- Outreach, education seminars, and speaking events.
- E-mails, newsletters, round tables, and customizable brochures for trade allies.

Outreach, marketing and communications will be discussed in more detail within the bundle descriptions later in this report.

3.2.3 Net-to-Gross Impacts

Net-to-Gross (NTG) ratios adjust the gross energy and demand savings associated with a bundle to reflect the overall effectiveness of the bundle, taking into account free riders and spillover. Free riders and spillover, as determined from an impact evaluation, are defined as:

- Free Riders: Customers who participate in energy efficiency bundles that would have engaged in the efficient behavior in the absence of the bundle. The inclusion of free riders overestimates the energy and demand savings associated with a bundle.
- Spillover: Customers who engage in energy efficient behavior due to some influence of a bundle but who do not participate in a bundle. For example, if a customer purchases an air purifier through the Energy Savings Products Bundle and then chooses to purchase an ENERGY STAR® clothes dryer after learning about the benefits of energy efficiency.

Spillover and free ridership act in opposing directions, with spillover increasing a bundle's energy and demand savings while free ridership diminishes a program's savings.

Evergy should make an effort to minimize free ridership and maximize spillover by:

- Modifying incentives to respond to market conditions, as needed and practical.
- Verifying customer eligibility to ensure the customer is an Evergy customer, as practical.
- Increasing marketing of Evergy's DSM portfolio.

Evergy bundle adjustments to address free ridership and spillover should not negatively impact bundle implementation or continuity (e.g., Evergy should not modify incentive levels with a frequency that would compromise bundle stability and the customer experience). Evergy should work with bundle implementation contractors as well as the evaluation contractor(s) to determine if additional action is needed to minimize free ridership and maximize spillover.

3.2.4 Evaluation, Measurement and Verification

Evaluation, measurement, and verification (EM&V) is designed to support the need for public accountability, oversight and cost-effective bundle improvements and documentation of the effects of ratepayer funded efficiency bundles. Evergy should engage an EM&V contractor(s) to conduct process and impact evaluations of the EE bundles. It is important in the bundle design phase to allocate a sufficient amount of budget for process and impact evaluations to be performed at appropriate intervals on the relevant portions of the portfolio.

EM&V is recommended on a multi-year rotating schedule (evergy 3-4 years). A process and impact evaluation should be conducted on each bundle at least once during the multi-year bundle cycle. The EM&V budget is presented on an annual basis but may be spent at any point during the bundle cycle. The process and impact evaluations need not be conducted at the same time. Process evaluations are typically conducted earlier in the bundle cycle so that any issues uncovered can be addressed immediately, ensuring optimal bundle performance. Impact evaluations are typically conducted later in the bundle cycle when bundle results are accessible and apparent.

3.2.4(a) Process Evaluations

Process evaluations ensure that a bundle is operating as intended and provides information that can enable improvements in both the bundle design and implementation. Process evaluations assess customer understanding, attitudes about, and satisfaction with the bundle and other educational activities. The EM&V contractor assesses the effectiveness of the marketing and outreach, trade ally involvement, and whether implementation milestones are met adequately and on schedule. These evaluations use sales and promotion data maintained by the tracking system as well as customer survey data.

A good process evaluation:

- Assists bundle implementers and managers structure bundles to achieve cost-effective savings while maintaining high levels of customer satisfaction.
- Determines awareness levels to refine marketing strategies and reduce barriers to participation.
- Provides recommendations for changing the bundle's structure, management, administration, design, delivery, operations or targets.
- Determines if specific best practices should be incorporated.

3.2.4(b) Impact Evaluations

Impact evaluations estimate gross and net demand, energy savings and the cost-effectiveness of installed systems. They are used to verify measure installations, identify key energy assumptions and provide the research necessary to calculate defensible and accurate savings attributable to the bundle. The selected EM&V contractor develops an evaluation plan that ensures the appropriate measurement of savings in compliance with industry protocols. The impact evaluation also includes an evaluation of net-to-gross components.

3.3 Proposed DSM IRP Bundles

Evergy's proposed DSM bundle portfolio for 2024 through 2043 are comprised of six residential bundles and two non-residential bundles. Each bundle targets multiple end uses and offers residential, commercial and industrial customers an opportunity to achieve significant energy savings through participation. The 2024-2043 bundles are listed with a brief description in Table 4-1.

Evergy's portfolio:

- Is cost-effective at portfolio level.
- Expands and/or coordinates with existing Evergy energy efficiency programs.
- Provides a broad range of energy efficiency opportunities to all Evergy customers.
- Represents broad program categories that Evergy can draw upon for upcoming MEEIA program planning.

The proposed bundle design delivers an effective and balanced portfolio of energy and peak demand savings opportunities across all customer segments. Each bundle was designed to leverage the mix of best-practice measures and technologies, delivery strategies, and target markets in order to most effectively deliver bundles and measures to Evergy customers. The bundles were designed to be broad enough to allow for flexiblilty in nuanced implementation strategies for specific measures or target markets.

The proposed DSM portfolio includes a suite of bundles that offer customers a variety of opportunities to participate in energy efficiency. Evergy's programs have been aligned to offer customers consistent programs and incentives across both service territories. This will allow Evergy to streamline implementation and marketing activities and provide equitable programs to all of their customers, regardless of whether they are located within Evergy West and Evergy Metro territories. The bundles described in Table 3-2 are inclusive of existing Evergy programs and go beyond the current programs.

Table 3-2 Proposed DSM Bundle Descriptions, 2024-2043

Bundle	Description
Energy Savings Products	Rebates to purchase and install qualifying energy efficient HVAC equipment, appliances, electronics, and water heating measures.
Heating, Cooling, and Weatherization.[11]	Incentives for purchase and installation of qualifying energy efficient HVAC equipment, appliances, weatherization, and water heating measures.
Income Eligible Multifamily	The program aims to provide direct install measures in housing units and common area measures to multi-family buildings, targeting income eligible customers.
Income Eligible Single Family	The program leverages the existing Missouri Weatherization Assistance Program to provide qualifying customers with approved energy efficiency measures and equipment. Targets income eligible customers and provides fully subsidized measures.
Research and Pilot	Customers are provided an incentive to turn in inefficienct refrigerators, freezers and room air conditioners to be recycled.
Residential New Construction	Incentives for installation of new, qualifying energy efficient measures for the purposes of new construction projects.
Commercial Prescriptive	C&I customers may receive prescriptive rebates for purchasing energy efficient equipment for commercial and industrial facilities.
Commercial Custom	C&I customers may receive custom rebates for purchasing energy efficient equipment for commercial and industrial facilities.

3.3.1 DSM Portfolio Scenario Results

Figure 3-3 presents the proposed annual budgets (in thousands of dollars) for each of the four portfolio scenarios.

Figure 3-3 Proposed Annual Budgets by Scenario (thousands of dollars)

West Scenario	2024	2025	2026	2028	2033	2043
RAP Minus	$9,549,515	$10,149,714	$10,639,668	$11,972,716	$13,769,851	$12,109,077
RAP	$12,732,687	$13,532,952	$14,186,225	$15,963,621	$18,359,801	$16,145,437
RAP Plus	$17,327,508	$18,250,339	$18,951,675	$20,897,758	$22,958,129	$17,788,340
MAP	$44,616,450	$46,731,098	$48,240,505	$52,614,642	$56,109,967	$39,961,488
West Scenario	**2024**	**2025**	**2026**	**2028**	**2033**	**2043**
RAP Minus	$8,696,261	$9,608,626	$10,164,461	$11,316,043	$12,898,619	$11,181,936
RAP	$11,595,015	$12,811,501	$13,552,614	$15,088,058	$17,198,159	$14,909,247
RAP Plus	$16,032,082	$17,673,058	$18,512,196	$20,174,001	$21,944,310	$16,736,732
MAP	$41,314,818	$45,474,009	$47,353,303	$50,884,261	$53,863,335	$38,076,924

[11] Whole Home Efficiency option is designed to encompass a range of general whole home designs including PAYS.

Figure 3-4 presents the proposed annual incremental energy savings for each of the five portfolio scenarios.

Figure 3-4 Proposed Annual Incremental Energy Savings by Scenario (Net MWh)

West Scenario	2024	2025	2026	2028	2033	2043
RAP Minus	21,273	22,982	23,195	24,378	26,779	22,171
RAP	28,364	30,643	30,927	32,504	35,706	29,561
RAP Plus	38,052	40,817	40,769	41,990	44,073	32,429
MAP	47,709	50,959	50,562	51,397	52,291	34,777
Metro Scenario	**2024**	**2025**	**2026**	**2028**	**2033**	**2043**
RAP Minus	20,783	23,014	23,044	23,481	25,222	20,258
RAP	27,711	30,686	30,725	31,307	33,629	27,011
RAP Plus	37,687	41,523	41,130	41,100	42,123	30,124
MAP	47,643	52,350	51,517	50,862	50,556	32,304

Figure 3-5 presents the proposed annual incremental summer demand savings for each of the four portfolio scenarios.

Figure 3-5 Proposed Annual Incremental Summer Demand Savings by Scenario (Net MW)

West Scenario	2024	2025	2026	2028	2033	2043
RAP Minus	6	6	7	7	8	5
RAP	8	8	9	9	10	7
RAP Plus	11	11	12	12	13	8
MAP	14	14	14	15	15	8
Metro Scenario	**2024**	**2025**	**2026**	**2028**	**2033**	**2043**
RAP Minus	5	6	6	6	7	5
RAP	7	8	8	9	9	7
RAP Plus	10	11	11	11	12	7
MAP	13	14	14	14	14	7

The comprehensive IRP results for the DR/DSR and Energy Efficiency can be found in workpapers for ***Evergy Metro 2023 IRP Data and Evergy West 2023 IRP Data***.

Applied Energy Group, Inc.
2300 Clayton Road, Suite 1370
Concord, CA 94520
P: 510-982-3526

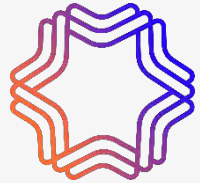
AEG
APPLIED ENERGY GROUP

Residential Appliance Saturation Survey

Prepared for: evergy

Date: August 2022

Overview and Objectives



Objectives	• Gather current information about residential customers in Missouri and Kansas service areas • Maintain consistency with previous RASS studies
Topics	• Customer and dwelling characteristics • Appliance saturations • Special topics
Approach	• Targets = 800 per service territory; 3,200 total • Anticipate 550 single-family and 250 multi-family homes • Formal sample design step • Mail-to-web and email-to-web data collection
Results	• Support development of residential market profiles in Market Potential Study • Provide appliance saturations for load forecasts

Methodology

Target Population and Sample Design

Separate surveys for four service areas:

- Missouri West
- Missouri Metro
- Kansas Metro
- Kansas Central

AEG designed the sample to target survey results with ±10% precision at the 90% confidence level by:

- Service territory
- Usage category within each service territory
- Net metering status

We also oversampled customers with email addresses to reduce the cost of data collection.

- The initial sample consisted of 18,000 mail customers and 46,000 email customer.
- Due to low response rate, another 80,003 email customers were added to the sample

Data Collection

Each customer in the sample was mailed or emailed a survey invitation

- The email invitation was sent directly from Evergy
- A postcard invitation was mailed by Ward Research, AEG's subcontractor
- The invitation included a URL/link and a unique password
- Reminders were sent 3 – 7 days later
- A total of 3,179 surveys were completed

Service Territory	Completed Surveys
Missouri West	819
Kansas Metro	816
Missouri Metro	741
Kansas Central	821
Total	3,197

Survey Results

Population estimates were developed by applying expansion weights to the sample

- The sample weights were calculated based on the sample design
- Includes stratification based on service territory, net metering, usage and email address
- Adjusted for nonresponse
- Ensures that weighted data represents the population

Missouri Customers

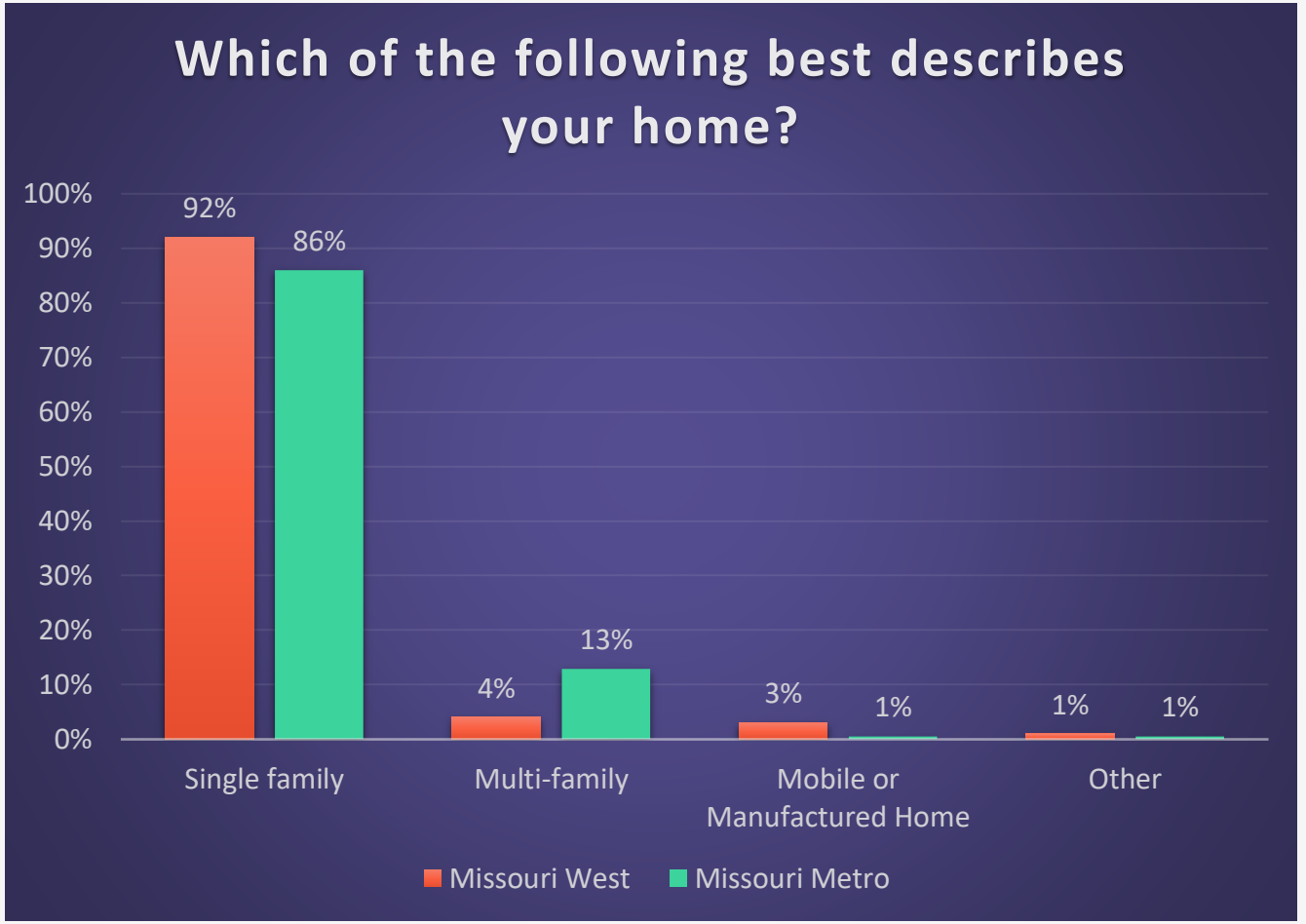
Type of Home

A large majority of Missouri customers live in single-family homes.

Missouri Metro has a greater proportion of multi-family households.

The proportion of customers living in single-family homes has increased since the 2019 study.

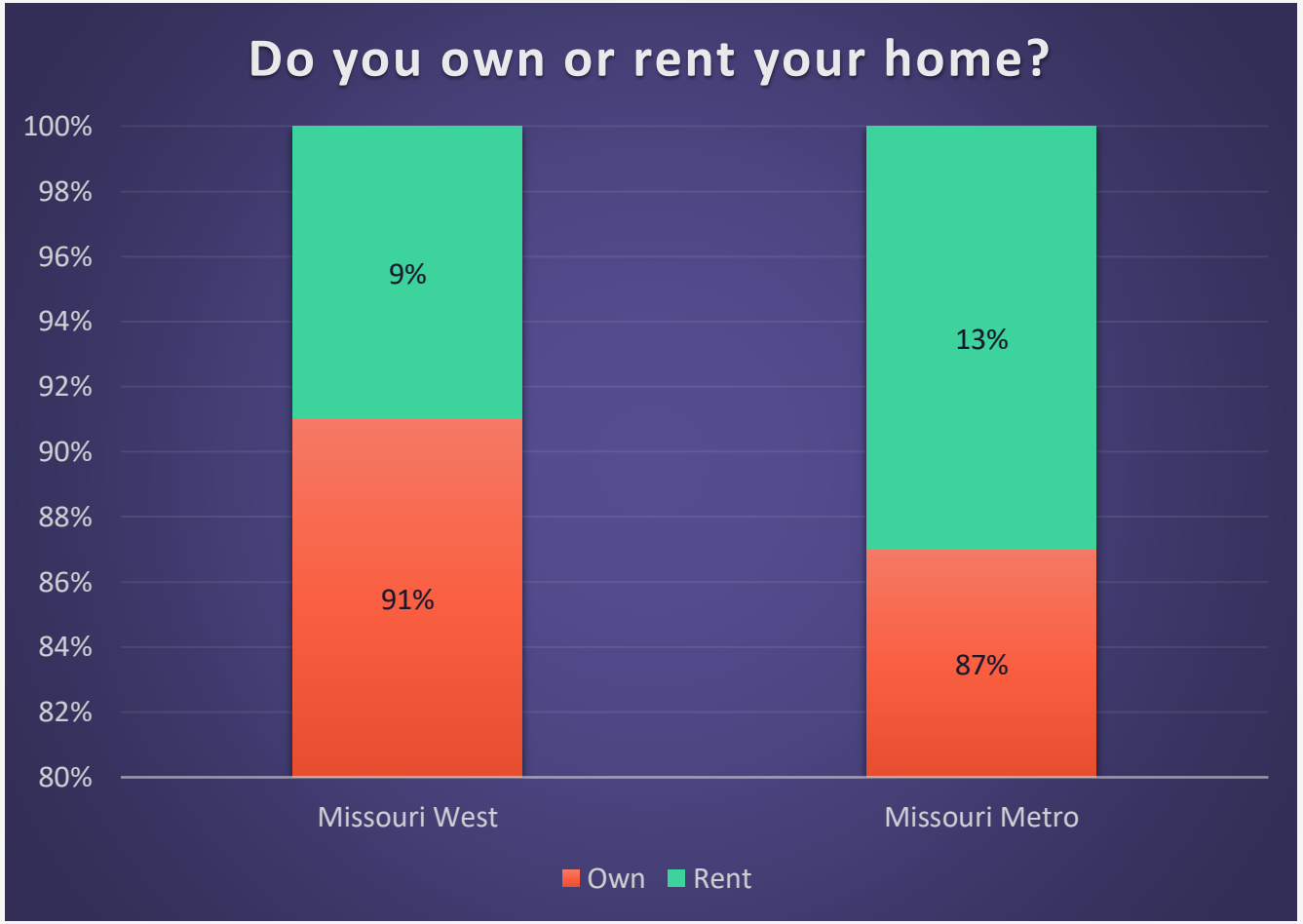
- At that time 84% of Missouri West and 71% of Missouri Metro customers resided in single-family homes.



Home Ownership

Most Missouri customers own their homes.

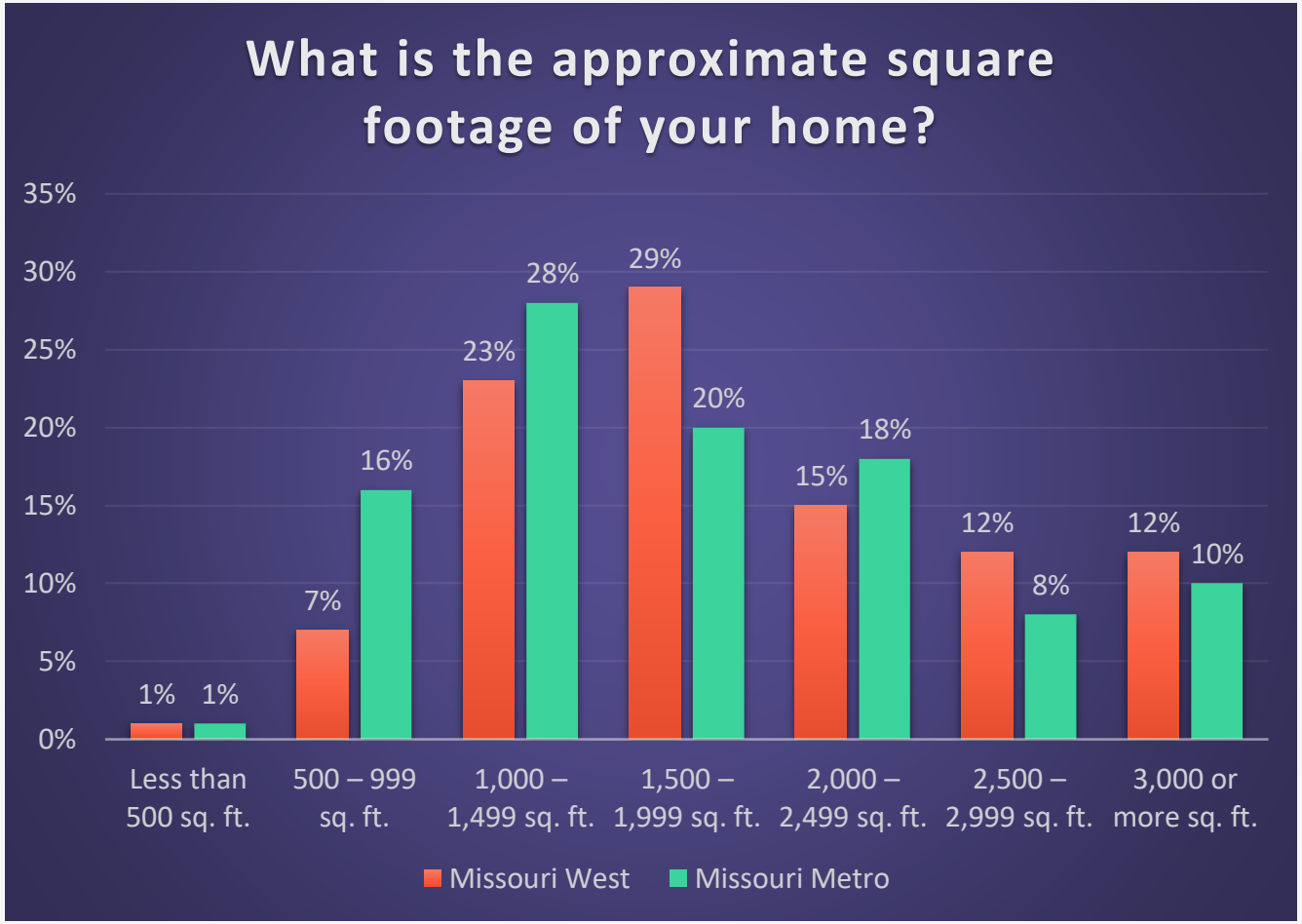
Not surprisingly, given the higher number of customers living in multi-family homes, more Missouri Metro customers rent their homes.



Size of Home — All Homes

About half of all customers in both service territories live in homes 1,000 — 1,999 square feet.

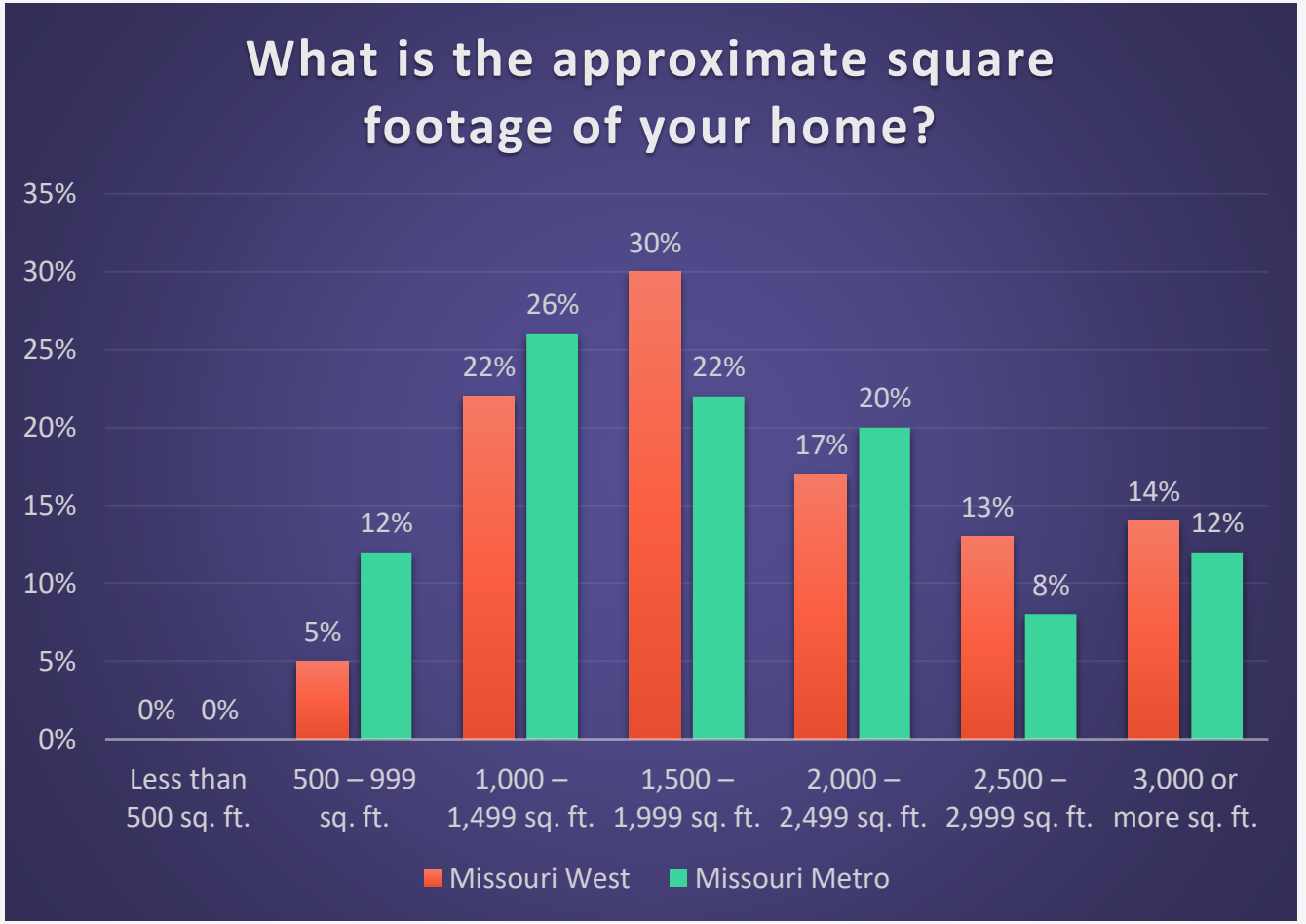
A larger proportion of Missouri West customers live in homes under 1,500 square feet.



Size of Home — Single Family

Given that a large majority of Missouri customers live in single-family homes, the distribution of size is very similar to the entire population shown in the previous chart.

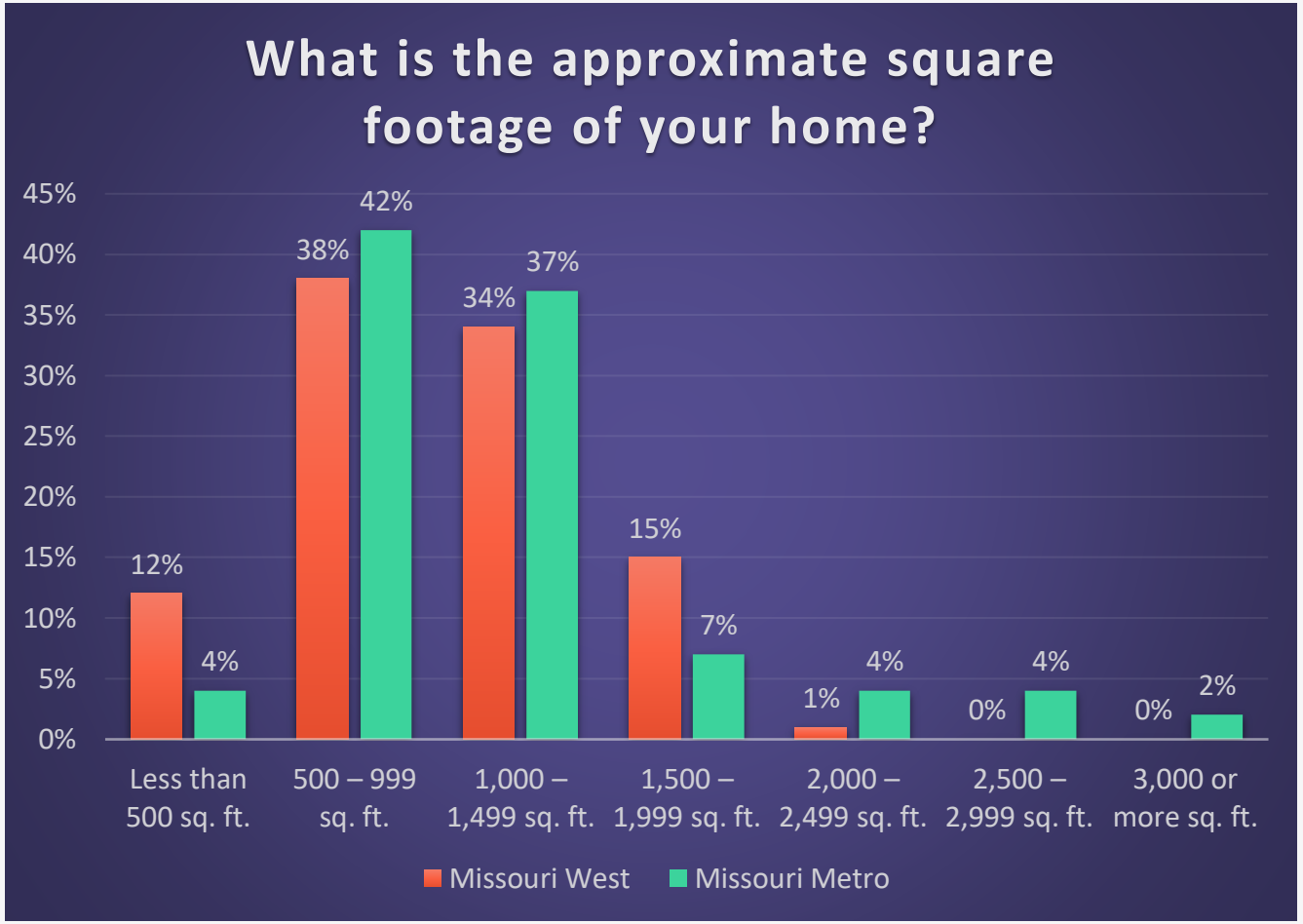
A small percentage of single-family homes are under 1,000 square feet.



Size of Home — Multi-Family

Most multi-family homes are under 1,500 square feet.

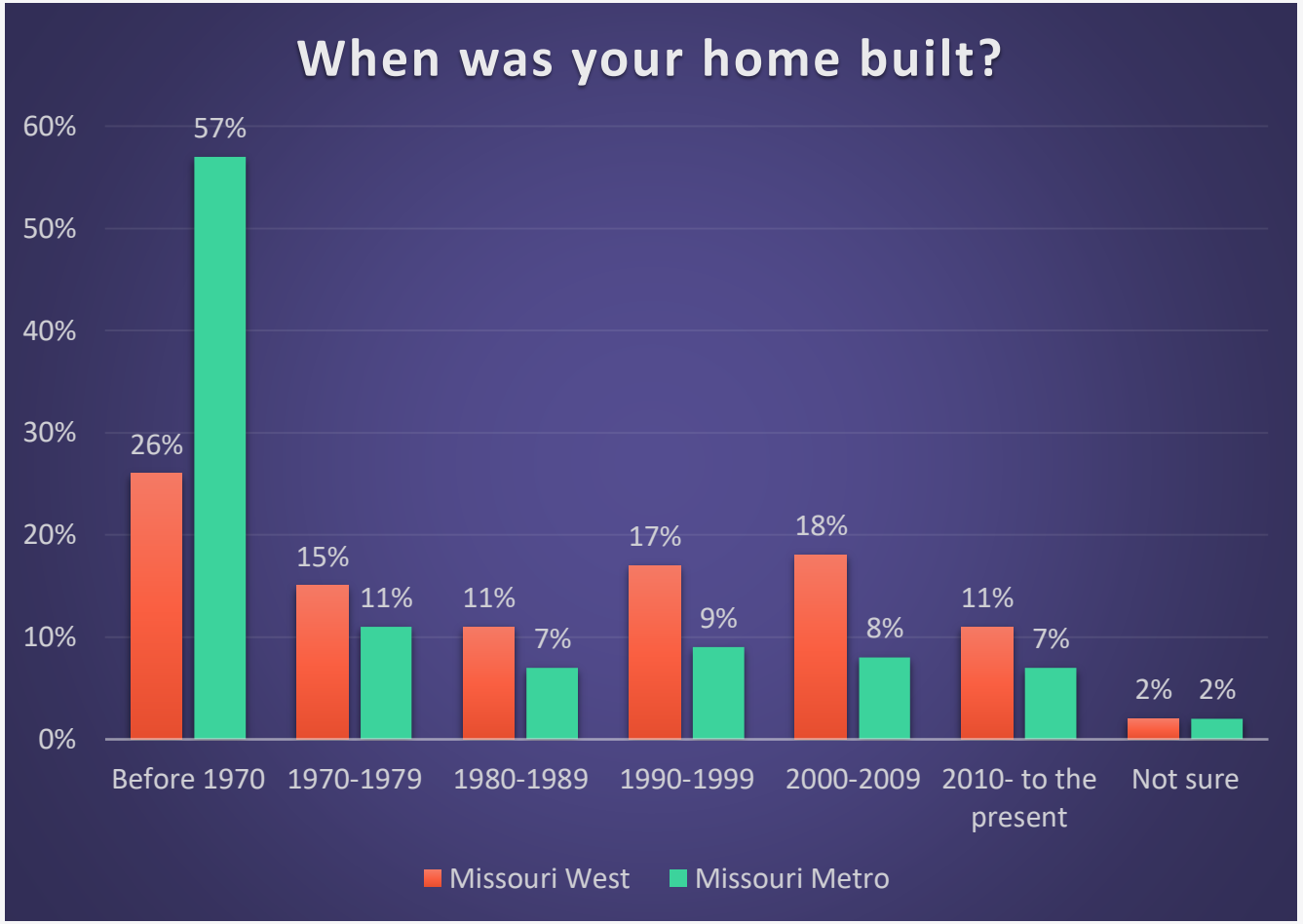
Missouri Metro has a larger proportion of multi-family homes larger than 2,000 square feet.



Age of Home

A majority of Missouri Metro customers live in homes built before 1970, which may indicate there is an opportunity among these customers for weatherization and other energy efficiency upgrades.

About one in ten homes were built in the last 12 years.



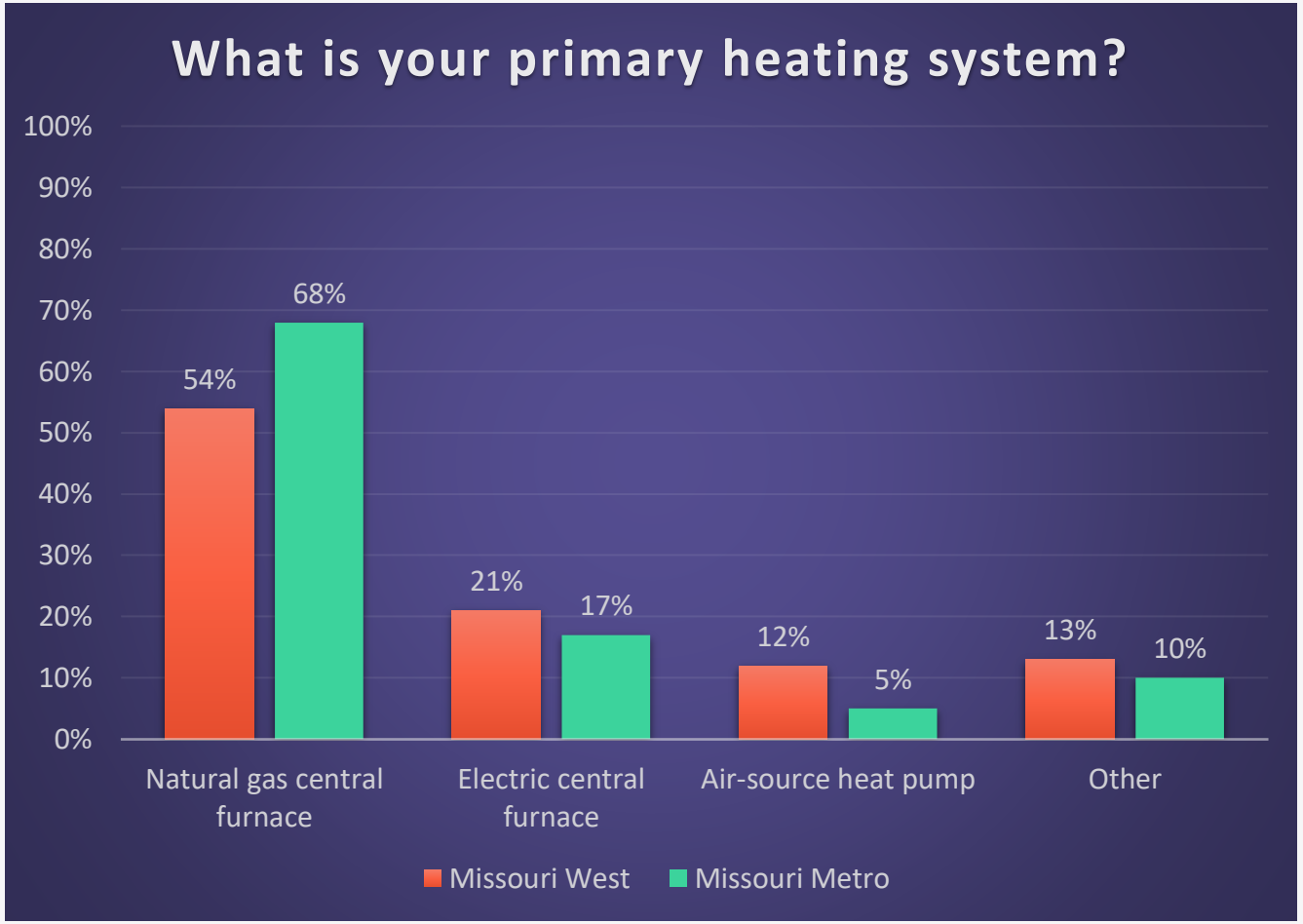
Space Heating, Cooling, and Water Heating

Primary Space Heating System

The majority of Missouri customers use natural gas central furnaces as their primary heating source.

The saturation of natural gas furnaces has grown in Missouri Metro's service territory since 2019 – at that time 58% used natural gas furnaces as their primary heating source.

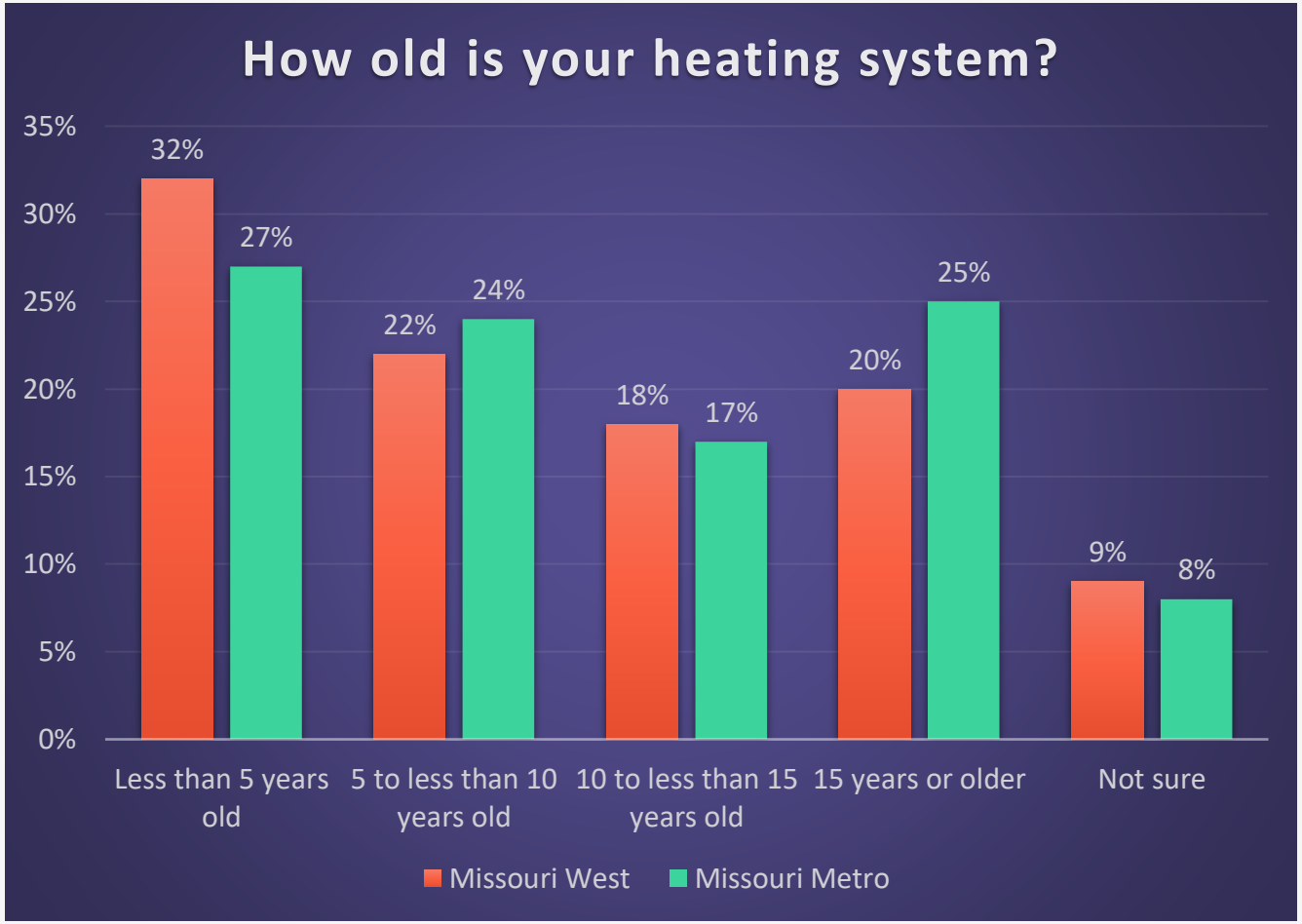
100% of customers who have heat pumps say they use electric heat for back up.



Age of Heating System

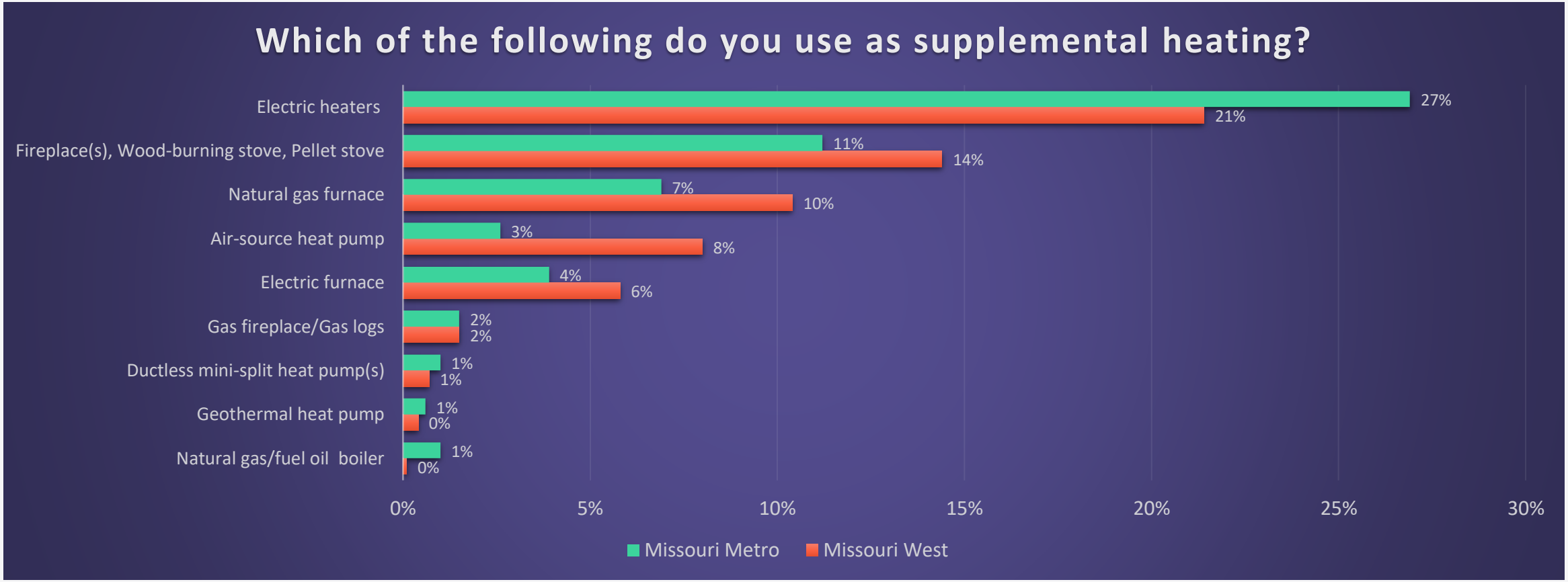
More than 1 in 5 Missouri customers have a heating system that is nearing the end of its useful life.

An opportunity exists for high efficiency HVAC upgrades among this group.



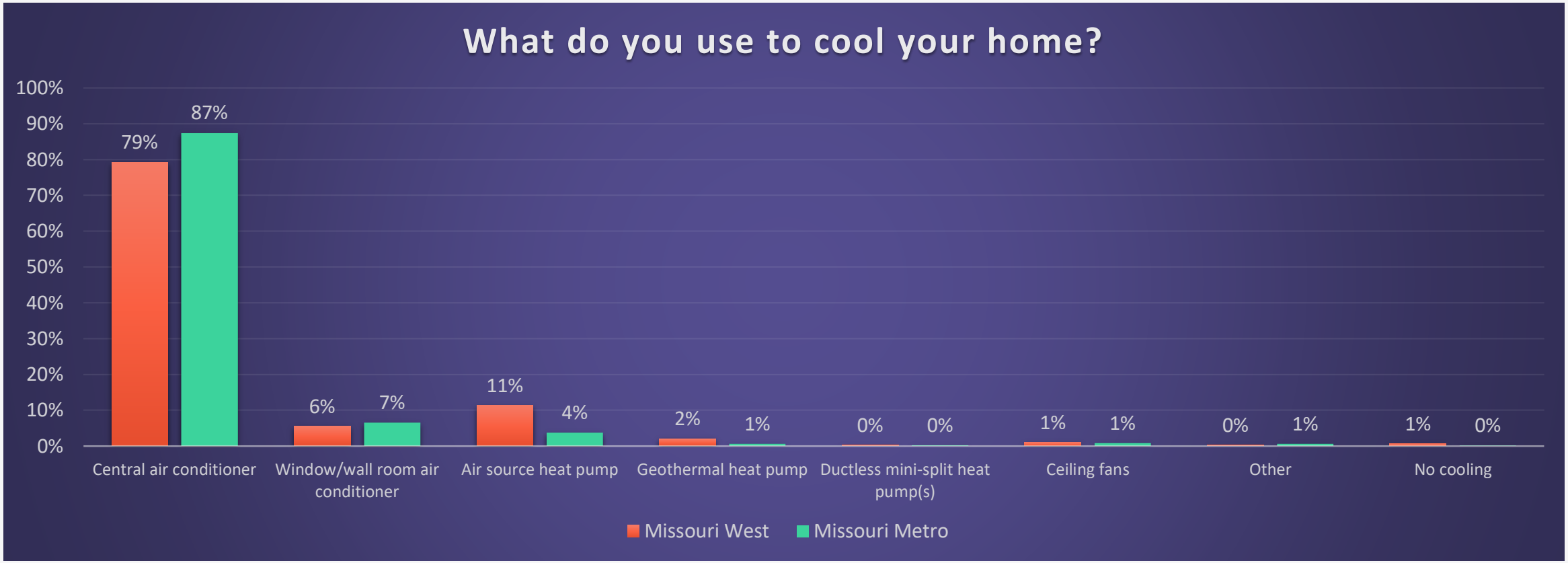
Secondary Heating System

Electric heaters are used as supplemental heating for the largest group of customers, followed by fireplaces, wood burning stoves and pellet stoves.



Primary Cooling System

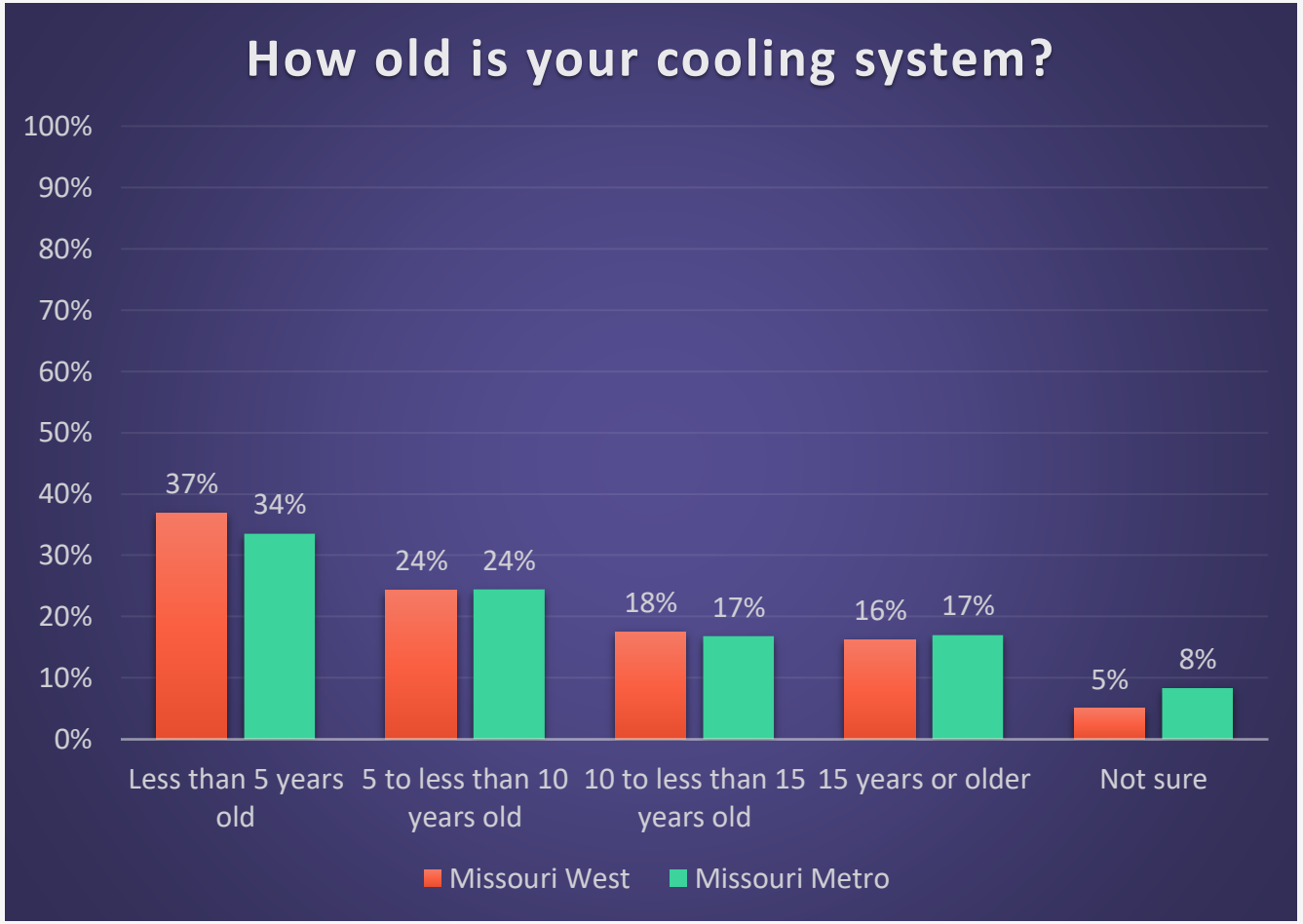
A large majority of Missouri customers have central air conditioners.



Age of Cooling System

More than a third of cooling systems are less than 5 years old.

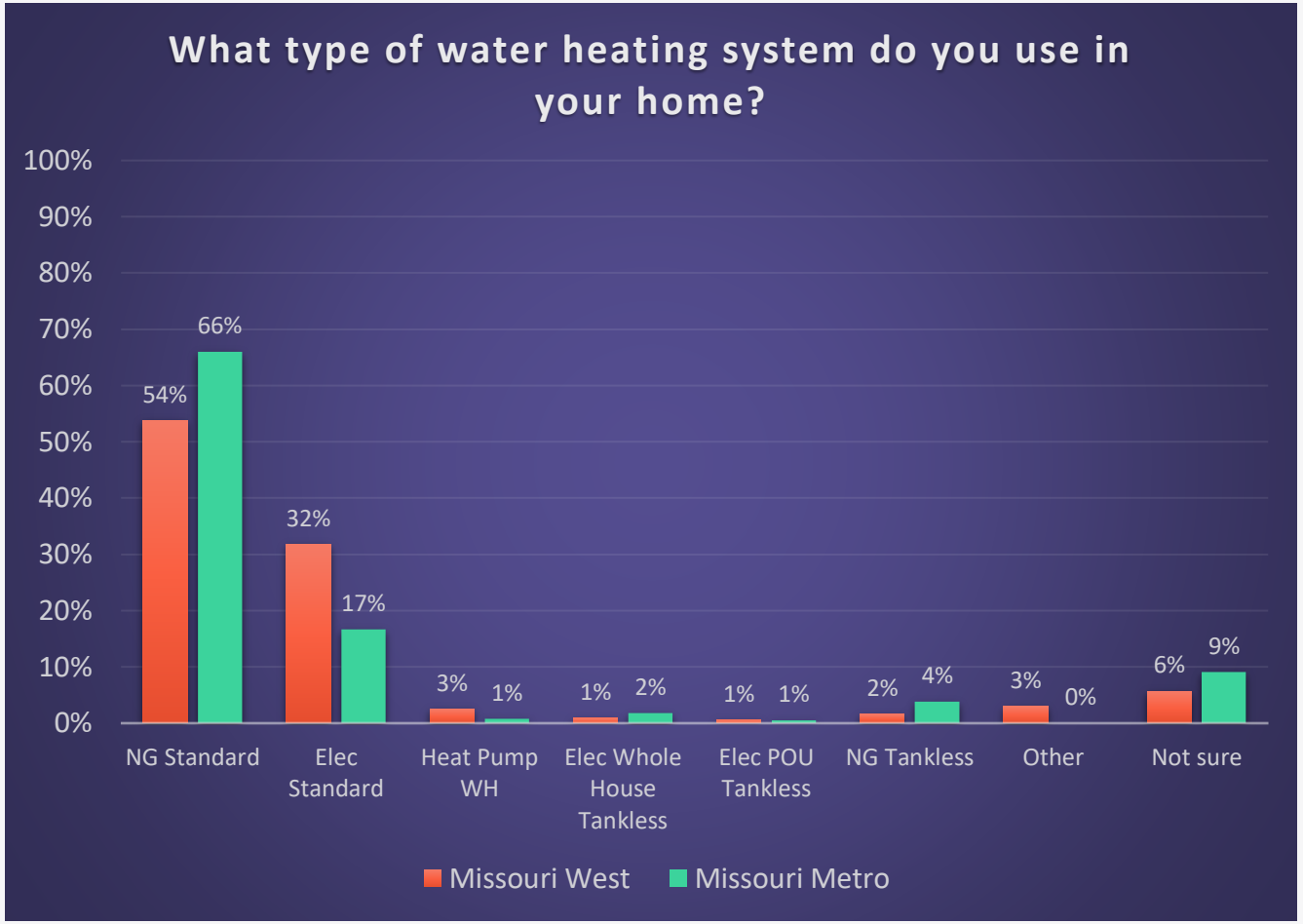
Sixteen to 17% of cooling systems are nearing the end of their useful life.



Type of Water Heater

The majority of Missouri customers have natural gas standard water heaters.

The proportion of natural gas water heaters has grown in the Missouri Metro service territory. In 2019, 53% had natural gas standard systems.

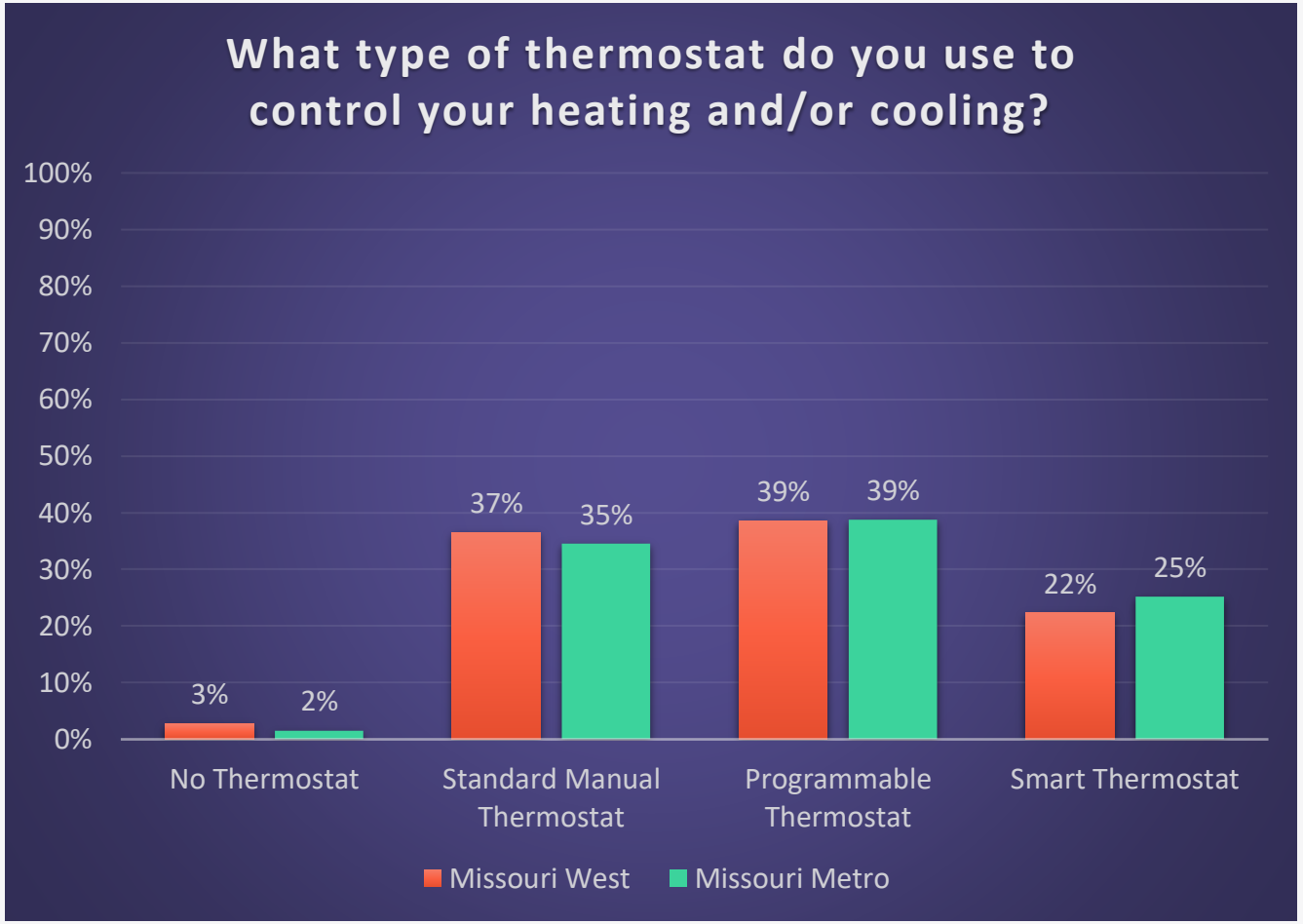


Thermostat

Type of Thermostat

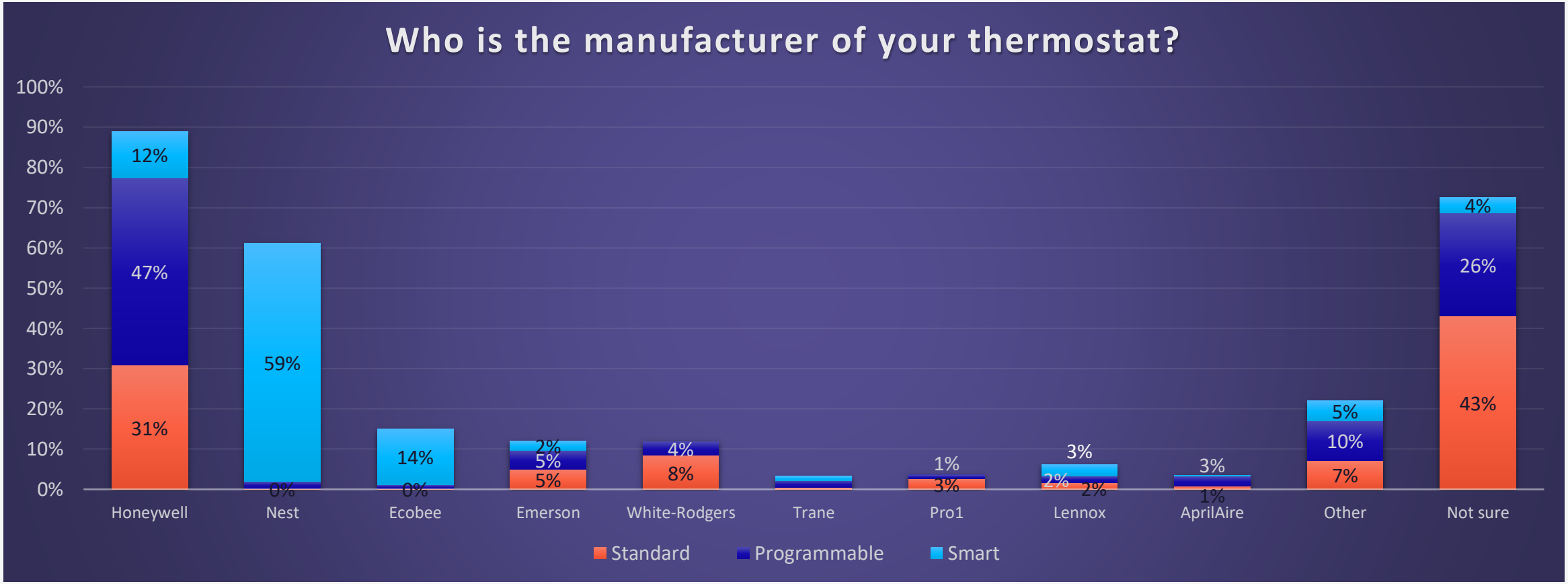
Over a third of Missouri customers have standard manual thermostats.

61% to 64% of customers have programmable or smart thermostats. This is significantly higher than 2019 when 43% of customers in Evergy's service territory (including Kansas customers) had programmable thermostats.



Type of Thermostat by Manufacturer

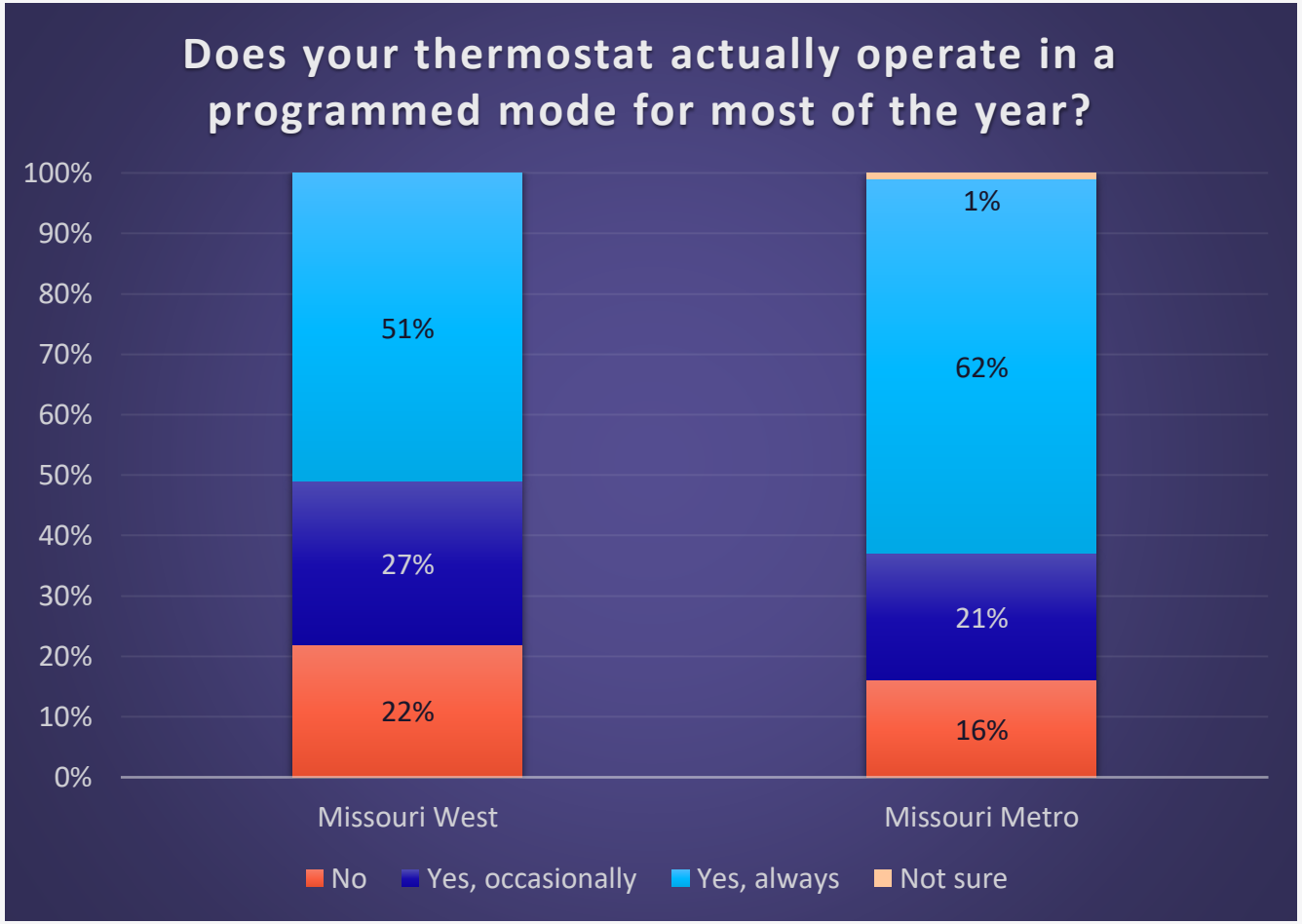
Based on the response to the thermostat manufacturer question, respondents appear to correctly identify their type of thermostat.



Programmable Thermostat Use

About half of Missouri West customers and a little under two-thirds of Missouri Metro customers always operate their thermostat in programmed mode.

This indicates an opportunity for customer education on how to operate their heating and cooling systems more efficiently.



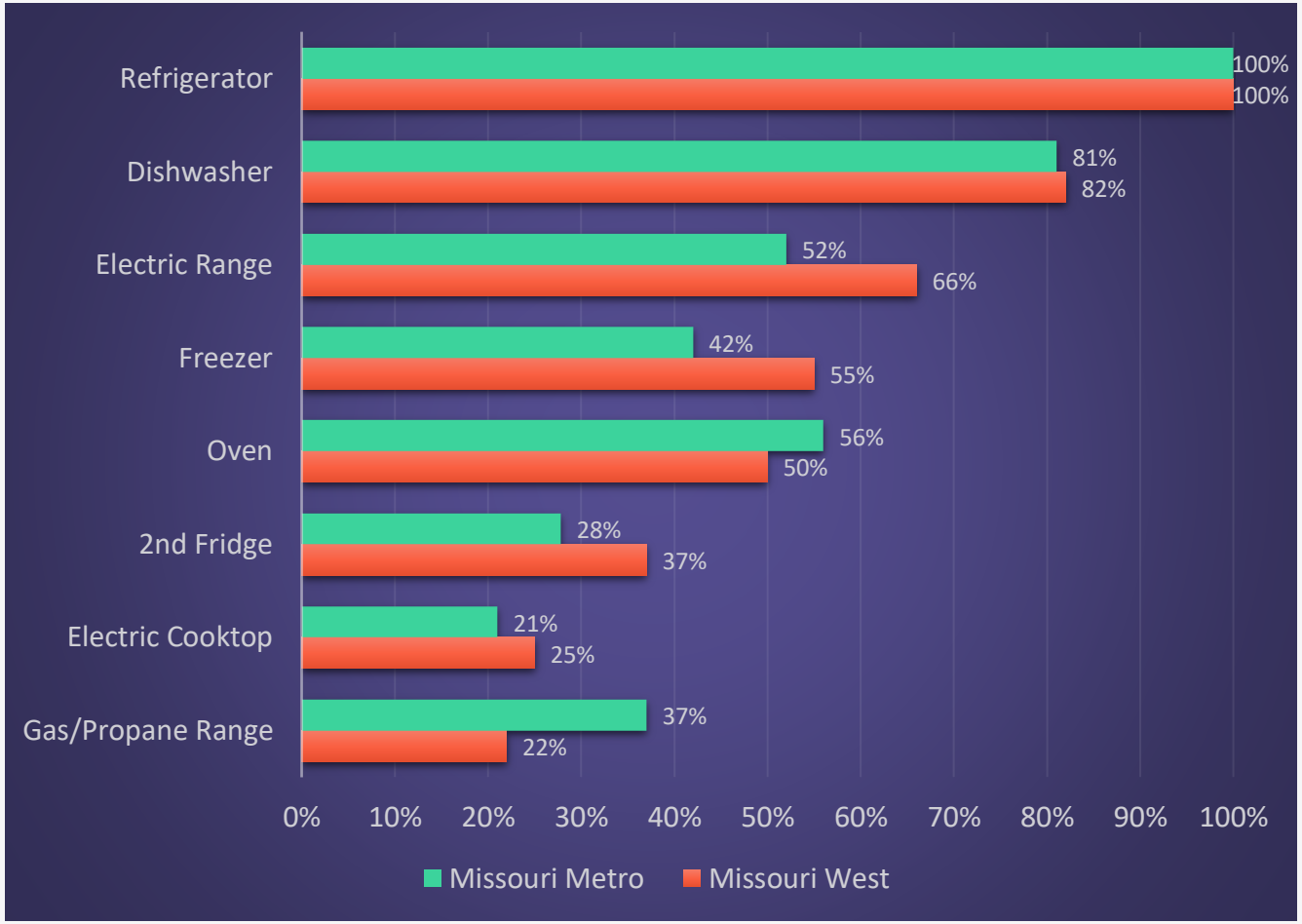
Appliances and Electronics

Kitchen Appliances

The majority of Missouri customers have a refrigerator, dishwasher and electric range.

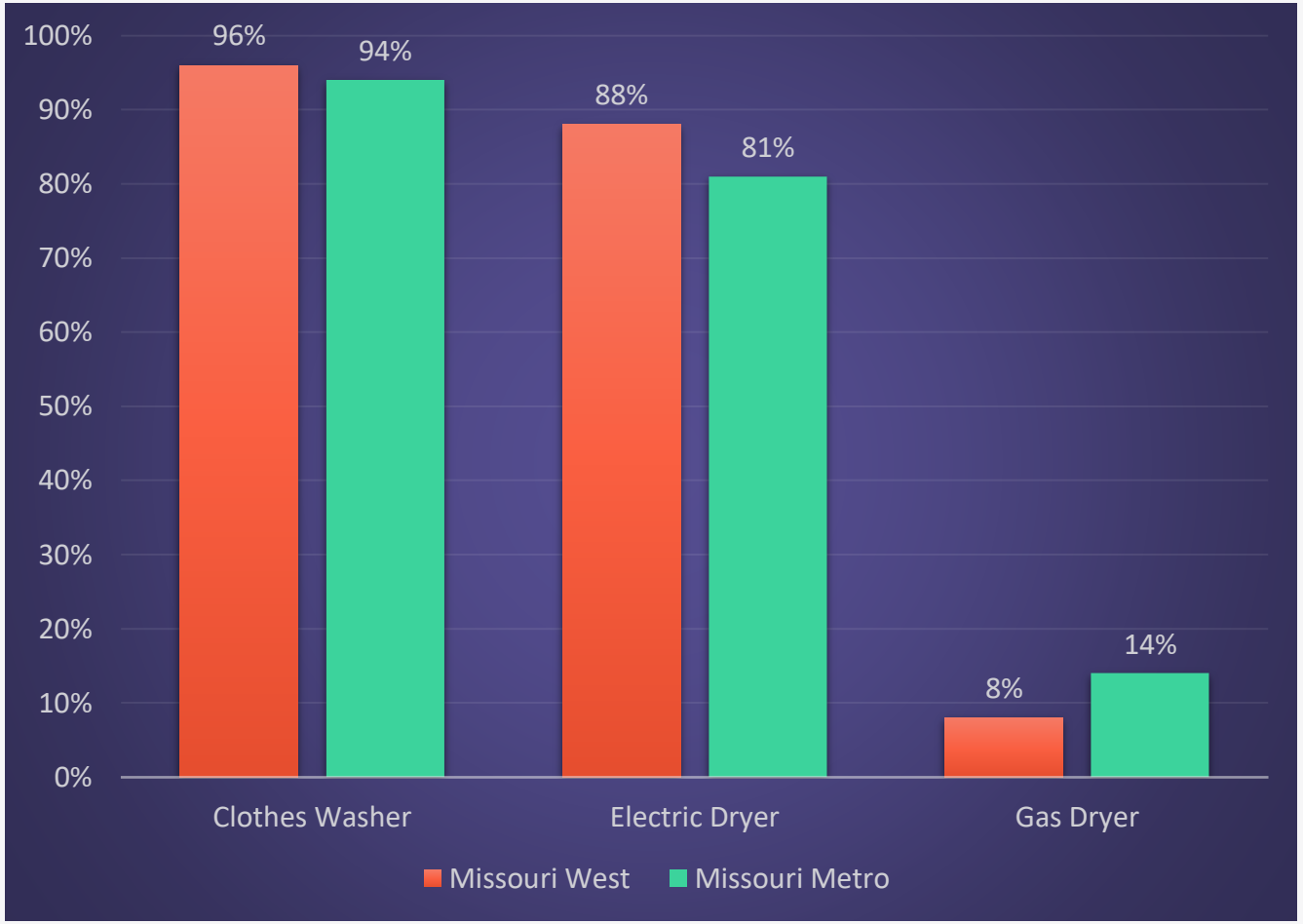
28% of Missouri Metro customers and 37% of Missouri West customers have a second fridge.

A large proportion of customers in both service territories have a stand-alone freezer.



Laundry Equipment

Most Missouri customers have clothes washers and electric clothes dryers.

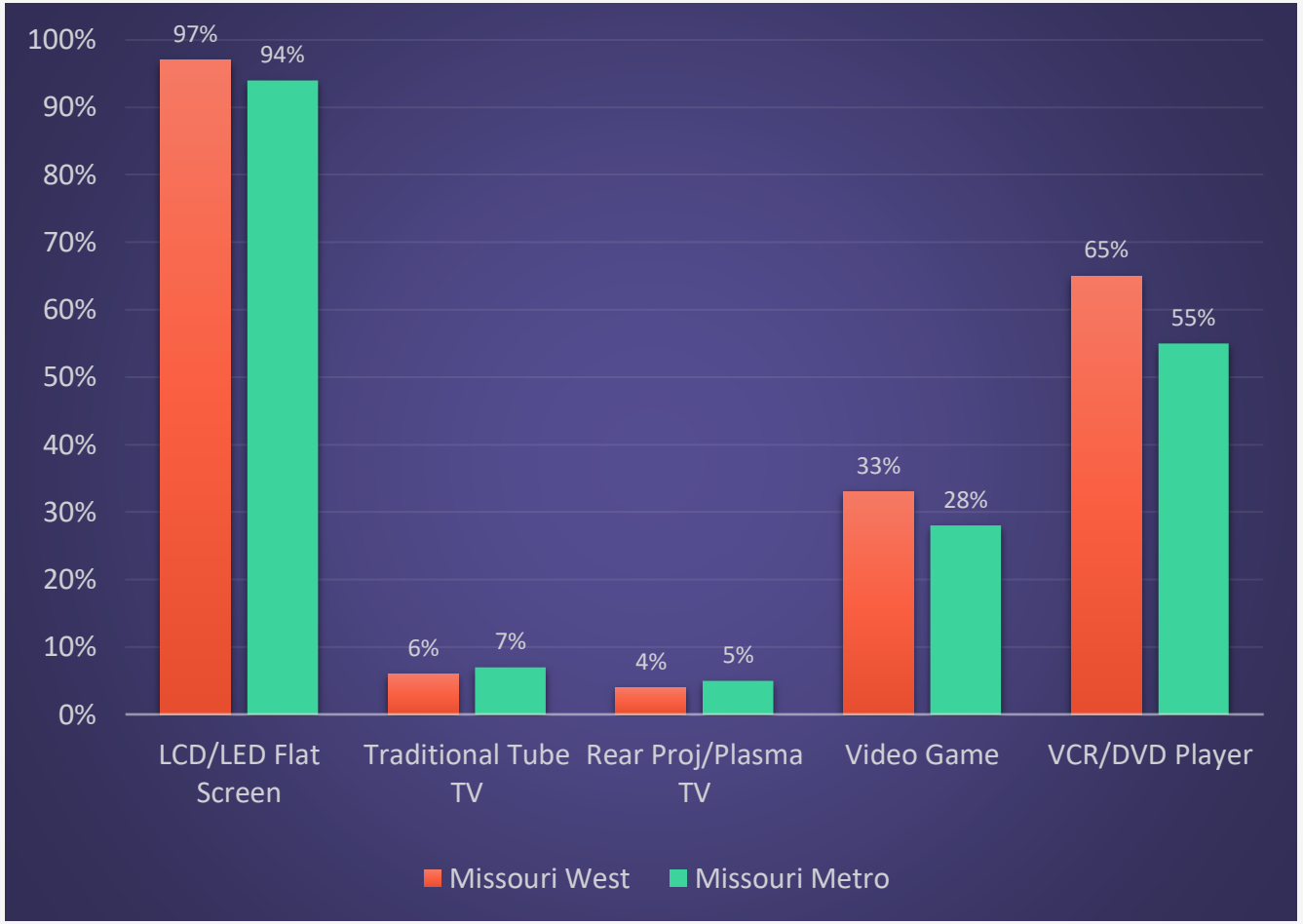


Entertainment Equipment

The mean number of TVs in both Missouri service territories is 2.

A third of Missouri West customers have video game consoles and almost two-thirds have VCR/DVD players.

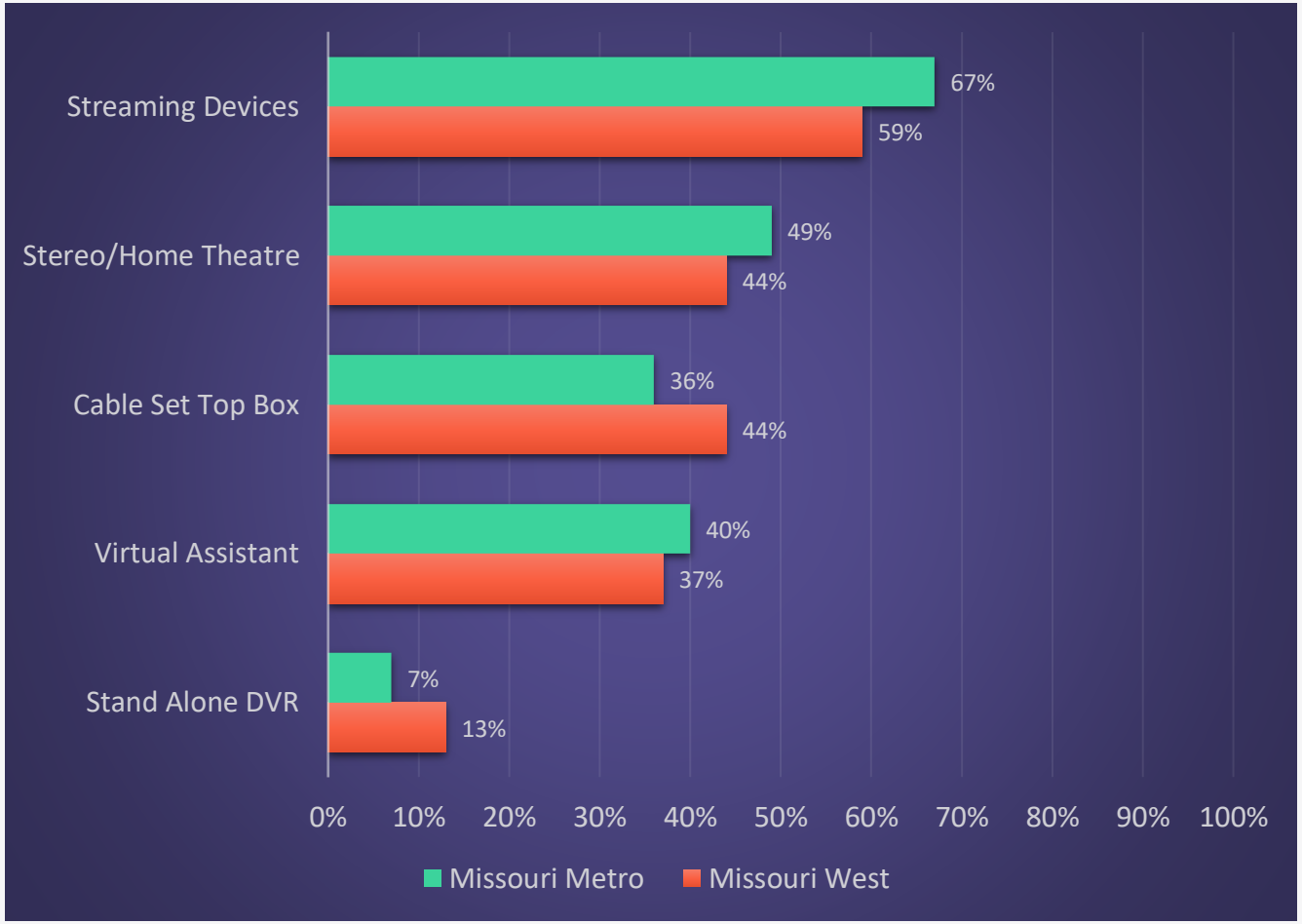
Over a quarter of Missouri Metro customers have video game consoles and over half have a VCR/DVD players.



Electronic Accessories

The majority of Missouri customers have streaming devices – an increase from 2019 when 45% of Metro customers and 42% of West customers had these devices.

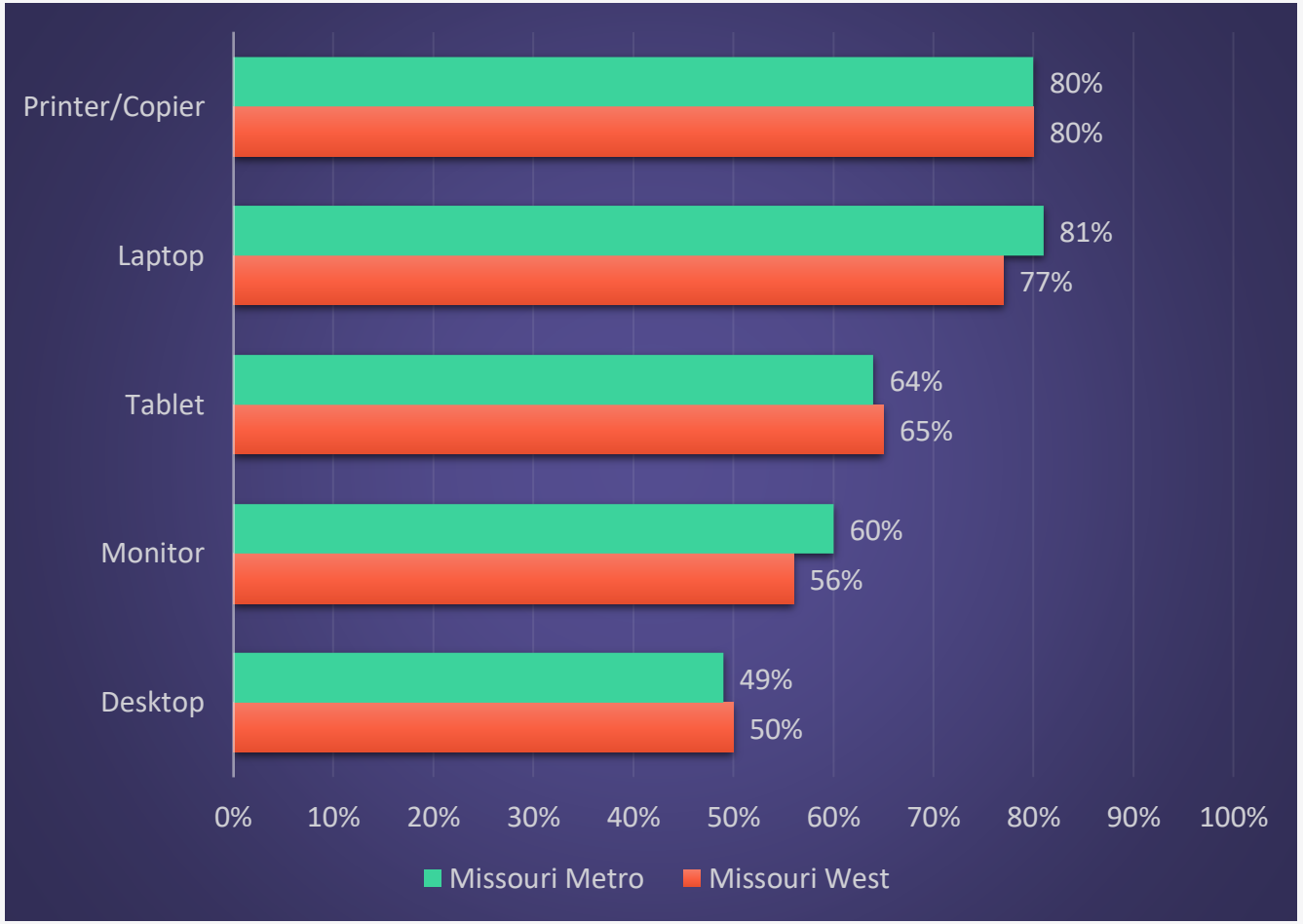
There was also an increase in virtual assistants – up from 26% of Metro customers and 25% of West customers in 2019.



Computer and Office Equipment

Computer and office equipment is prevalent in Missouri customer homes.

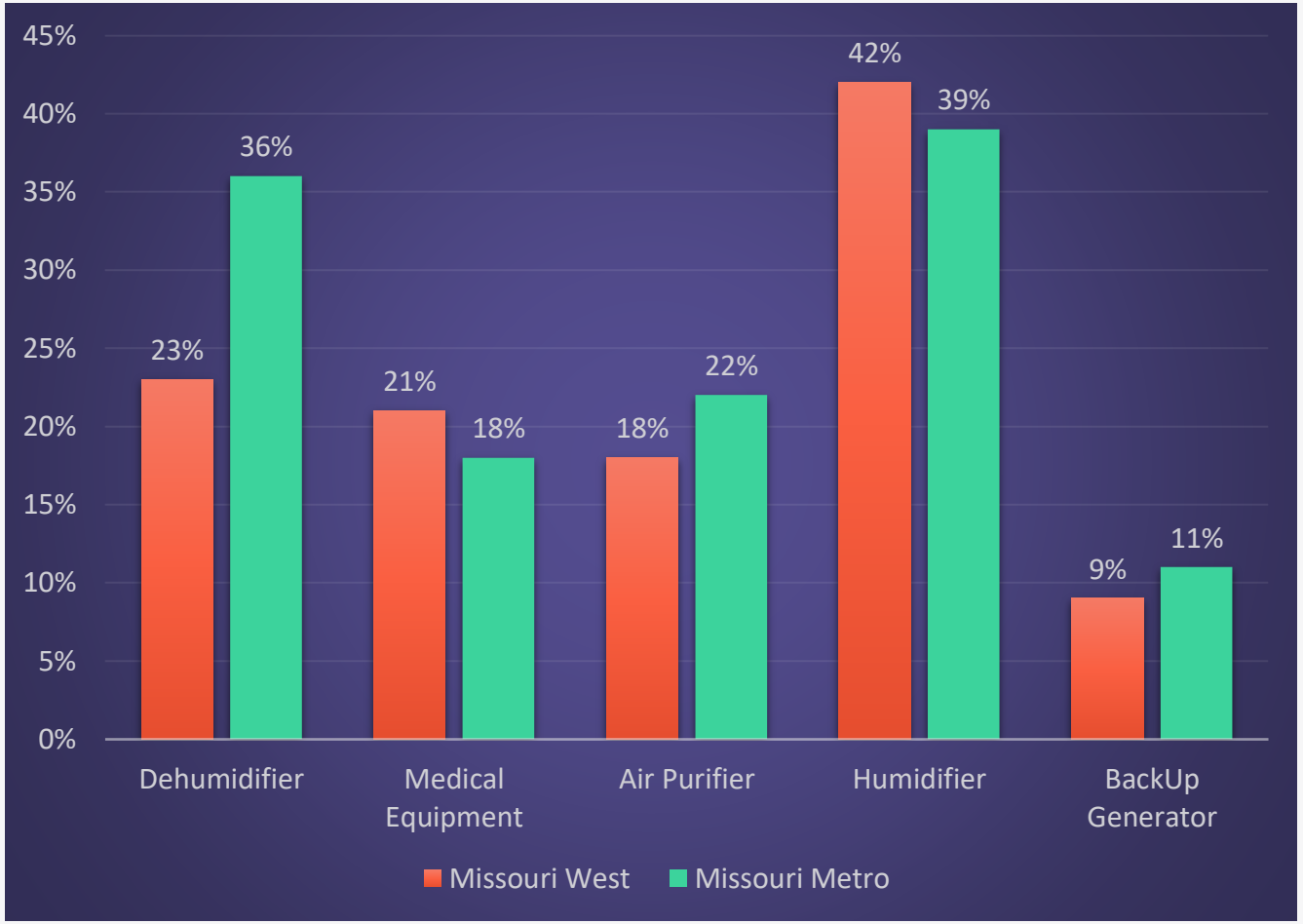
The saturation of this equipment has grown in all categories since 2019 by 3% - 16%.



Other Types of Equipment

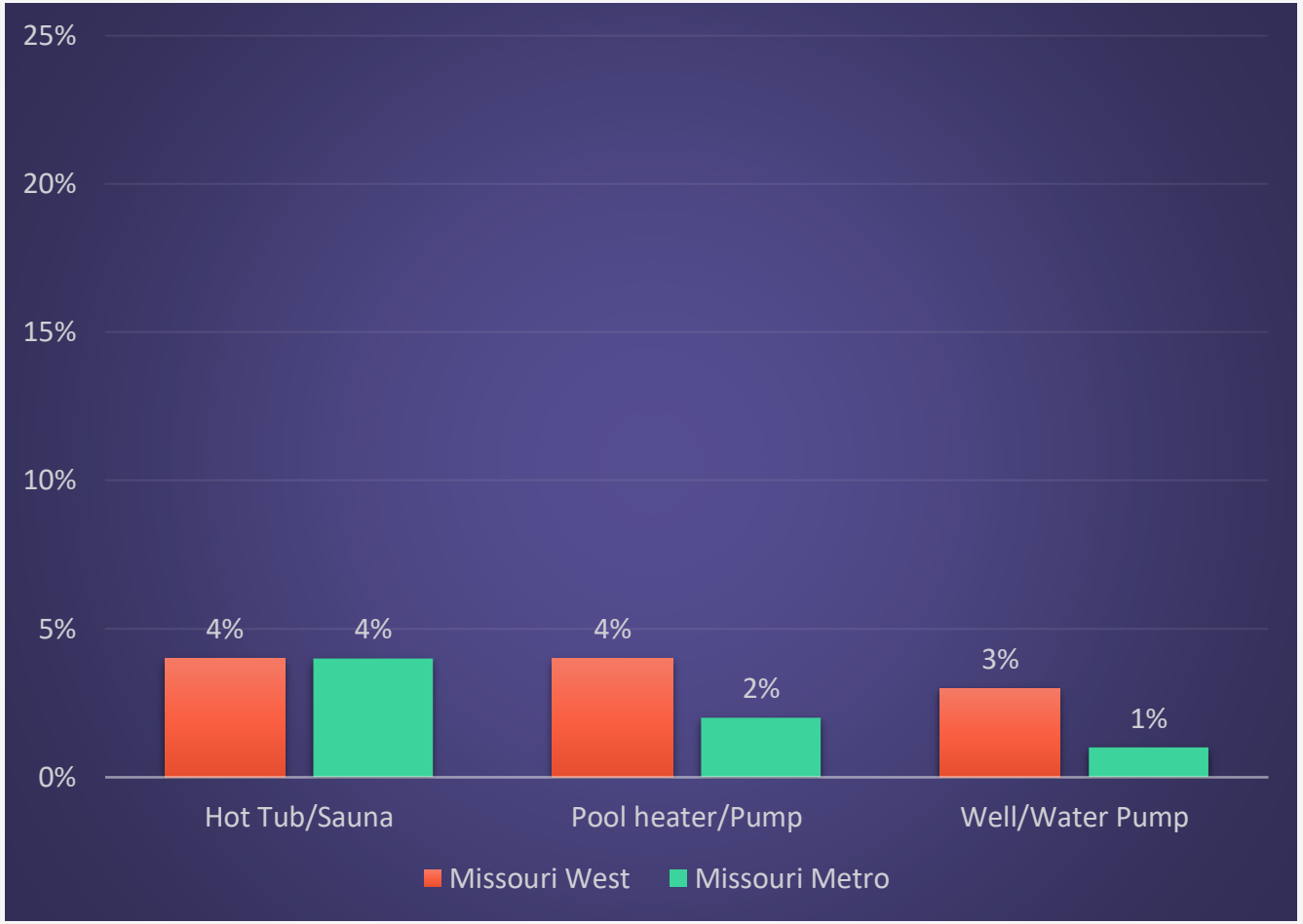
Humidifiers and dehumidifiers are owned by 23% - 42% of Missouri customers.

A larger proportion of Missouri Metro customers have dehumidifiers in their homes.



Pools, Pumps and Spas

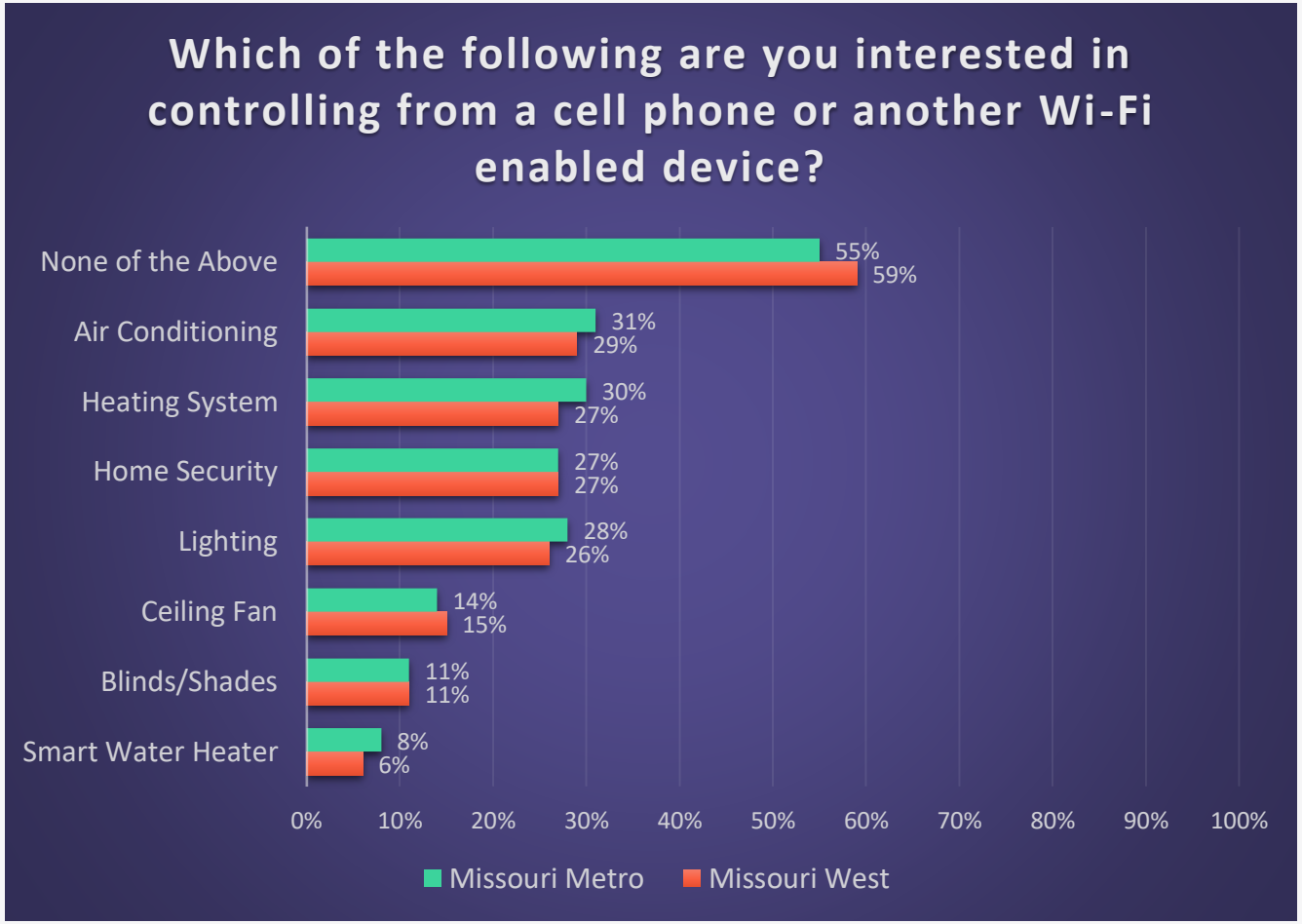
Very few Missouri customers have pools, pumps, or spas.



Interest in Smart Controls

The majority of customers are not interested in smart controls.

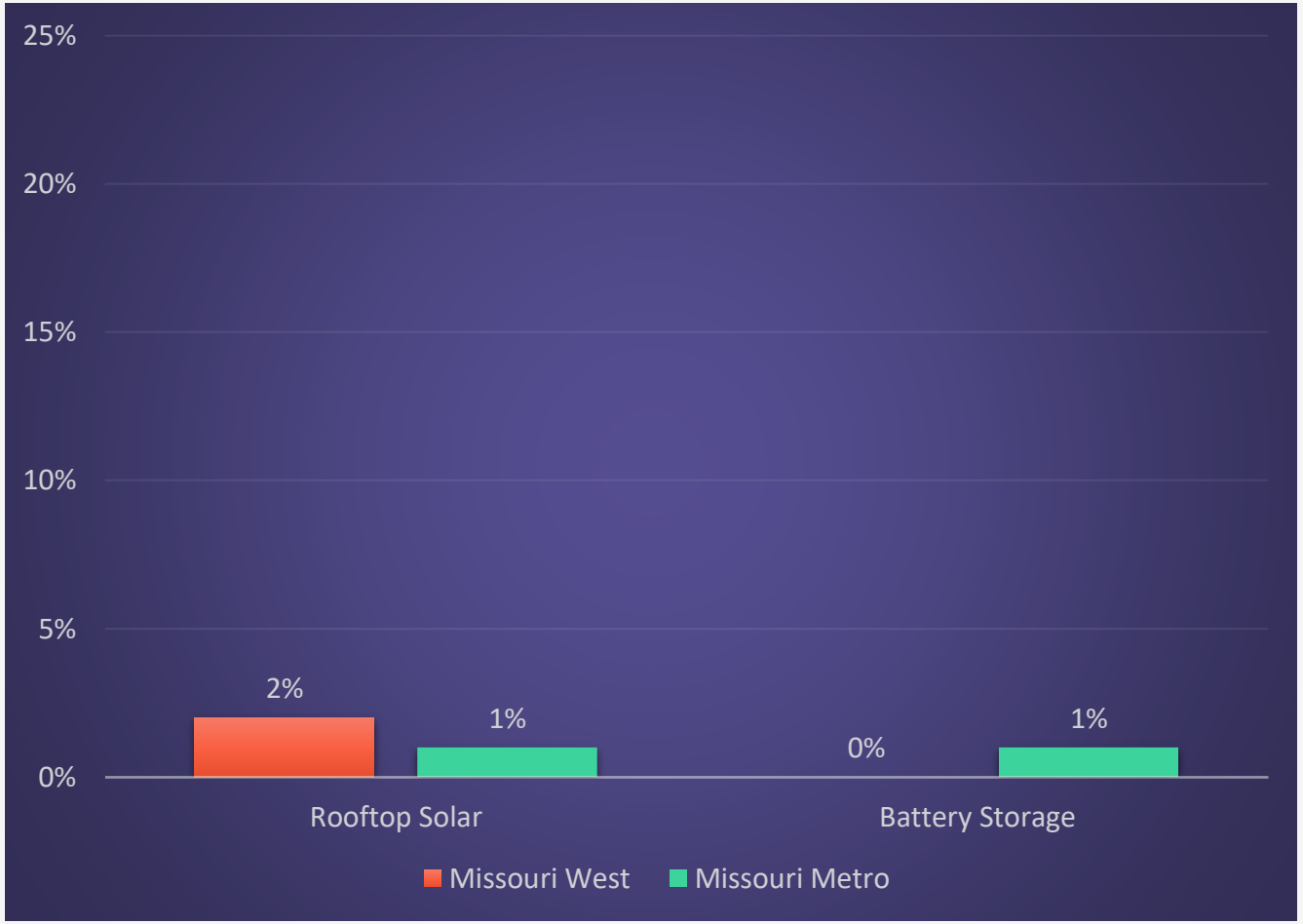
The highest interest is in controlling HVAC, security and lighting.



Solar and Electric Vehicles

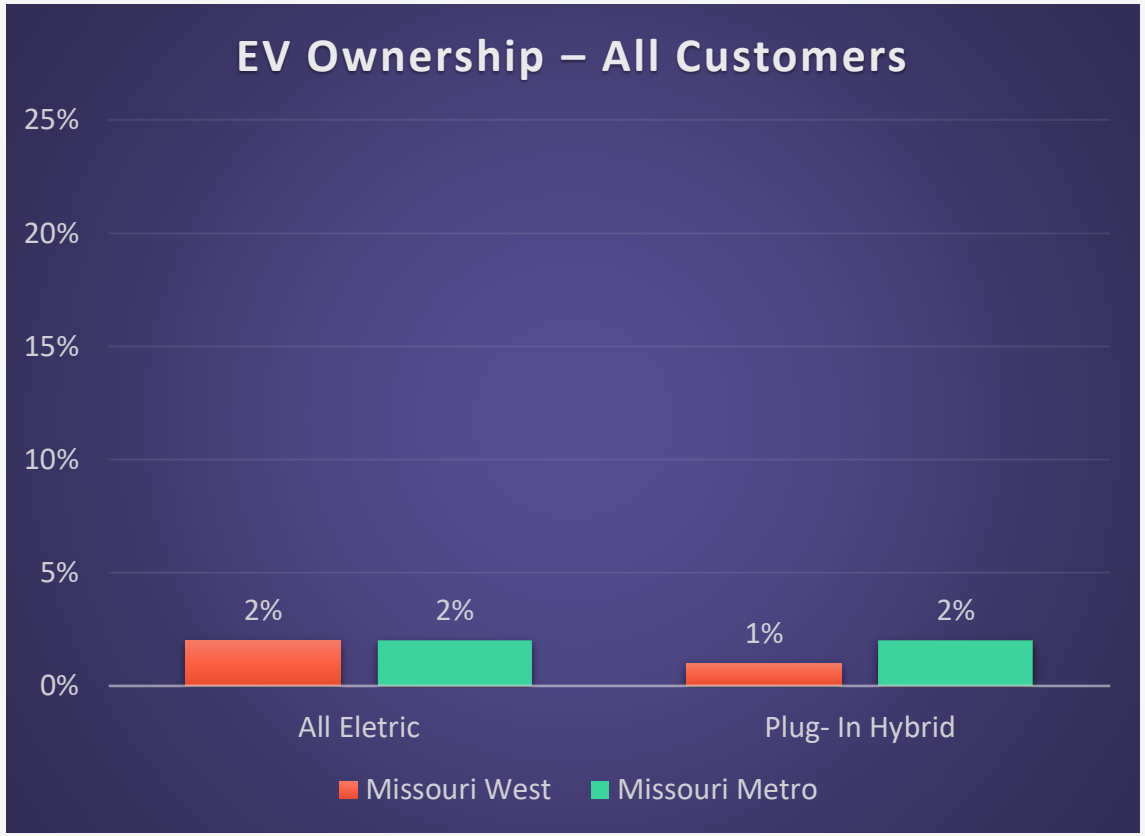
Rooftop Solar and Battery Storage

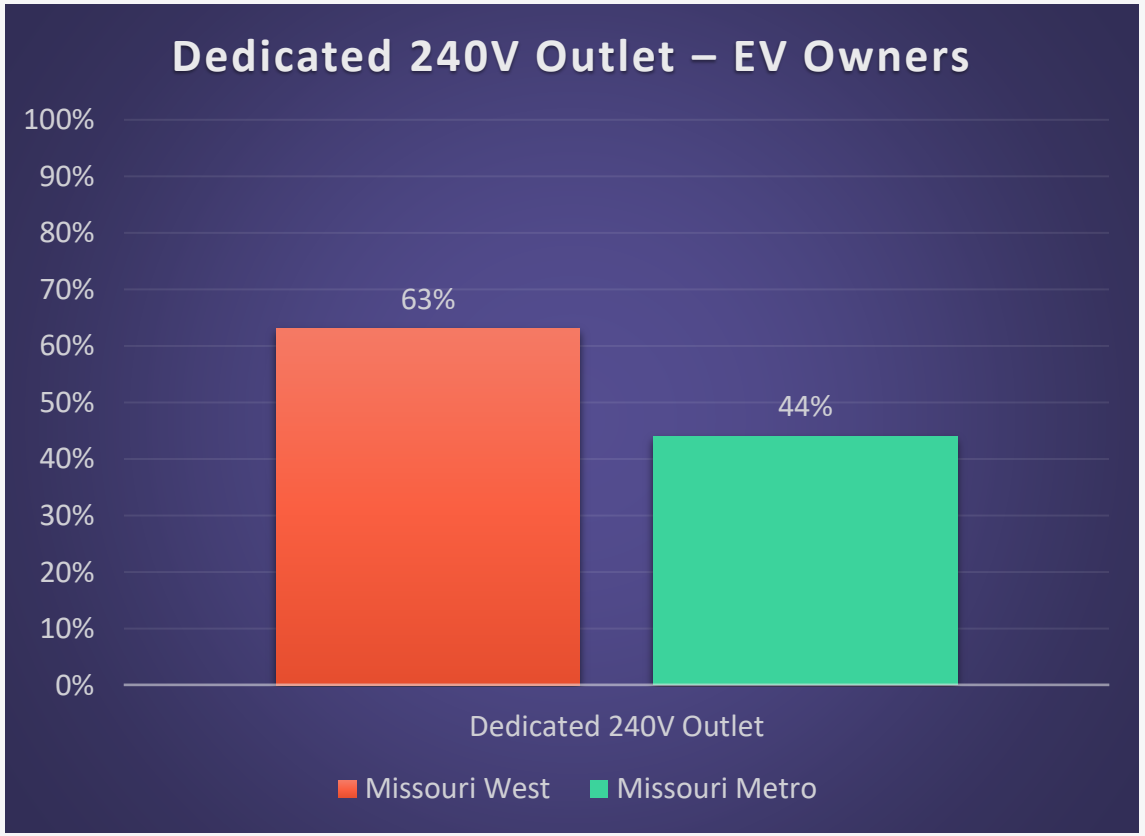
Few Missouri customers have rooftop solar or battery storage.



Electric Vehicles

Few Missouri customers own all-electric or plug-in hybrid vehicles. Of those that do, significant proportions have a dedicated 240V outlet, with larger proportions in the West.





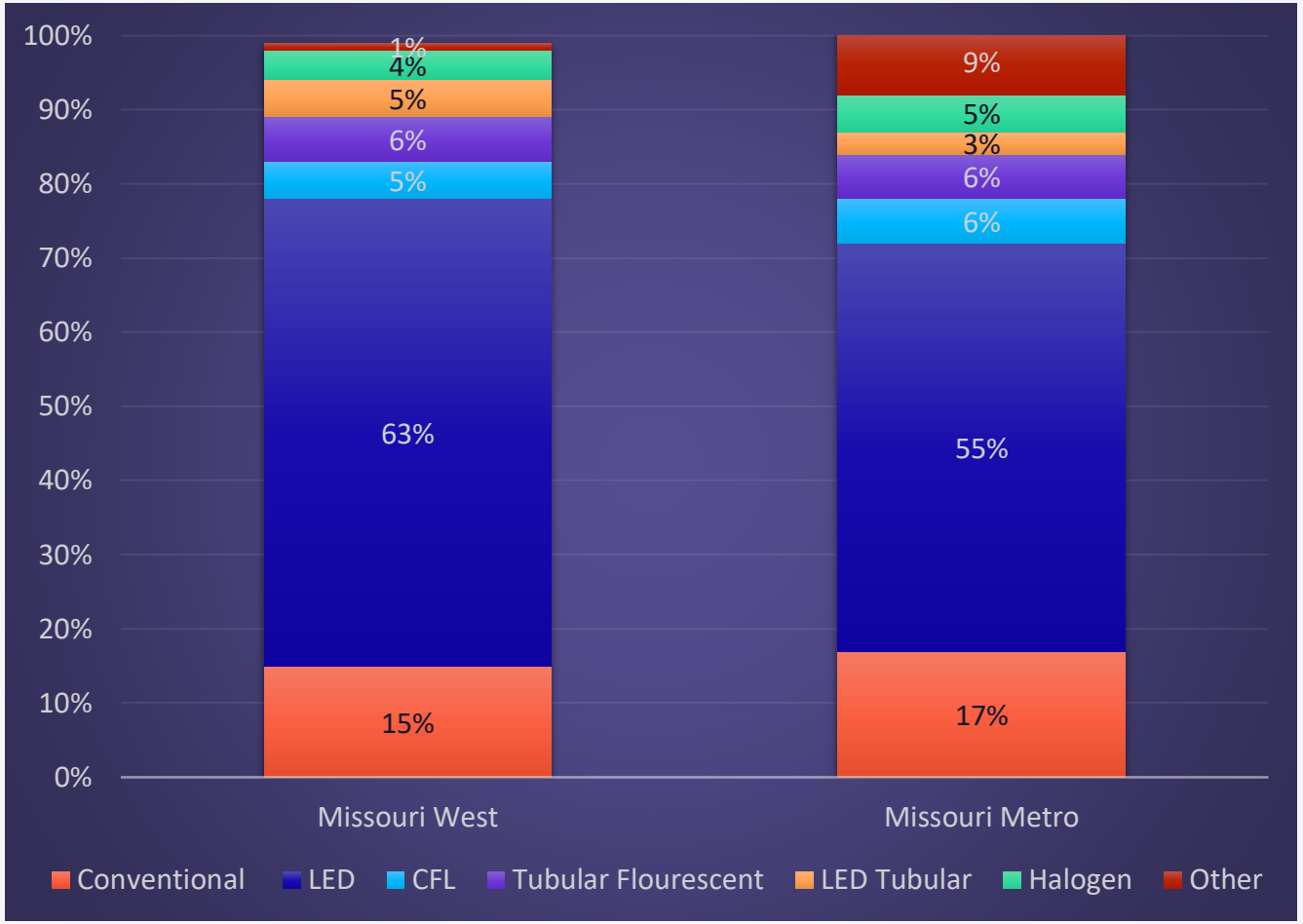
Energy Efficiency

Proportion of Lighting by Type of Bulb

The majority of lamps are LED.

In the last few years, LED lighting has increased while conventional incandescent lighting has decreased.

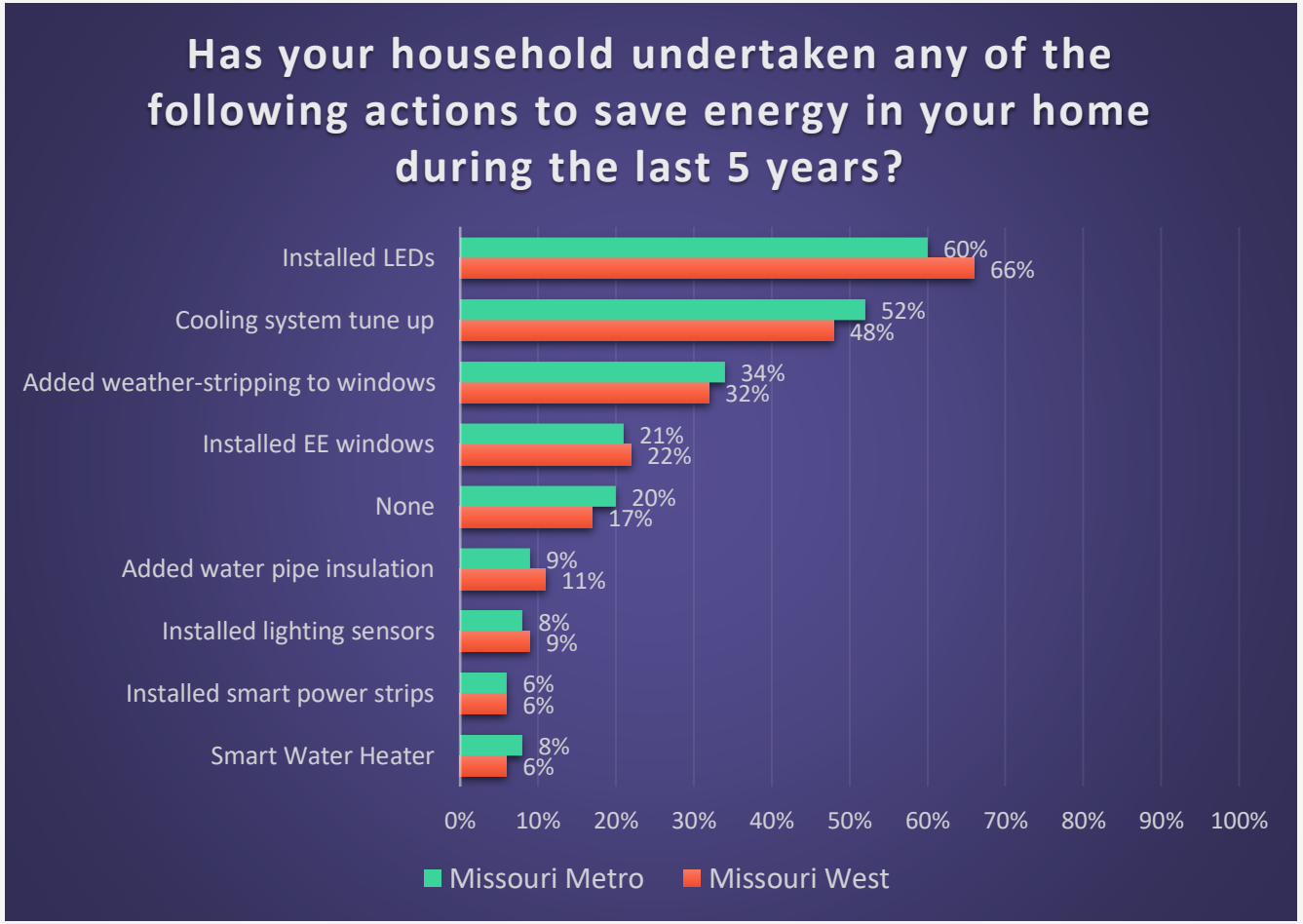
In 2019, 34% of Missouri Metro and 36% of Missouri West customers had LEDs.



Energy Efficient Actions

Eighty to 83% of Missouri customers have taken at least one action to save energy in the last 5 years.

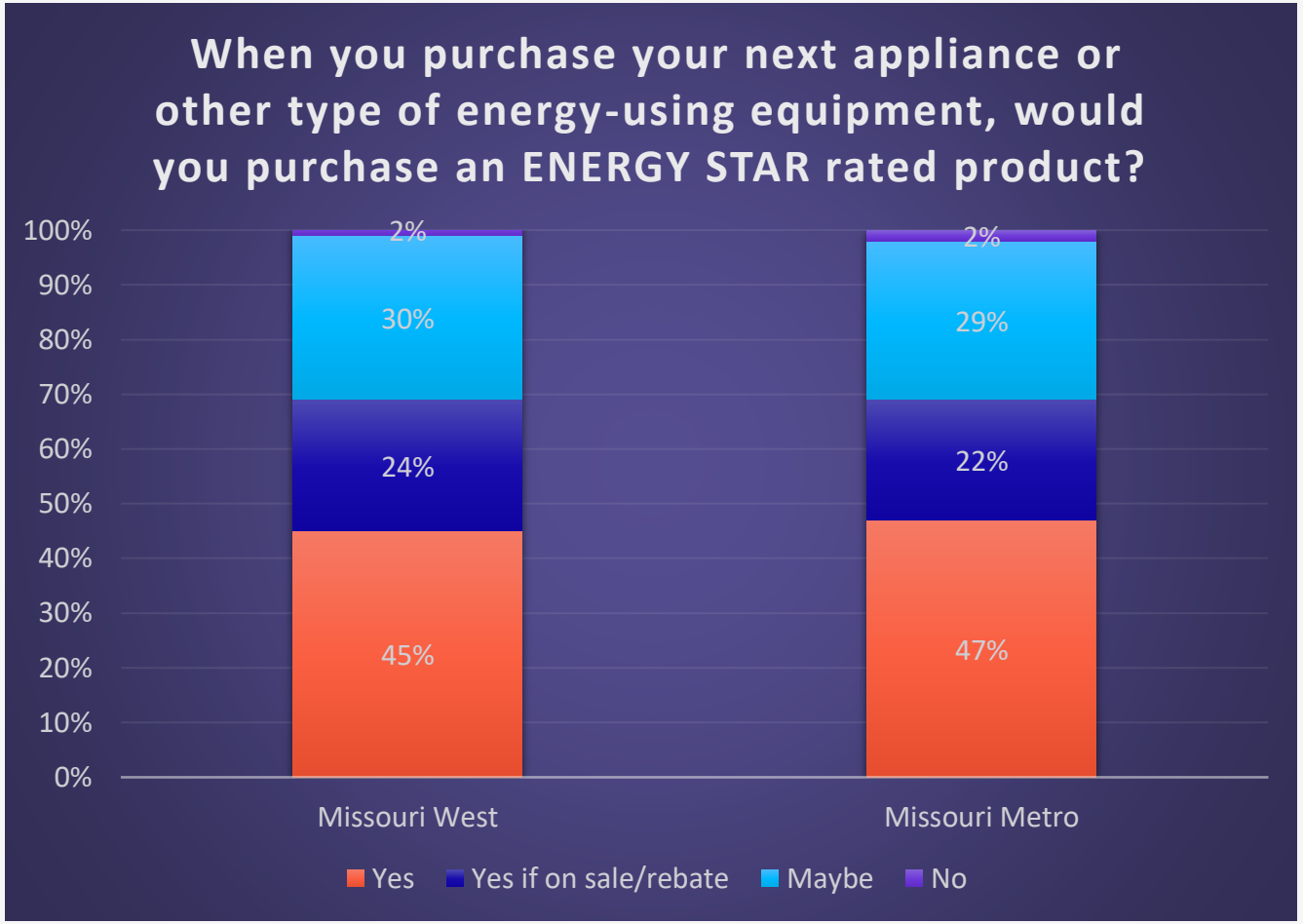
Not surprisingly, based on the growth in LEDs illustrated in the previous slide, a large majority of Missouri customers have installed LEDs to save energy.



Plan to Purchase Energy Star

A little less than half of Missouri customers plan to purchase Energy Star models when they are in the market for their next appliance.

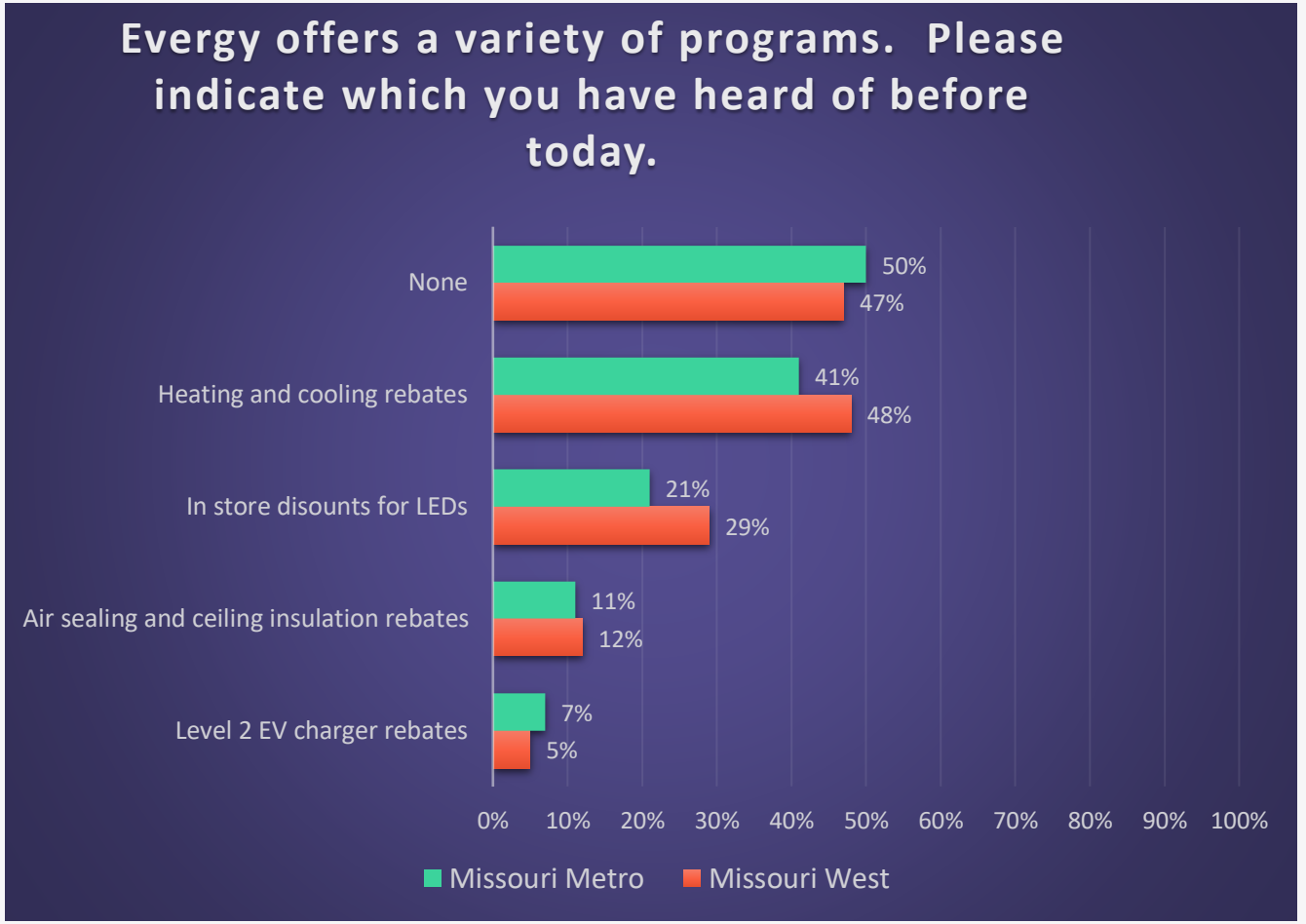
The prime market for EE programs is the 22-24% who say they will purchase Energy Star if there is a discount along with the 29-30% that are on the fence.



Awareness of Evergy EE Programs

About a half of Missouri customers have not heard of any Evergy Programs.

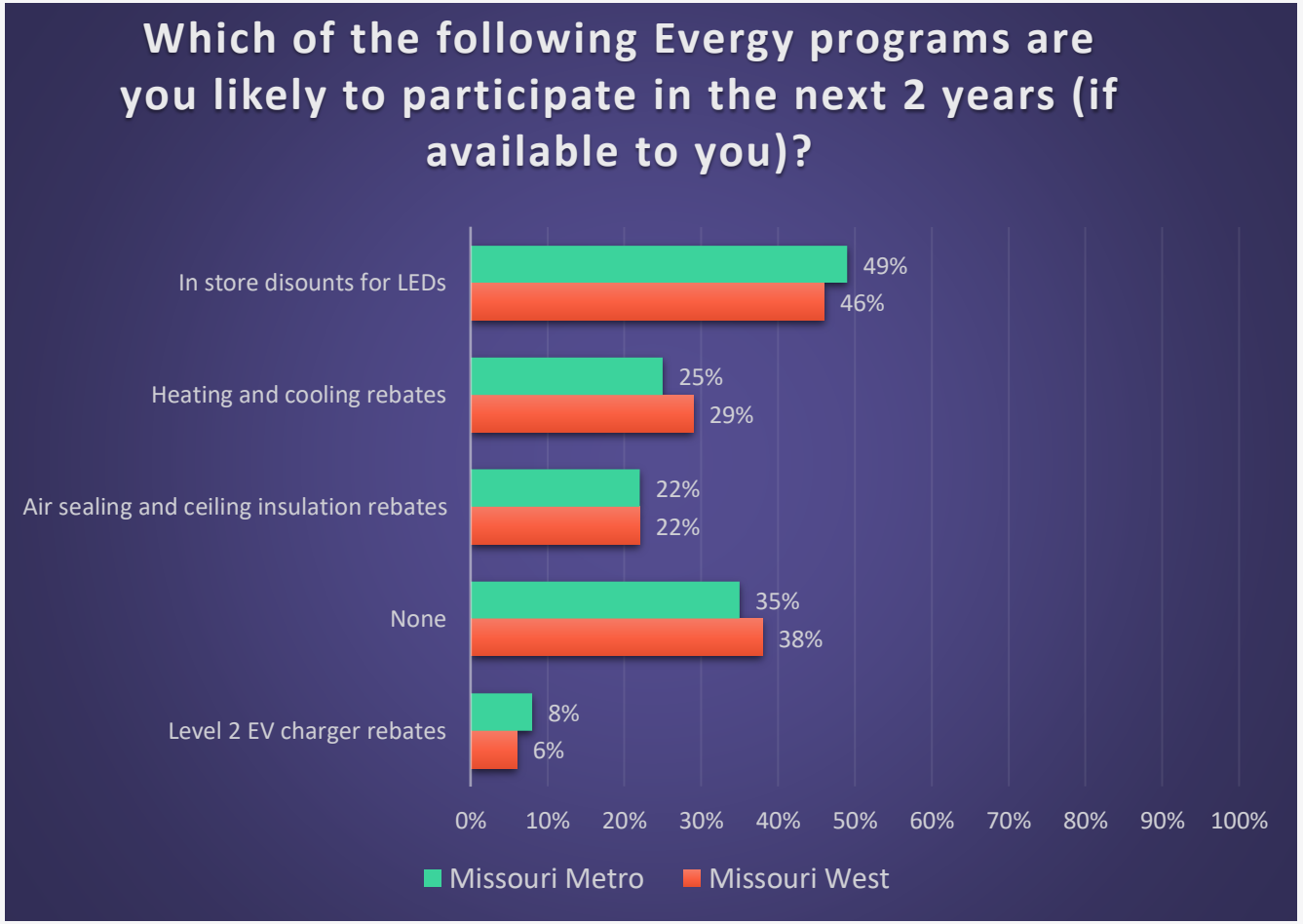
The program with the highest level of awareness is heating and cooling rebates.



Likelihood of Participating in Evergy EE Programs

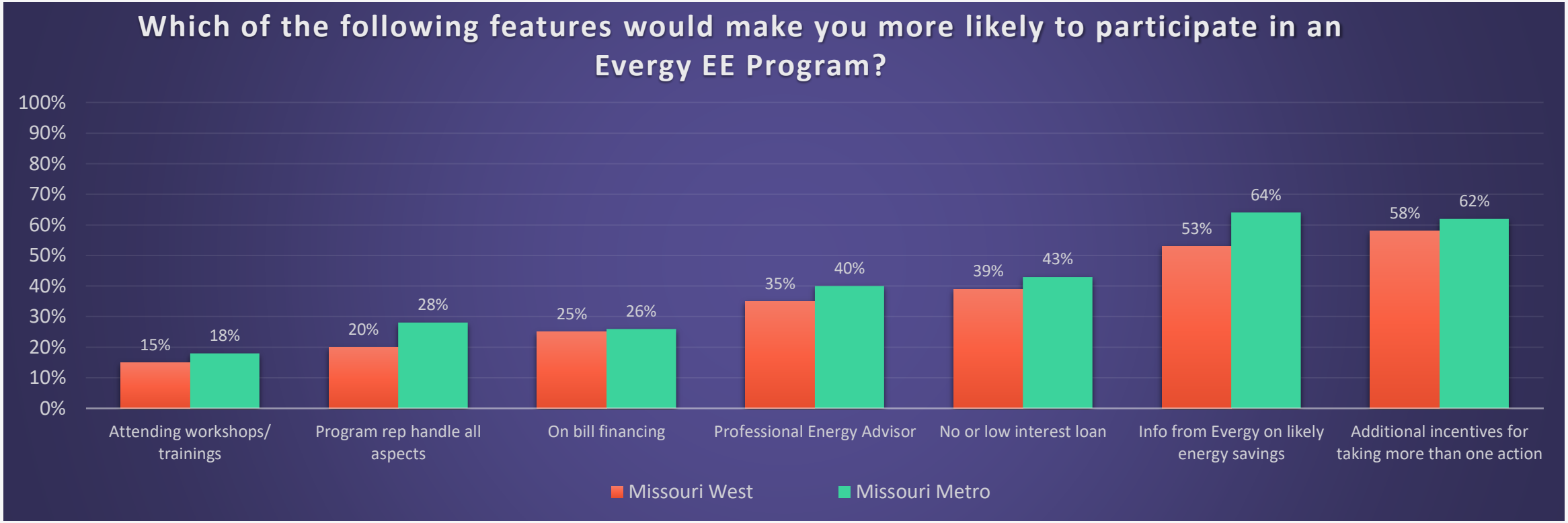
In-store discount lighting programs are the most popular among Missouri customers.

More than a third say they will not participate in any programs in the next two years.



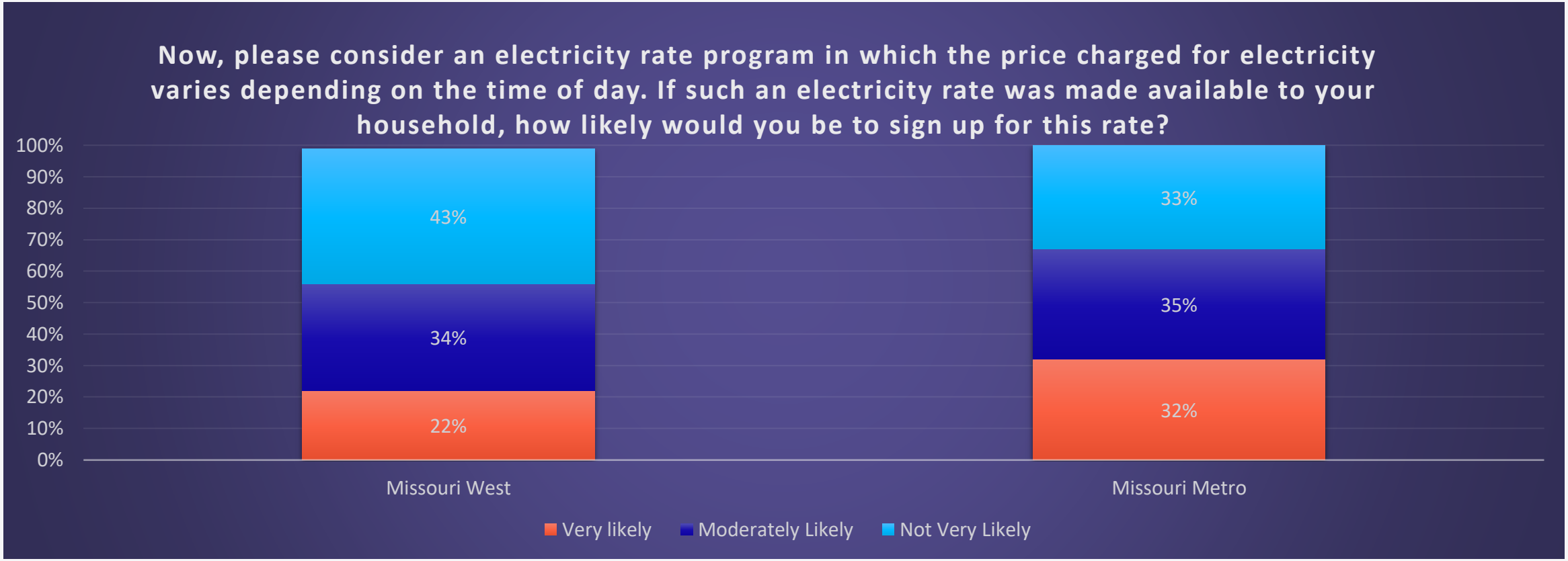
Program Features that Would Influence Participation

Bundled incentives that provide customers with additional savings for taking more than one EE action and information from Evergy on likely energy savings are the features most likely to influence participation.



Interest in Time-of-Day Rate

There is moderate interest in a time-of-day program, with Missouri Metro customers indicating a higher level of interest.

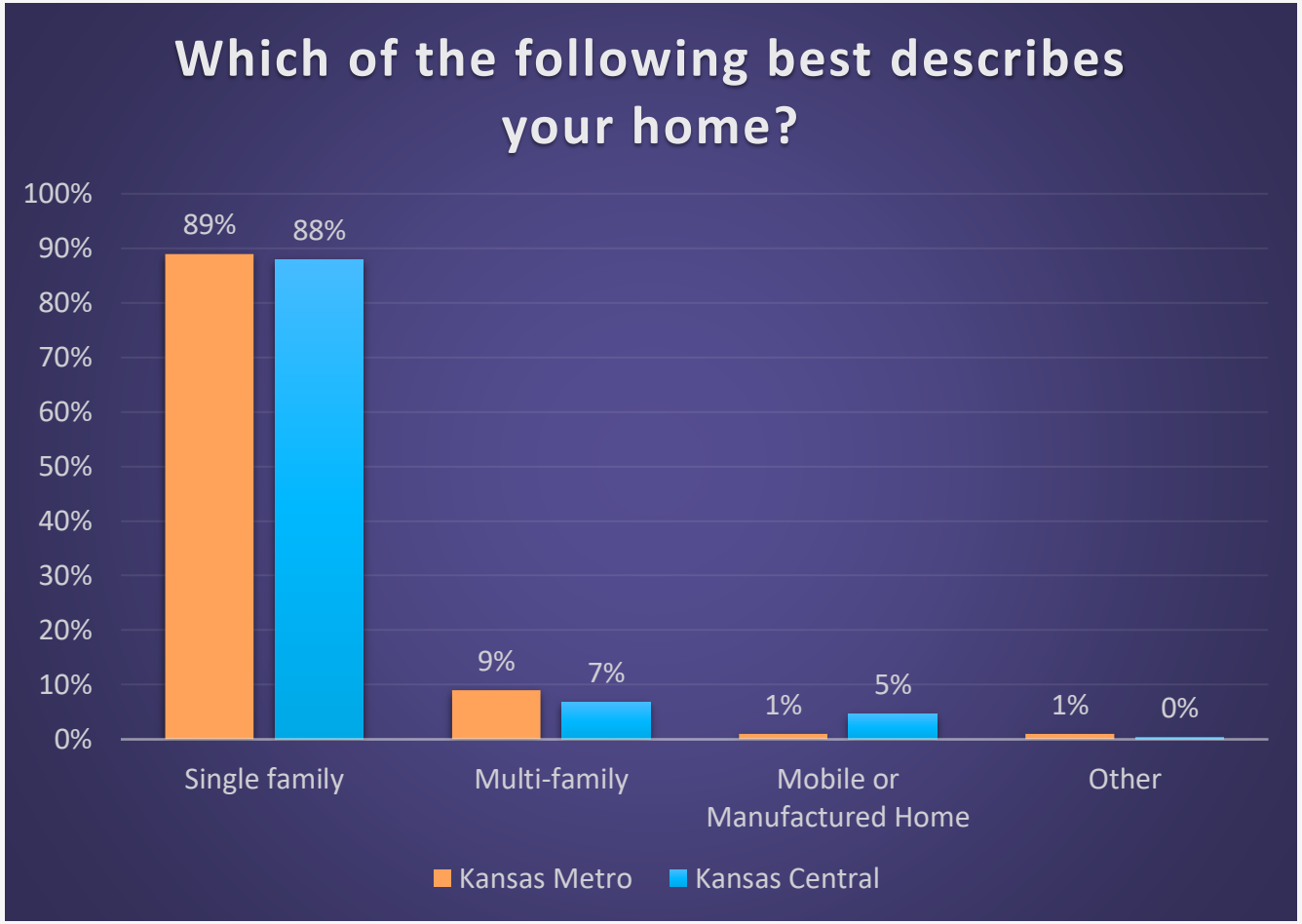


Kansas Customers

Type of Home

A large majority of Kansas customers live in single family homes.

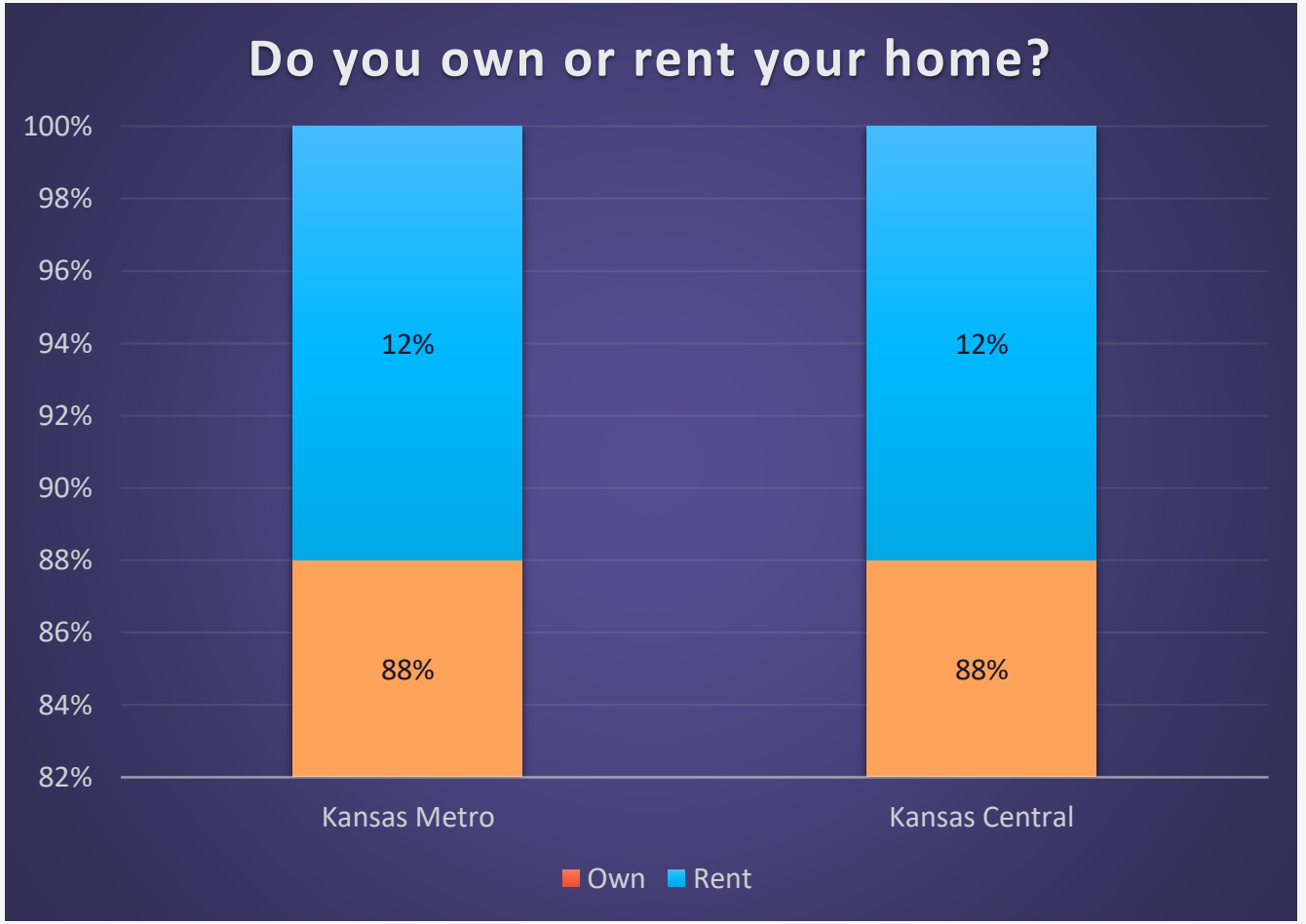
5% of Kansas Central customers live in a mobile or manufactured home.



Home Ownership

Home ownership among Kansas customers largely mirrors the proportion of customers living in single family homes.

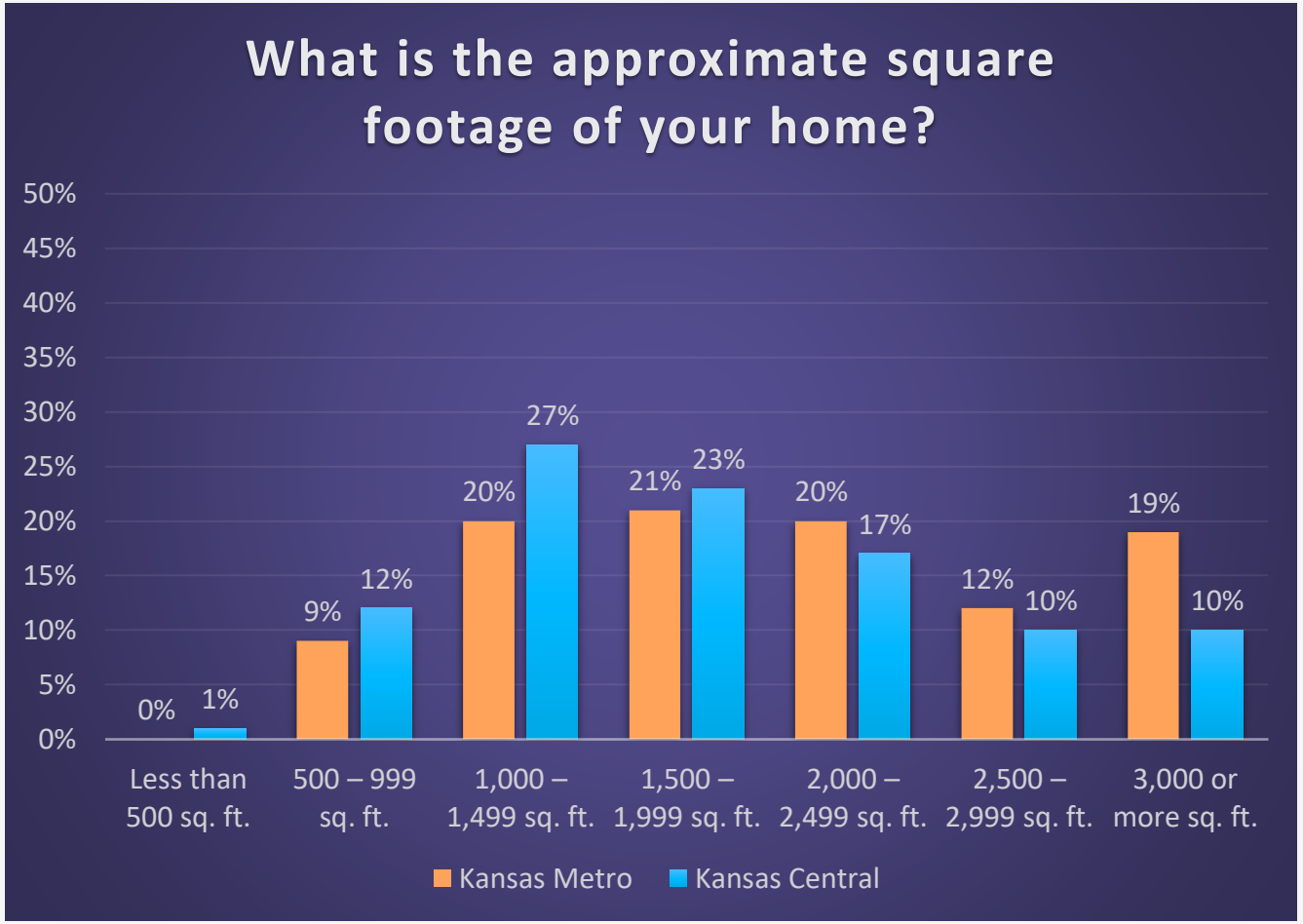
The proportion of customers who own their home has increased since 2019 with 74% of Metro and 76% of Central customers owning homes at that time.



Size of Home — All Homes

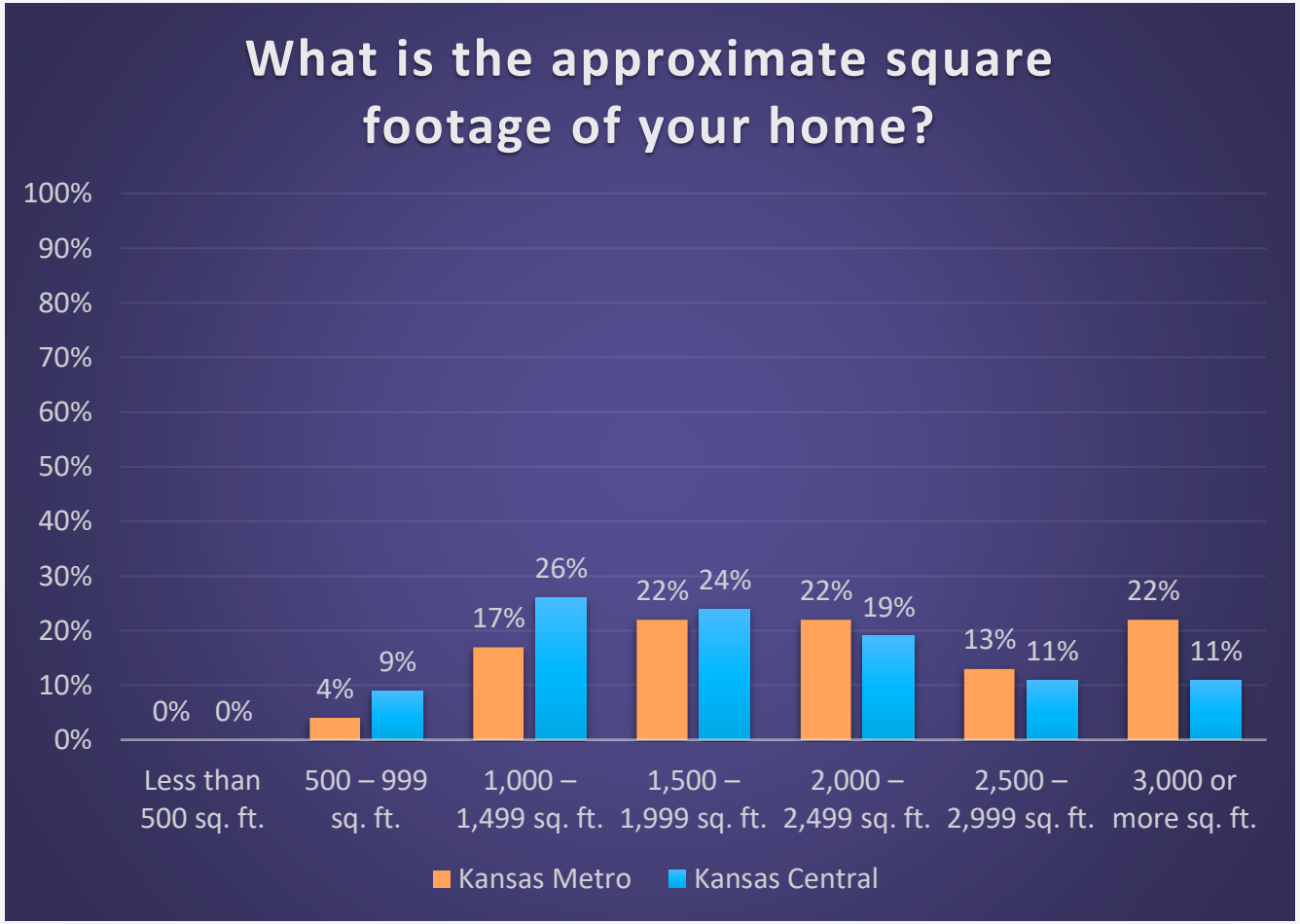
More than a third of Kansas Central customers live in homes less than 1,500 square feet.

While the majority of Kansas Metro customers live in homes larger than 2,000 square feet.



Size of Home — Single Family

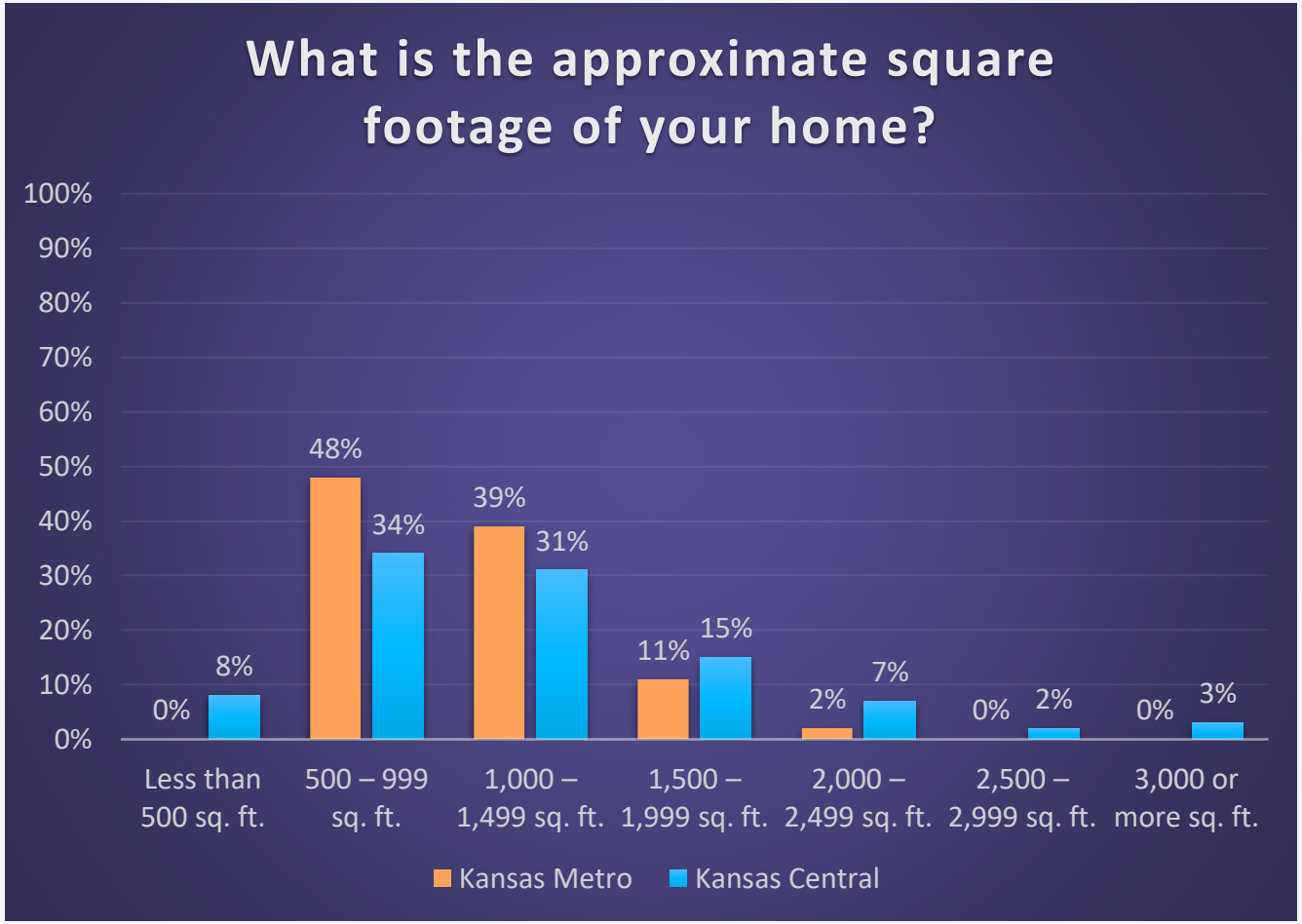
Not surprisingly, given the large proportion of Kansas customers residing in single-family homes, square footage of single-family homes is very similar to the entire Kansas population shown in the previous slide.



Size of Home — Multi-Family

The majority of multi-family homes in Kansas are less than 1,500 square feet.

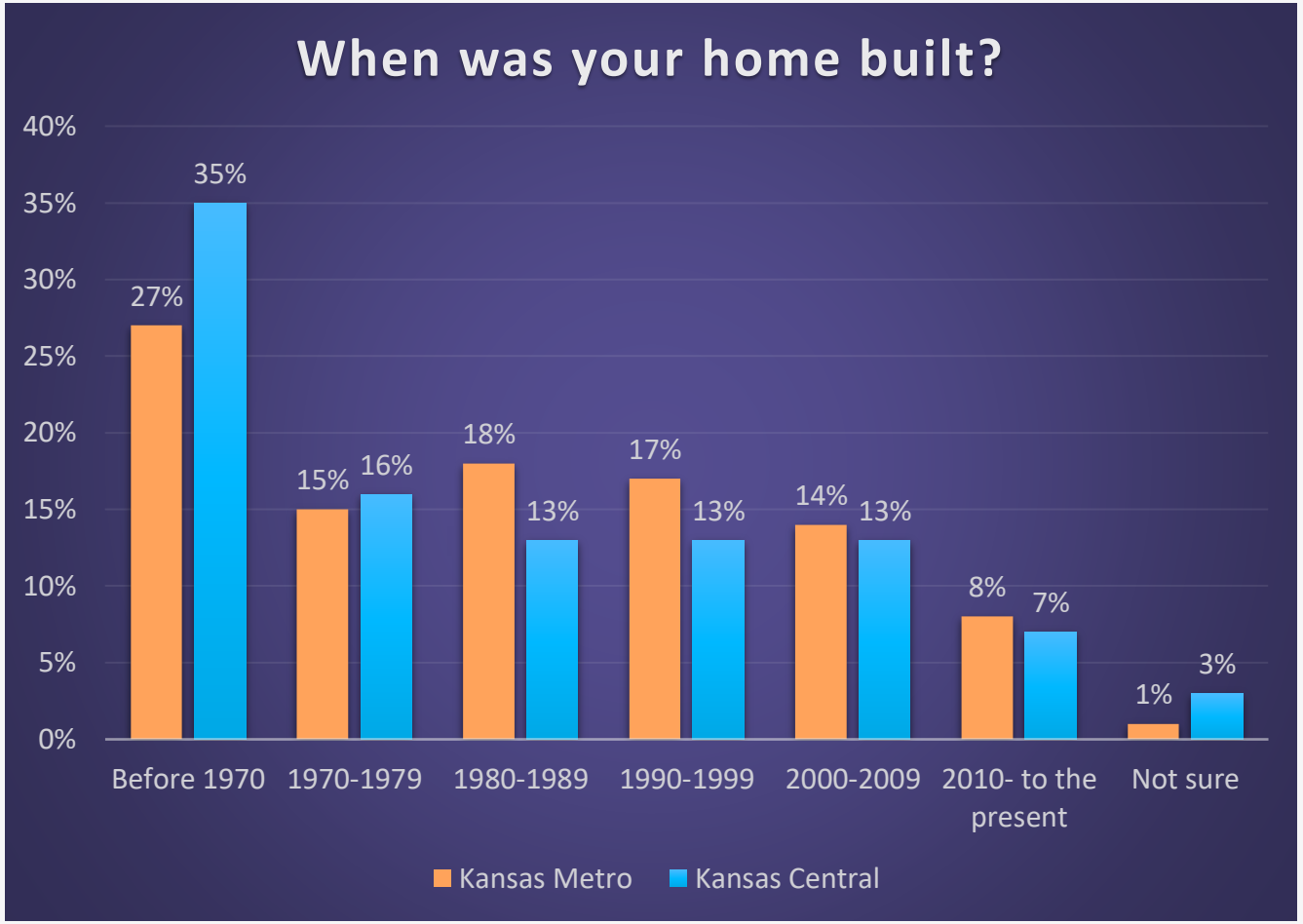
Kansas Metro customers tend to live in smaller multi-family homes compared to Kansas Central customers.



Age of Home

More than a quarter of Kansas Metro and more than a third of Kansas Central customers live in homes built before 1970.

Only 7-8% of Kansas homes have been built in the last 12 years.

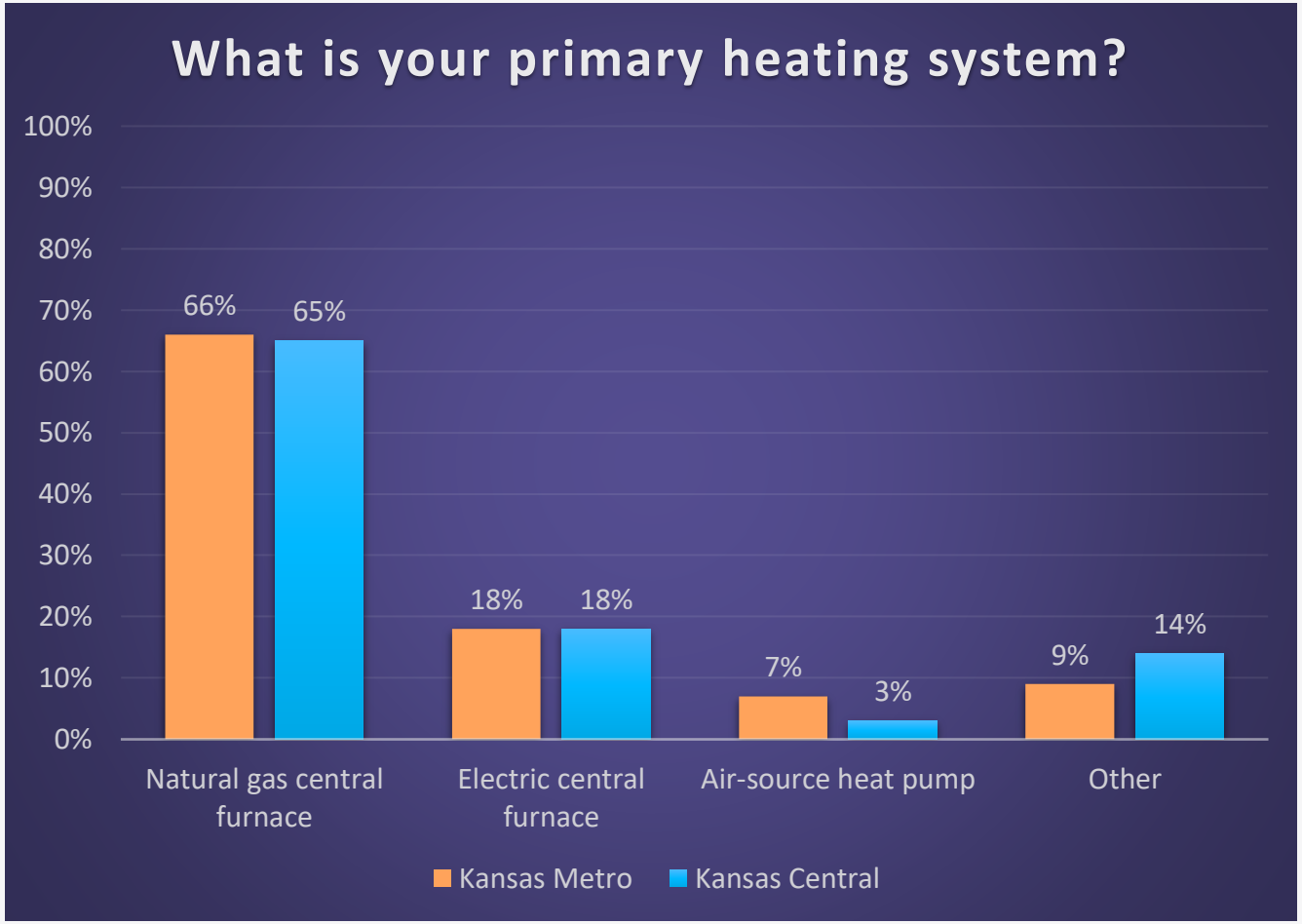


Heating, Cooling, and Water Heating

Primary Heating System

About two-thirds of Kansas customers have natural gas central furnaces as their primary heating system.

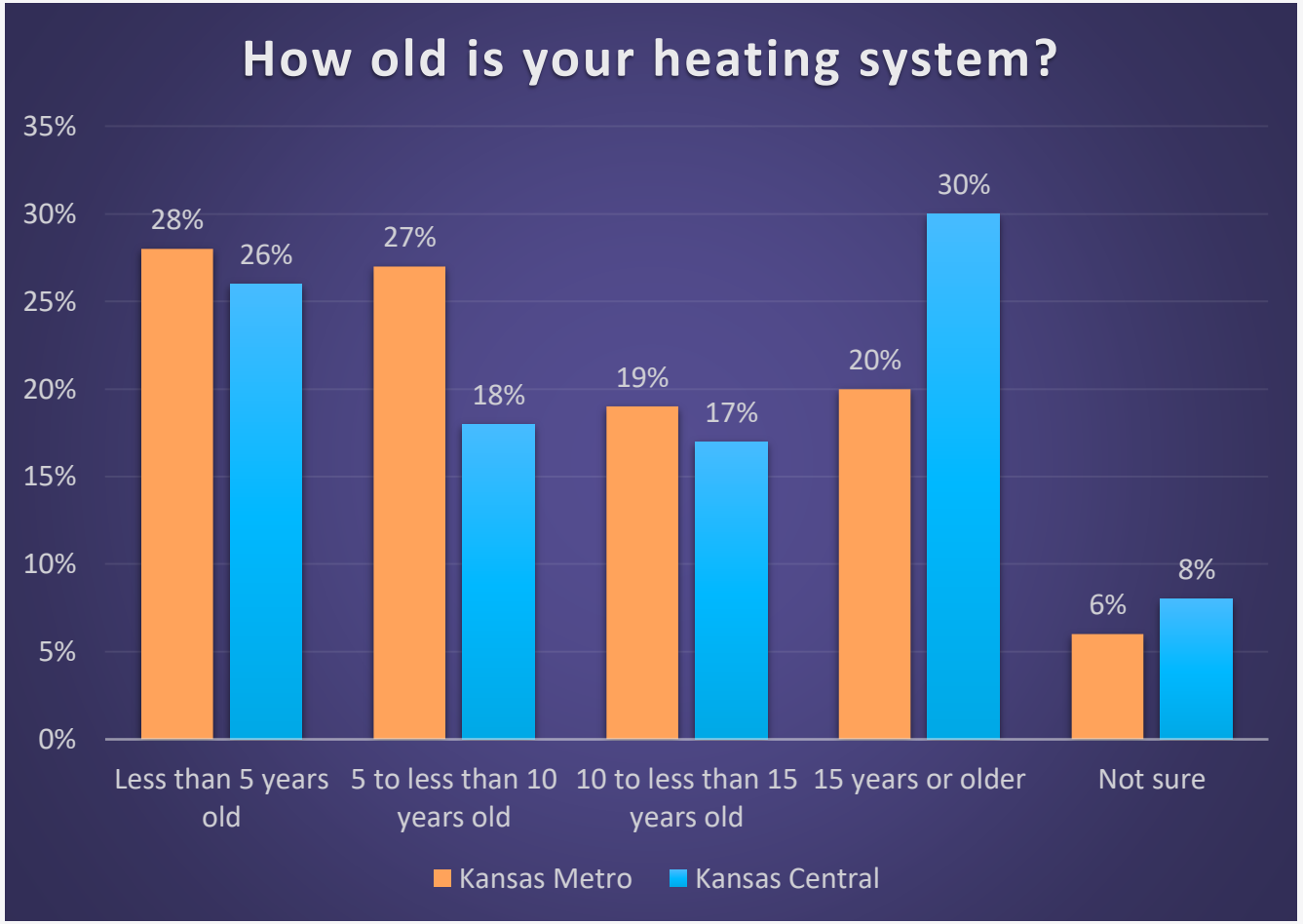
The saturation of electric central furnaces has decreased since 2019, from 30% (Metro) and 25% (Central).



Age of Heating System

Kansas Central has a significant opportunity for EE HVAC programs, with 30% of households having a heating system near the end of its useful life.

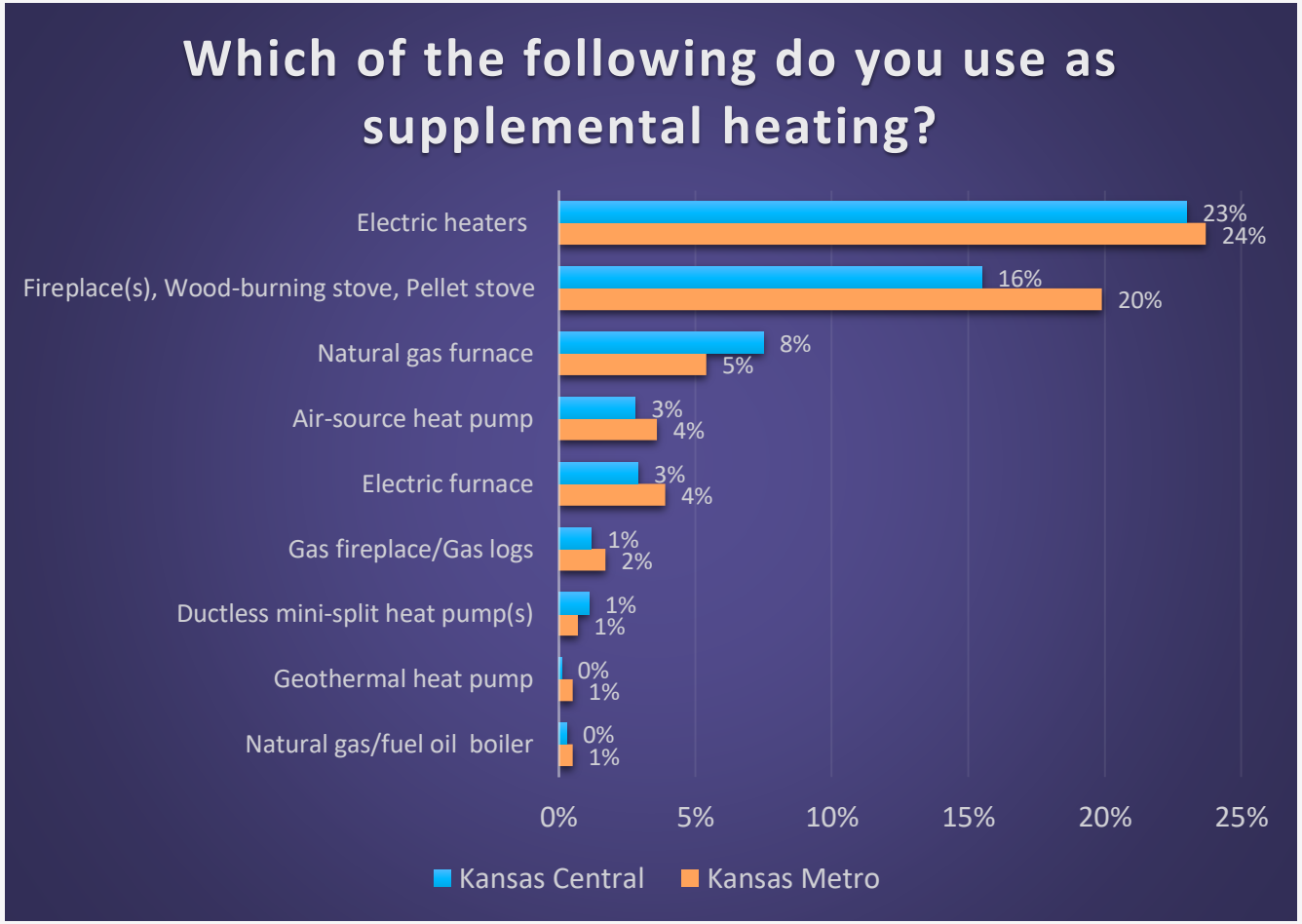
20% of Kansas Metro customers have a heating system that is nearing replacement.



Secondary Heating System

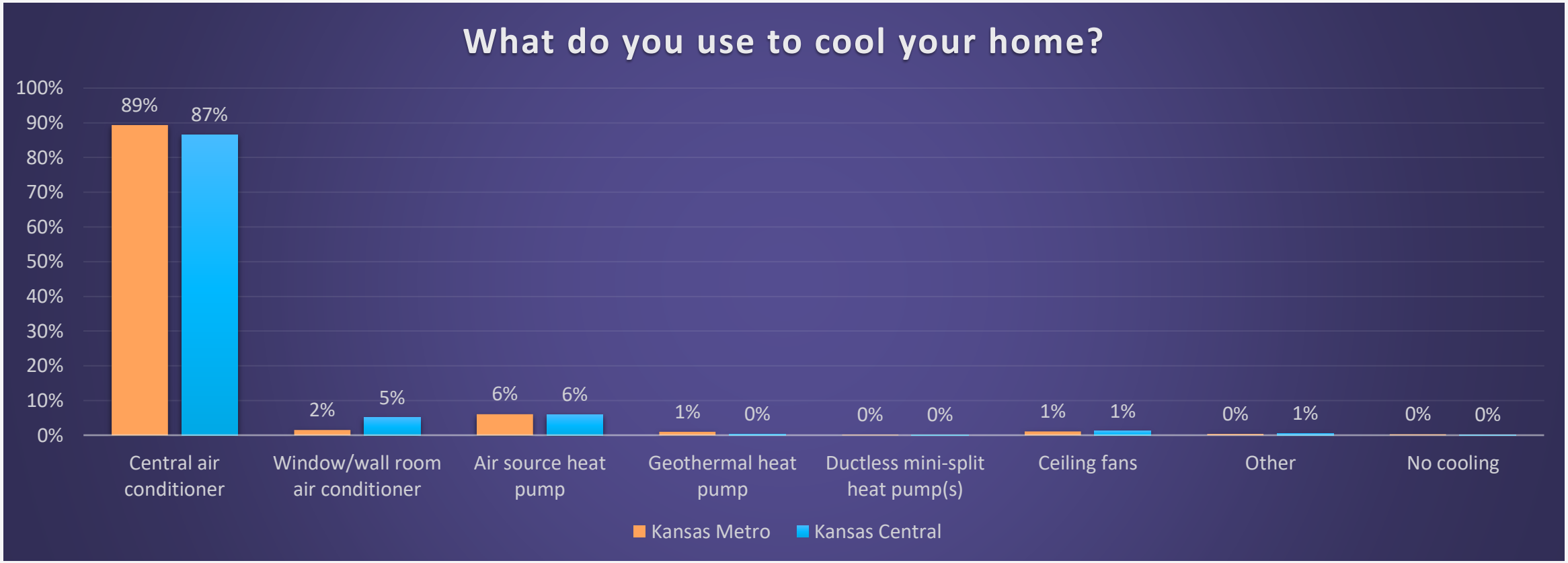
Electric heaters are the secondary heating system used by about one quarter of Kansas customers.

Fireplaces, wood-burning stoves and pellet stoves are second choice for 16 – 20% of Kansas households.



Primary Cooling System

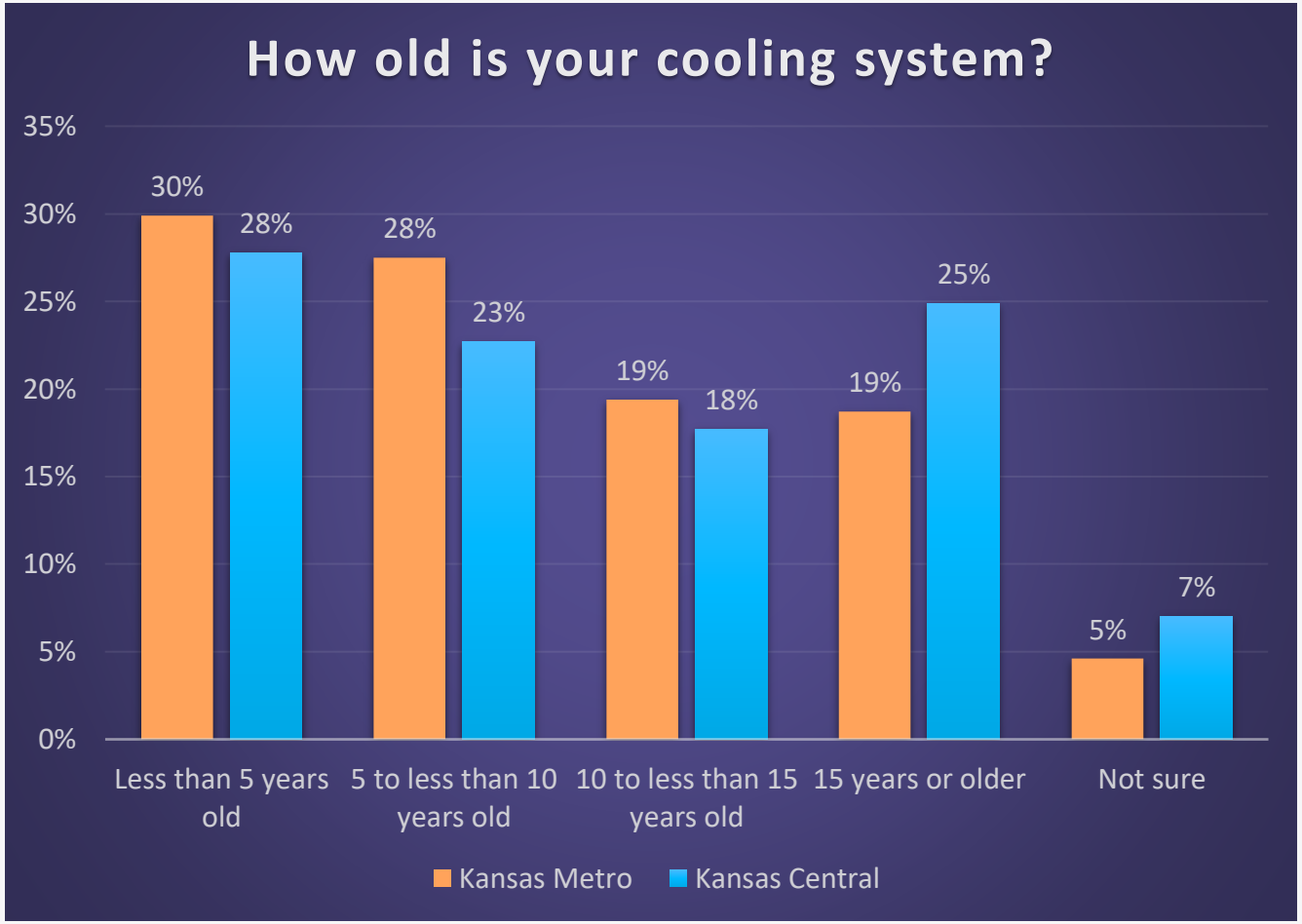
Most Kansas customers have central air conditioning. Very few rely on window/wall units.



Age of Cooling System

Over half of cooling systems in Kansas are less than 10 years old.

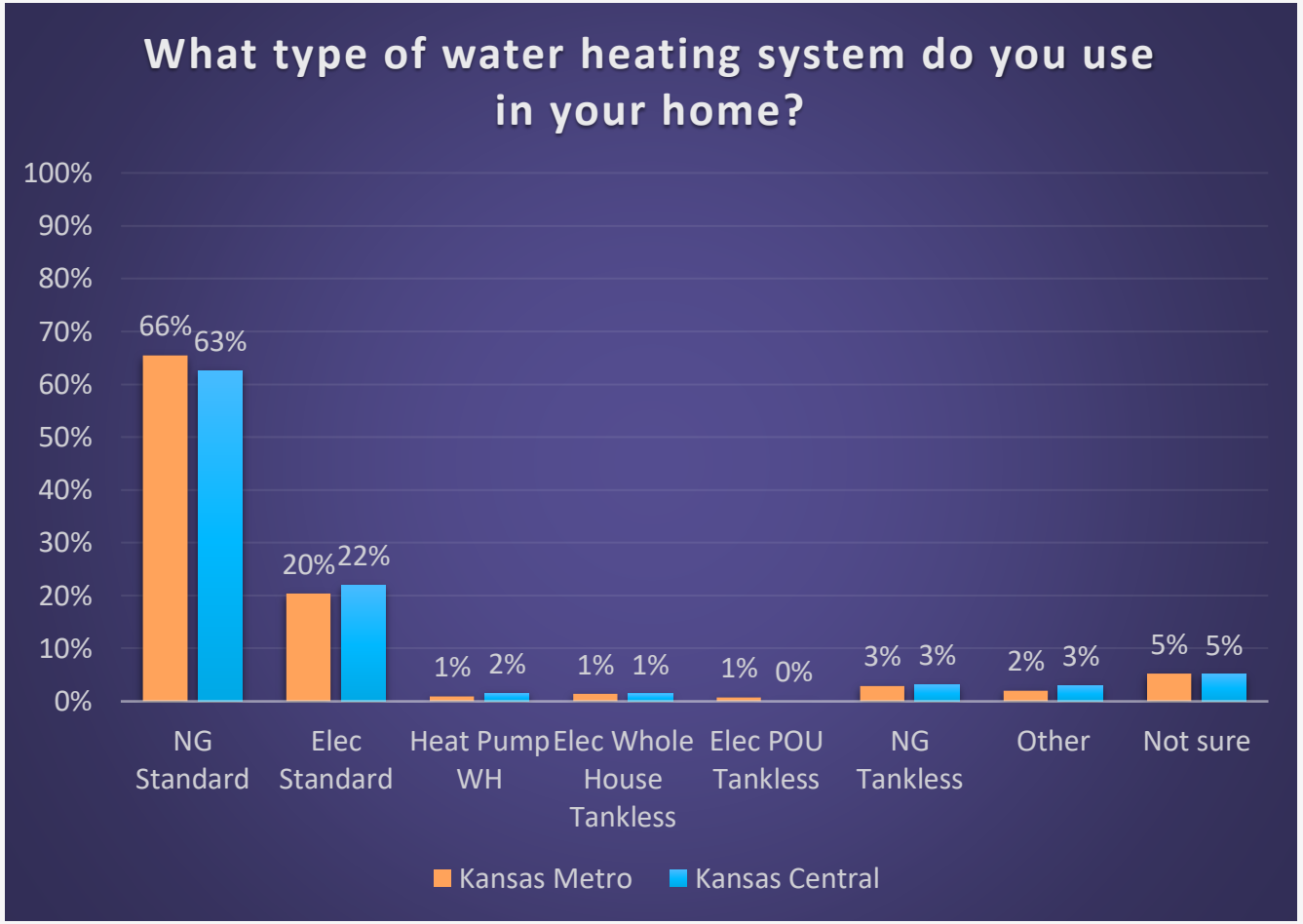
A quarter of Kansas Central customers and 19% of Kansas Metro customers have cooling systems nearing replacement.



Type of Water Heater

Natural gas is the primary fuel used for water heating in Kansas; 69% of Kansas Metro and 65% of Kansas Central customers have natural gas water heaters.

Few Kansas customers have newer technologies such as heat pump water heaters or tankless systems.

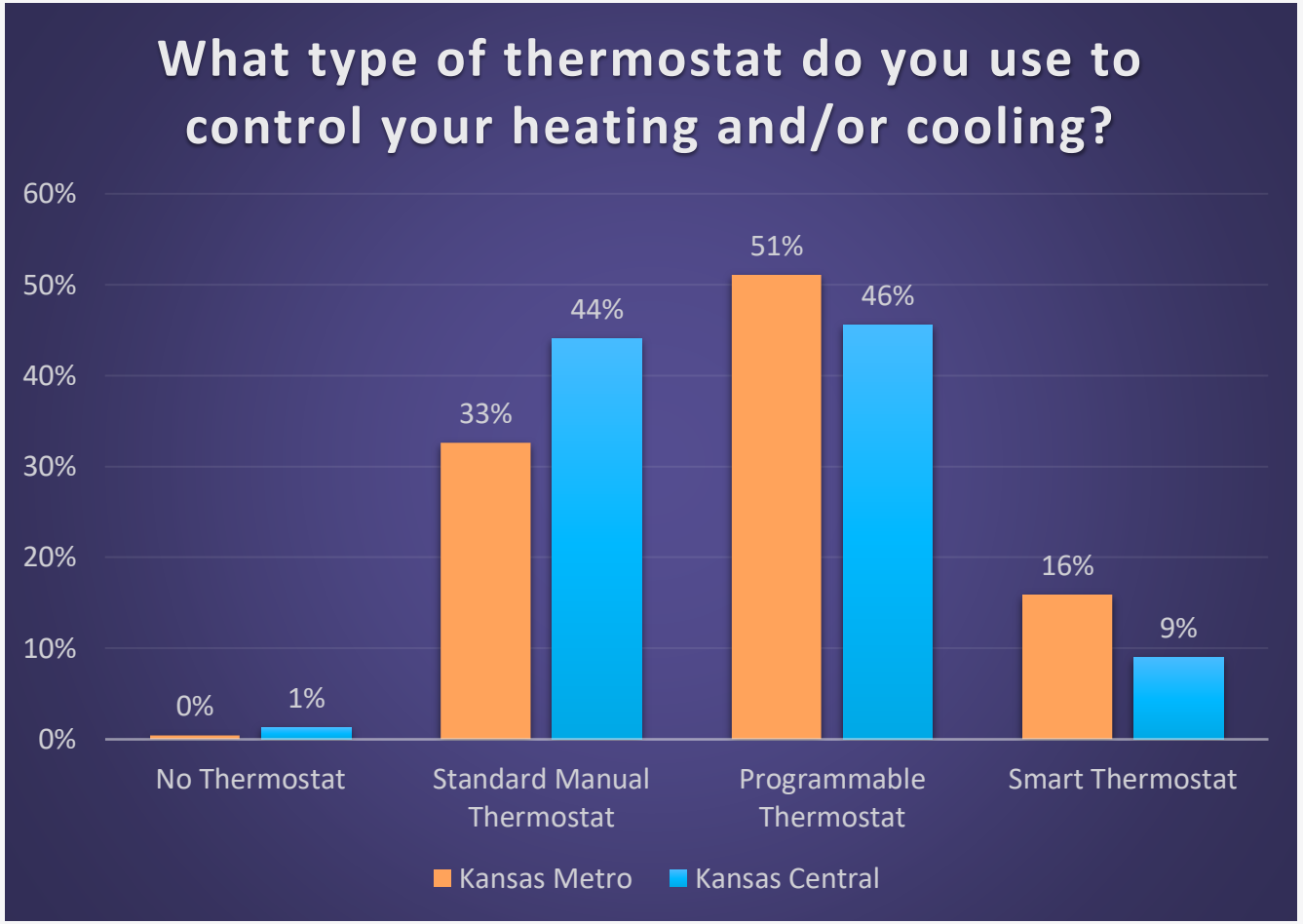


Thermostat

Type of Thermostat

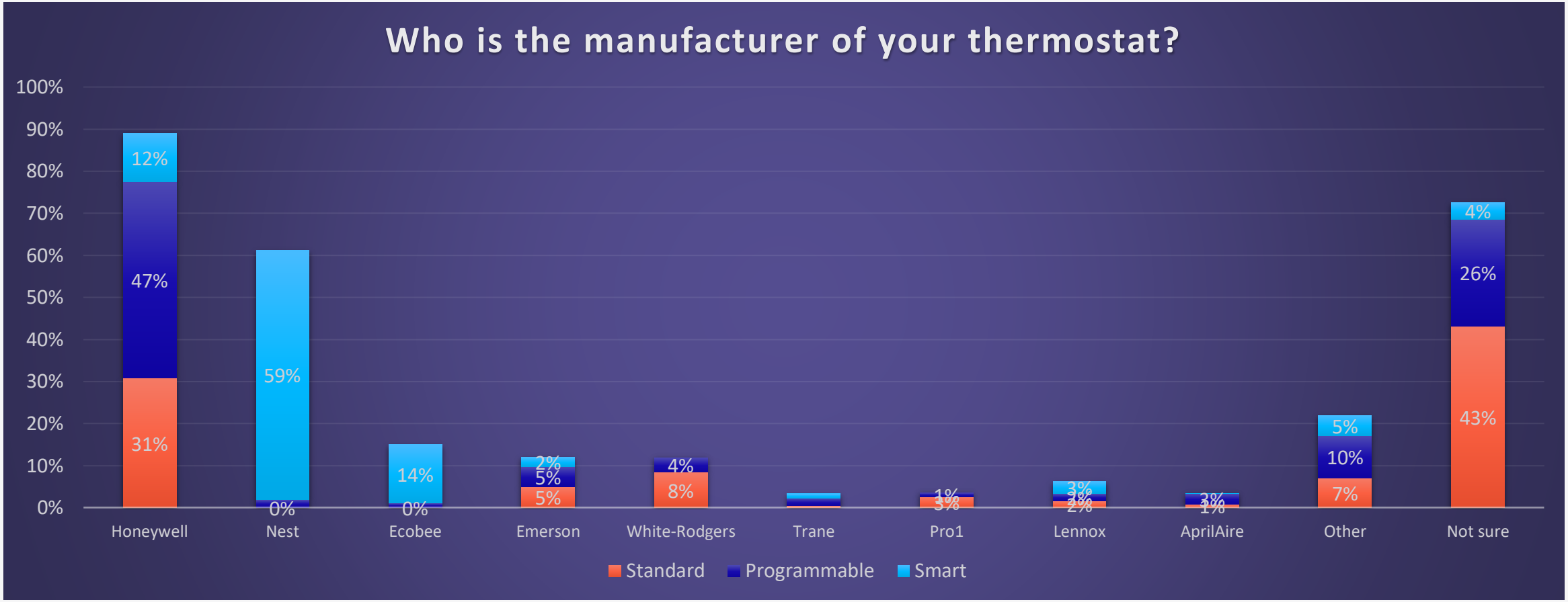
Over a third of Kansas Metro customers and 44% of Kansas Central customers have standard manual thermostats.

54% to 67% of customers have programmable/smart thermostats which is significantly higher than 2019 when 43% of customers in Evergy' s service territory (including Missouri customers) had programmable thermostats.



Type of Thermostat by Manufacturer

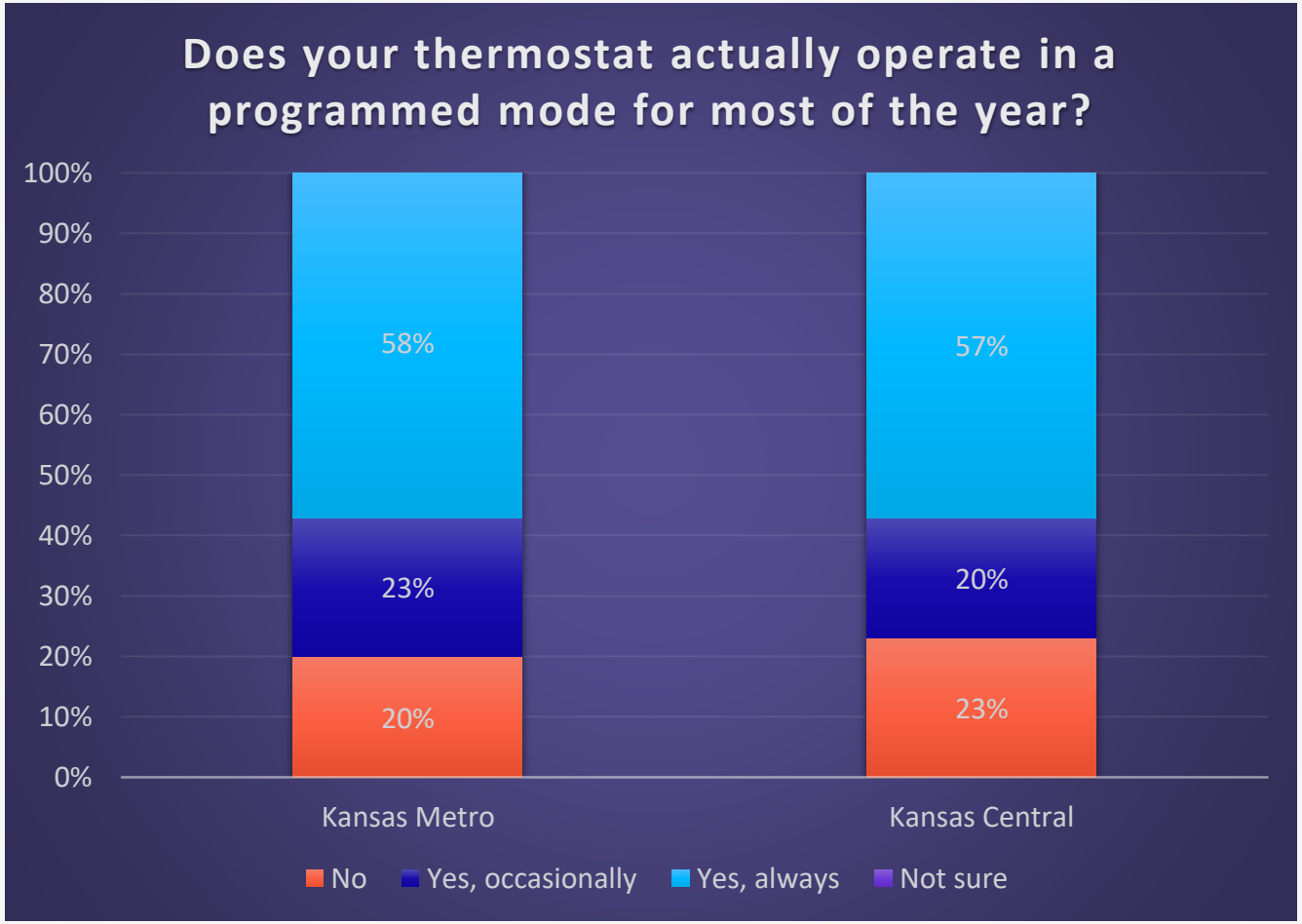
Based on the response to the thermostat manufacturer question, respondents appear to correctly identify their type of thermostat.



Programmable Thermostat Use

More than half of Kansas customers always operate their thermostat in programmed mode.

There is an opportunity with the remaining 43% for customer education on how to operate their heating and cooling systems more efficiently.



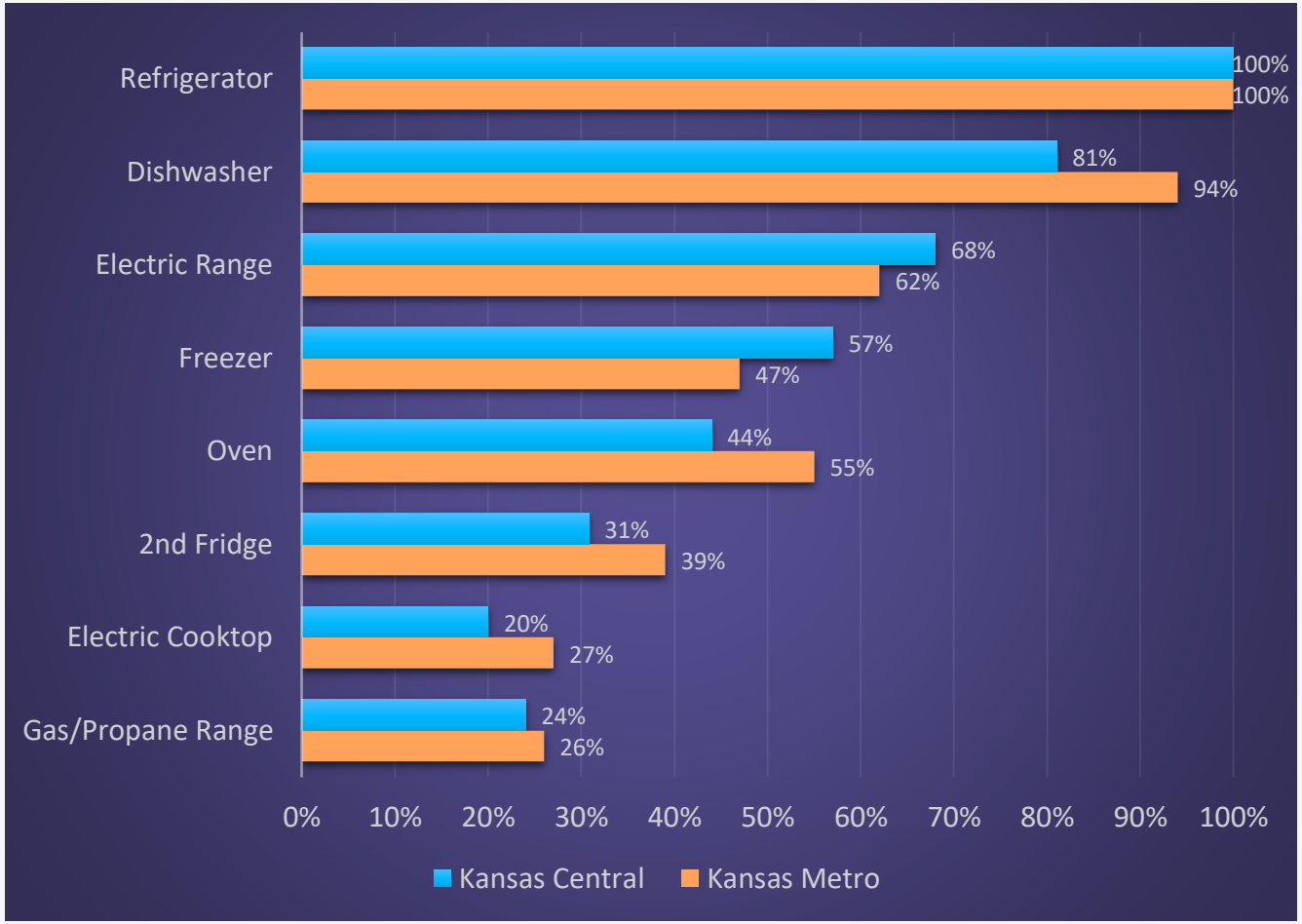
Appliances and Electronics

Kitchen Appliances

The majority of Kanas customers have a refrigerator, dishwasher and electric range.

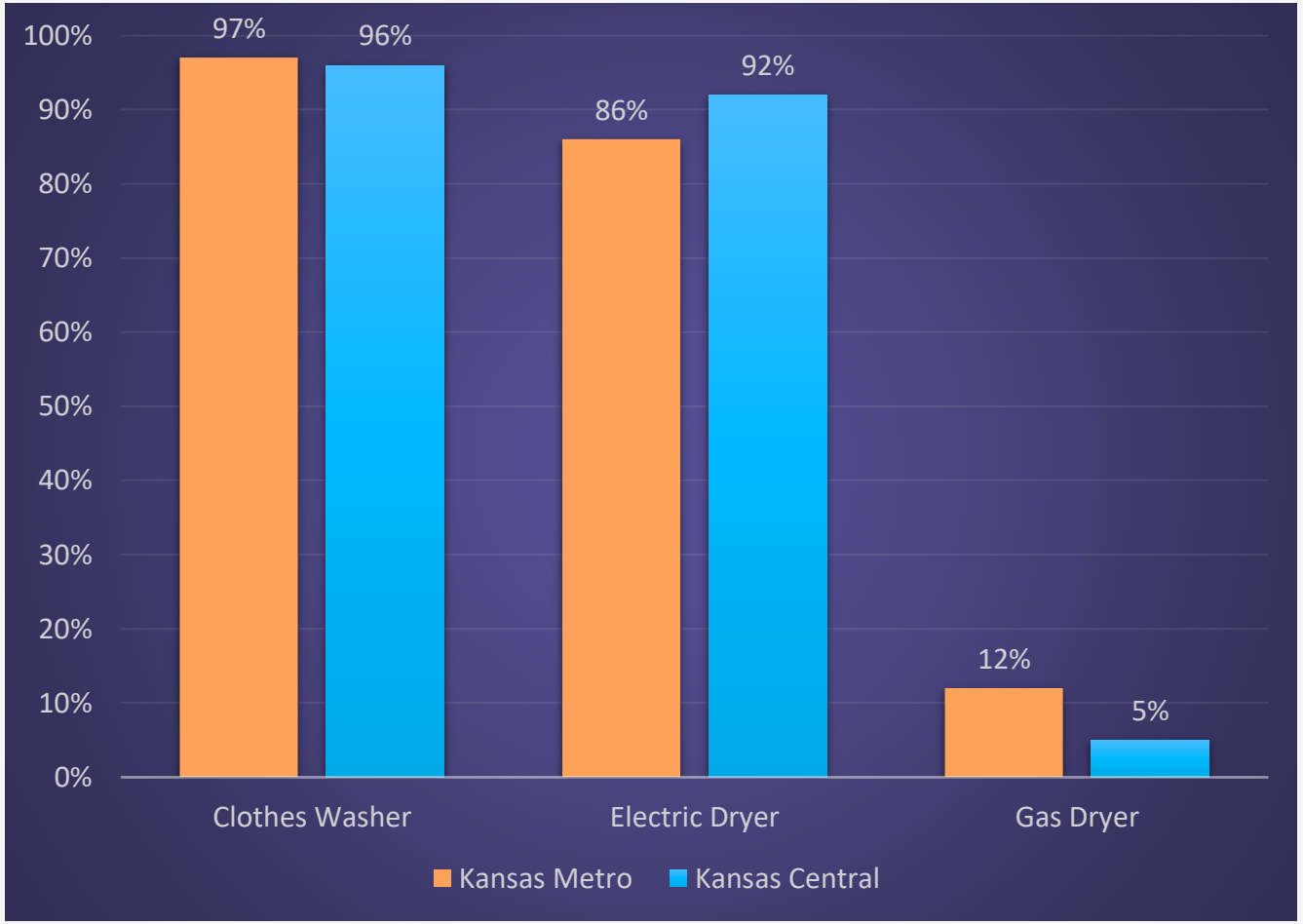
39% of Kansas Metro and 31% of Kansas Central customers have a second fridge.

57% of Kansas Central and 47% of Kansas Metro customers have a stand-alone freezer.



Laundry Equipment

A large majority of Kansas customers have a clothes washer and an electric dryer.

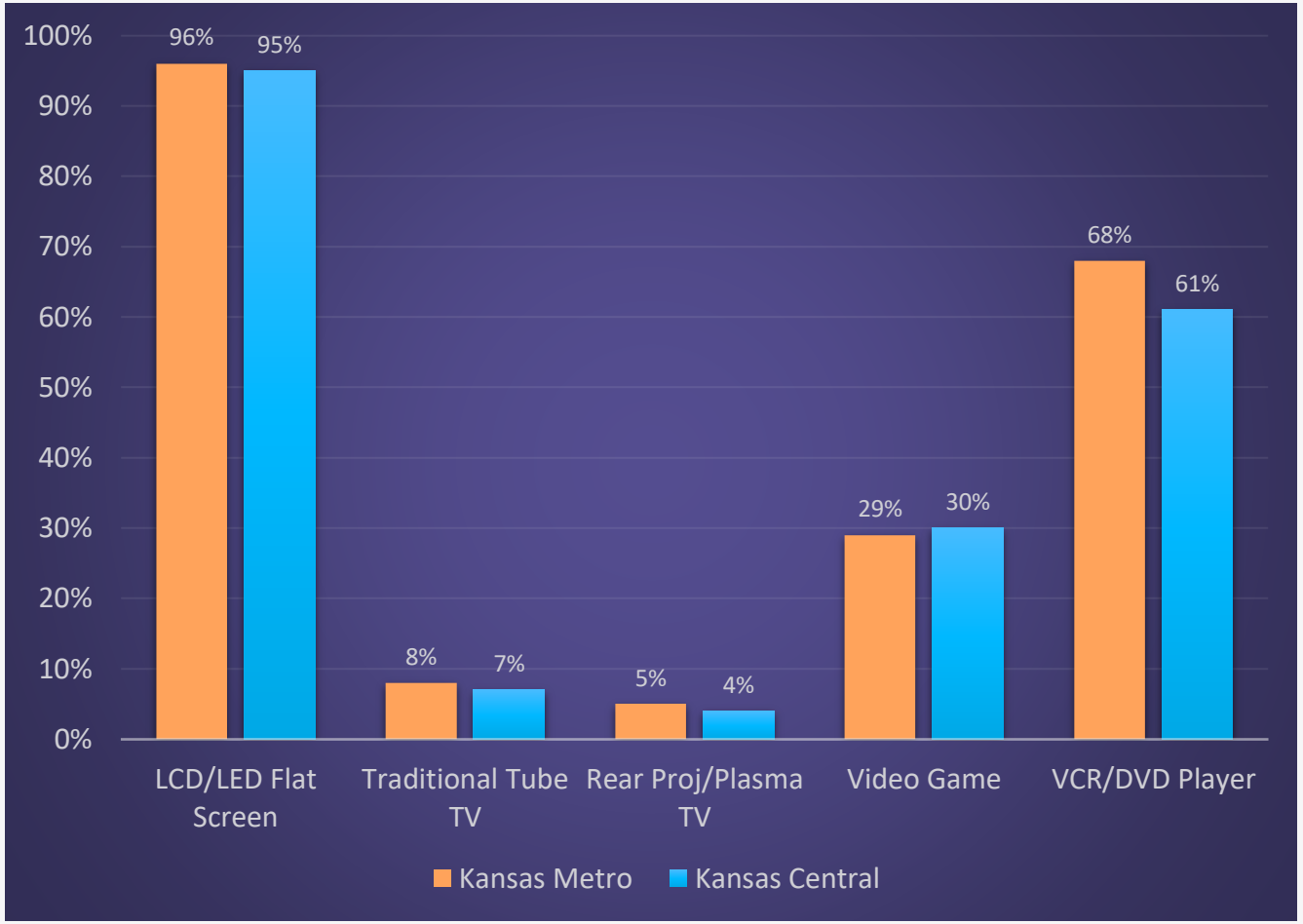


Entertainment Equipment

The mean number of TVs is 3 in Kansas Metro households and 2 in Kansas Central households. The vast majority of those are LCD/LED flat screen.

Less than third have video game consoles.

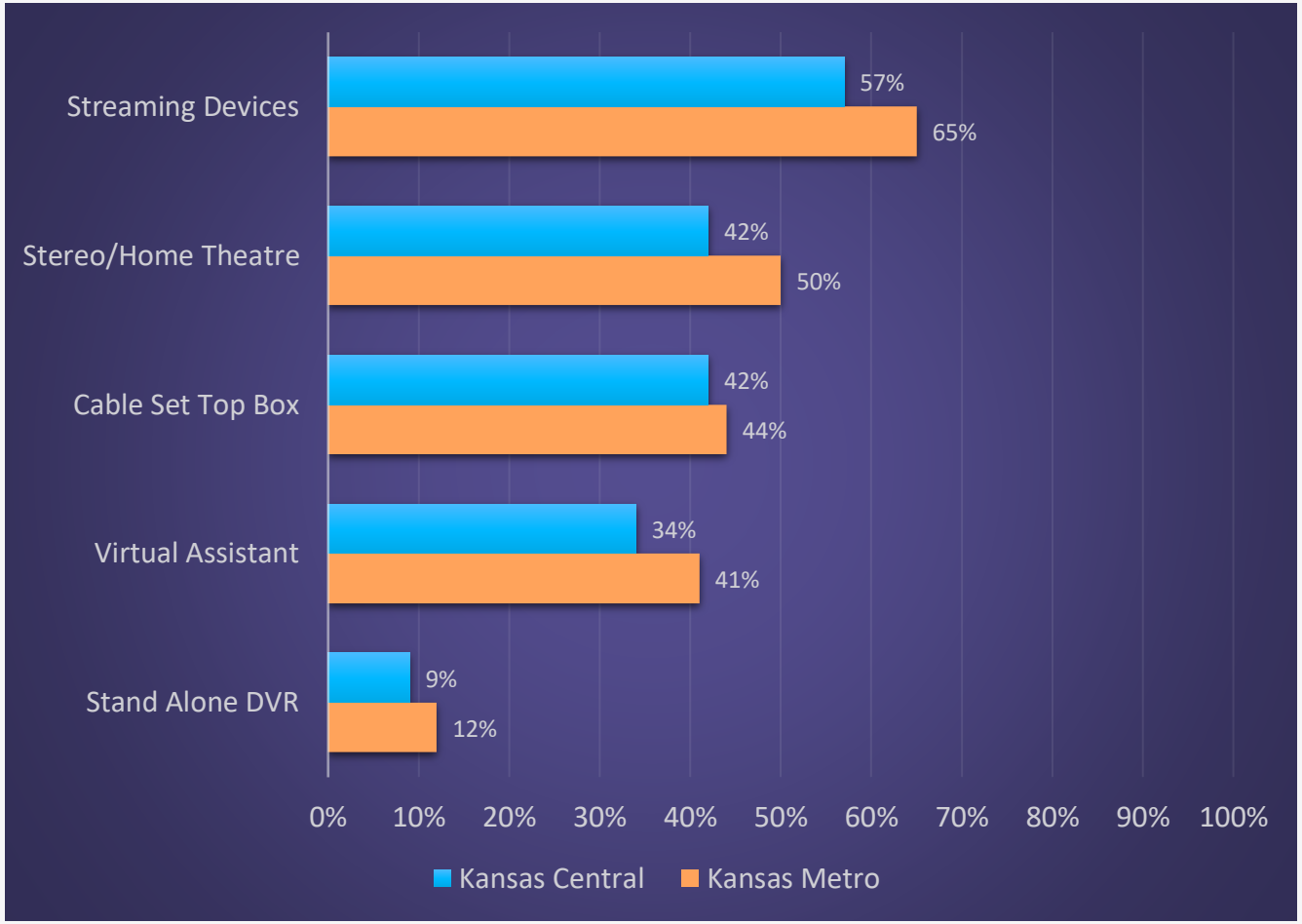
68% of Kansas Metro and 61% of Kansas Central customers have a VCR/DVD player.



Electronic Accessories

Streaming devices have shown significant growth since 2019, up from 48% of Kansas Metro and 39% of Kansas Central households.

The saturation of virtual assistants has also increased. In 2019 29% of Kansas Metro and 21% of Kansas Central customers had virtual assistants.

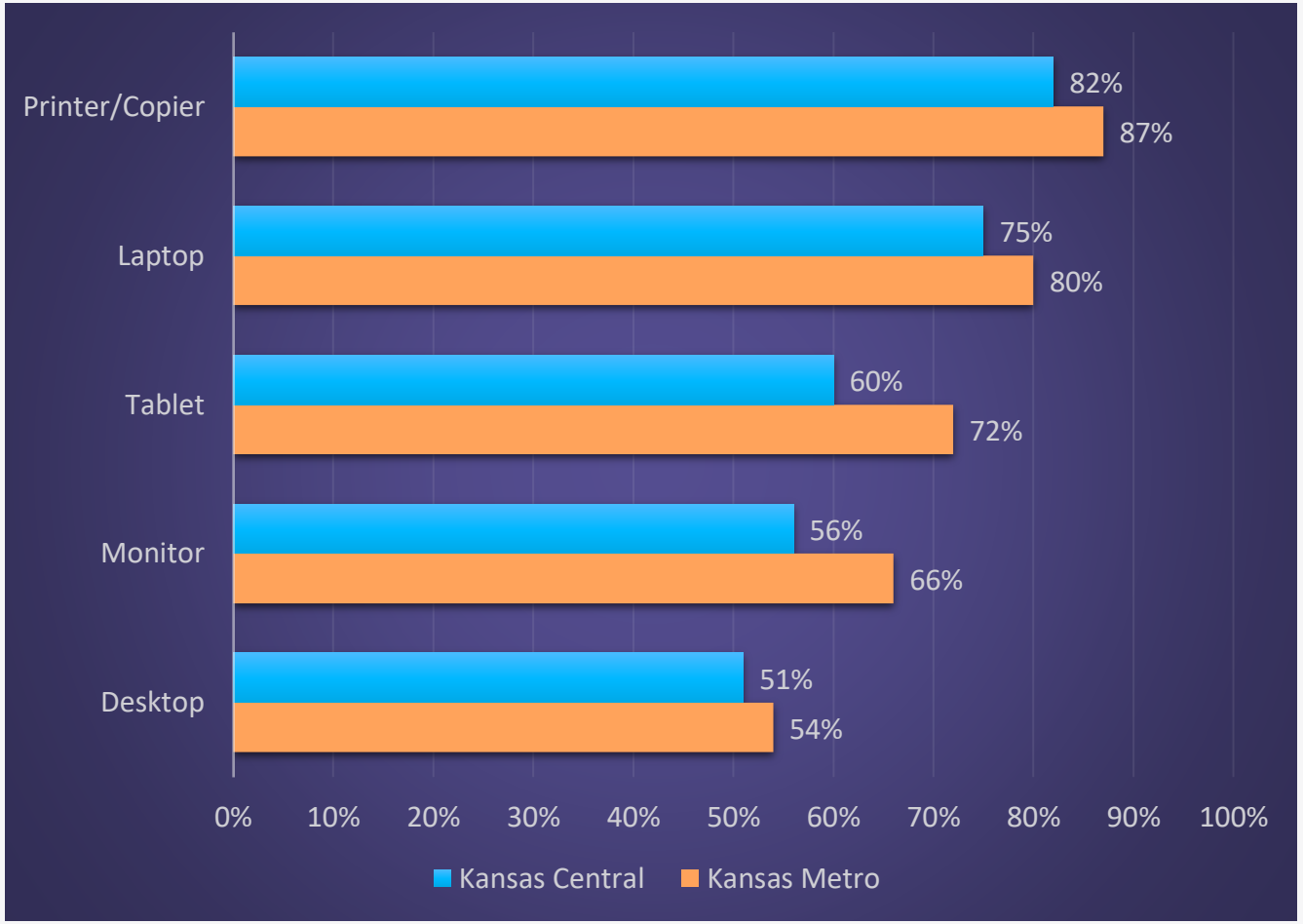


Computer and Office Equipment

Computer and office equipment is prevalent in most Kansas homes.

Most equipment in this category has seen an increase since 2019, with monitors showing the largest growth.

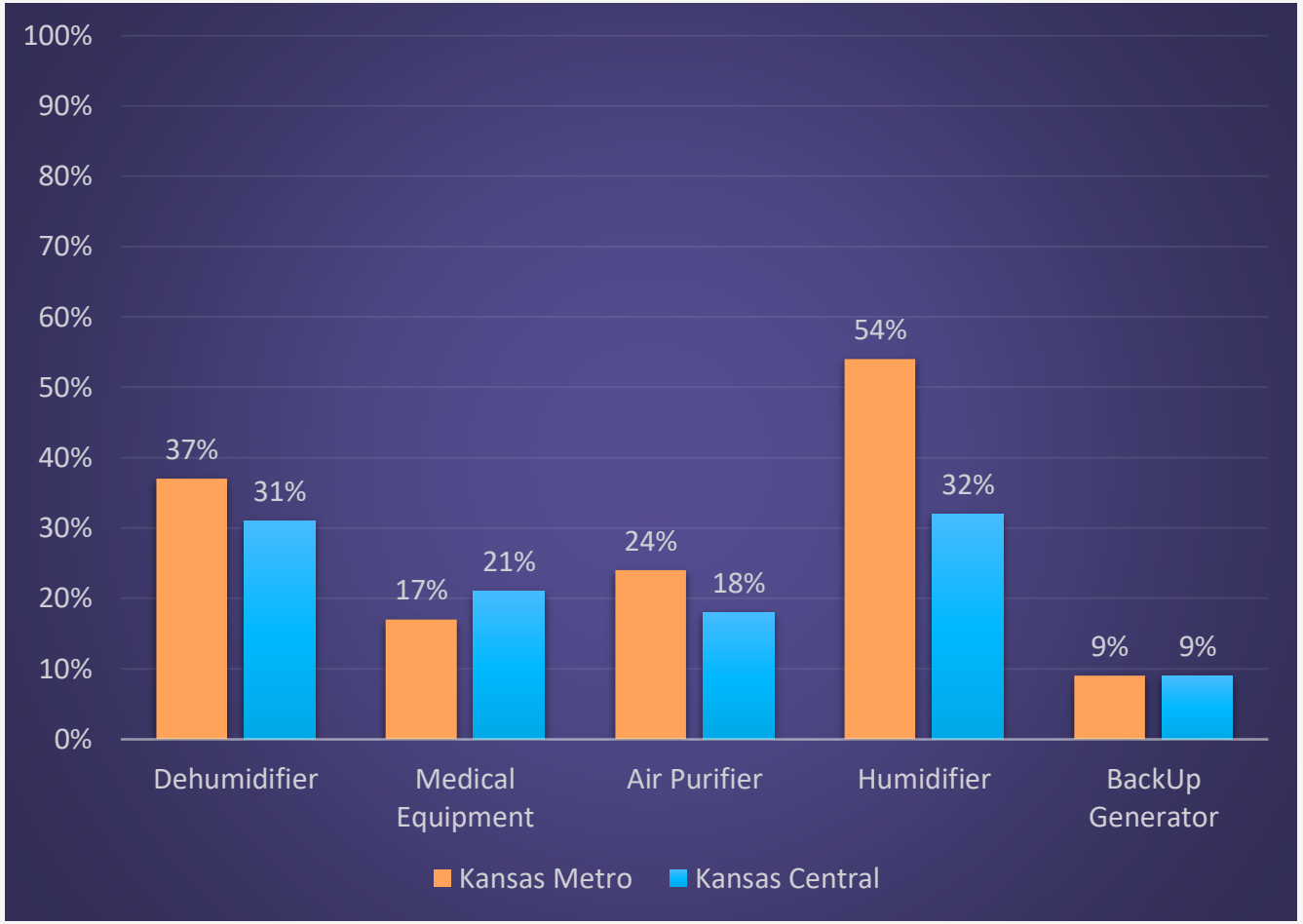
In 2019, 46% of Kansas Central and 53% of Kansas Metro customers had monitors.



Other Types of Equipment

Over half of Kansas Metro customers have a humidifier, while 37% have a dehumidifier.

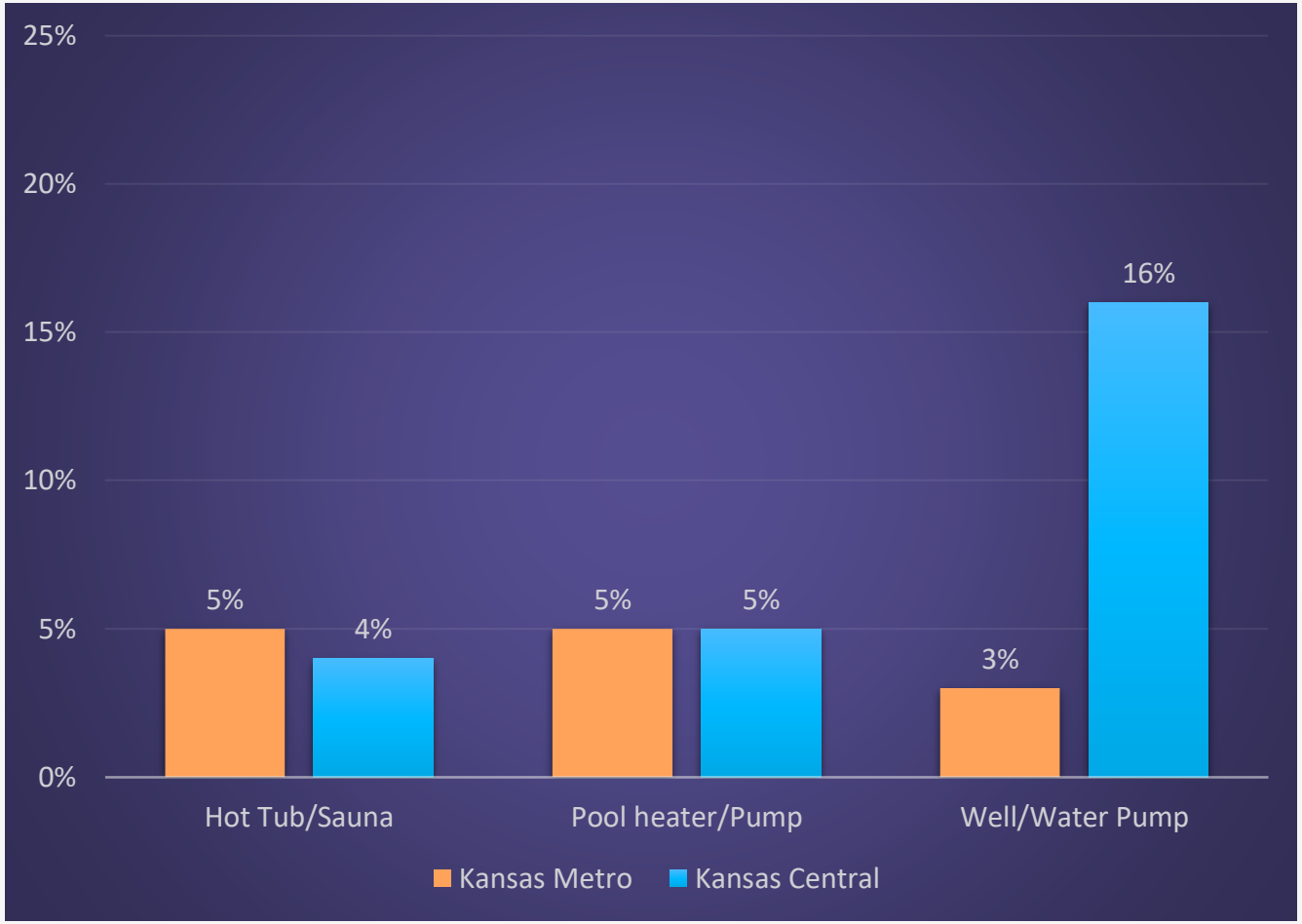
A little under a third of Kansas Central customers have humidifiers and/or dehumidifiers.



Pools, Pumps and Spas

16% of Kansas Central customers have a well/water pump.

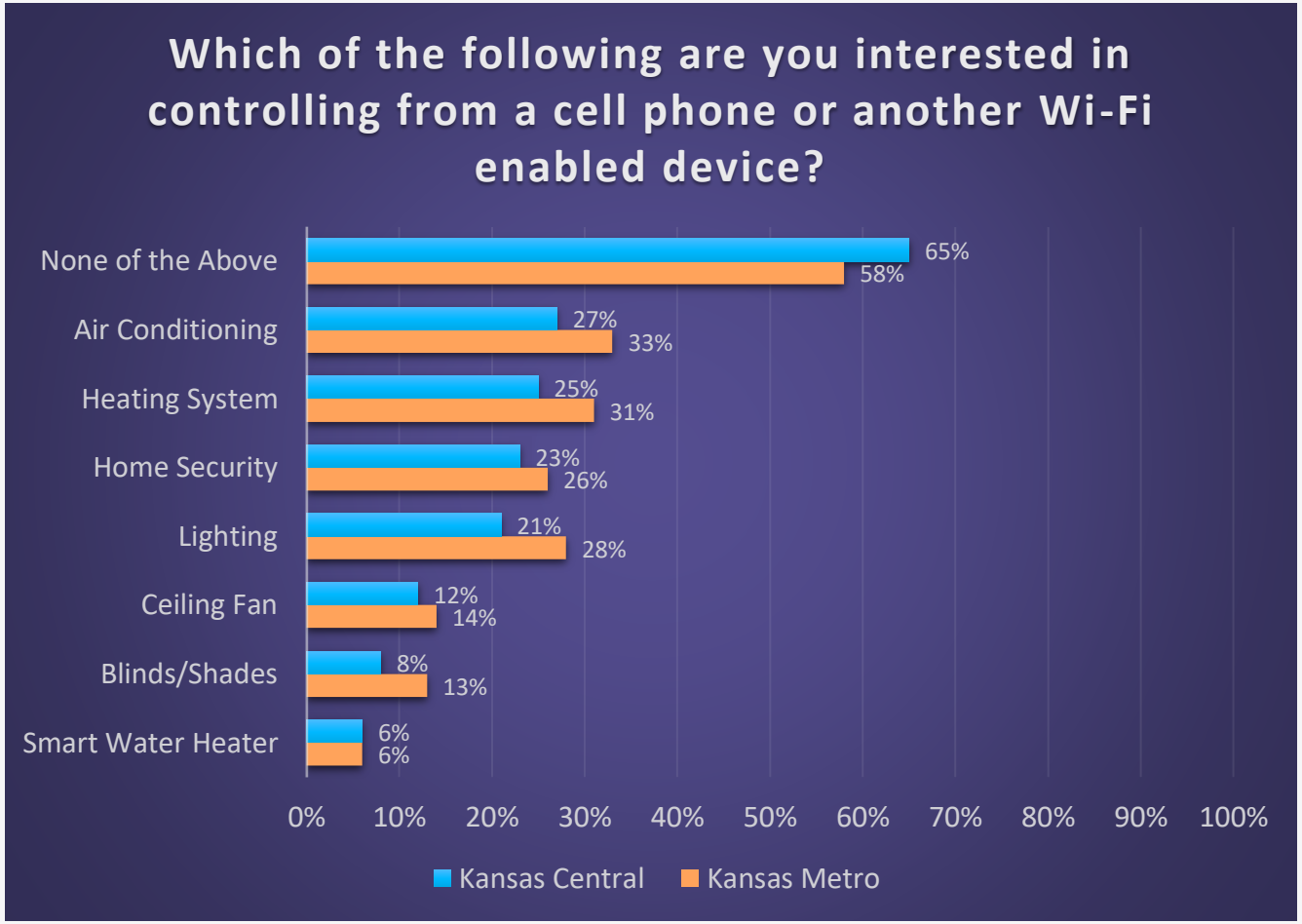
5% or fewer customers in Kansas have hot tubs, saunas or pools.



Interest in Smart Controls

The majority of Kansas customers are not interested in smart controls.

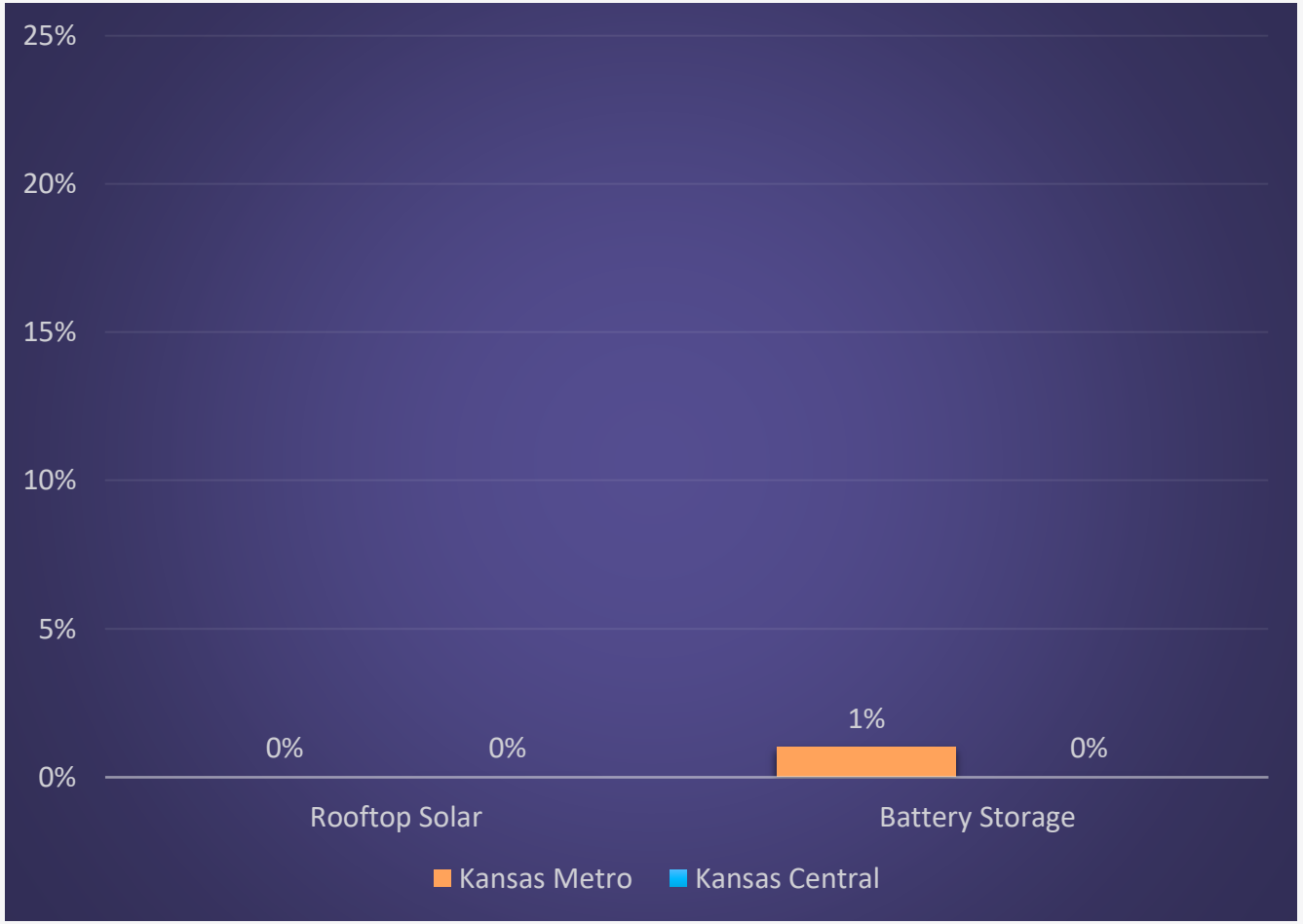
Customers who are interested want to control their HVAC, home security and lighting.



Solar and Electric Vehicles

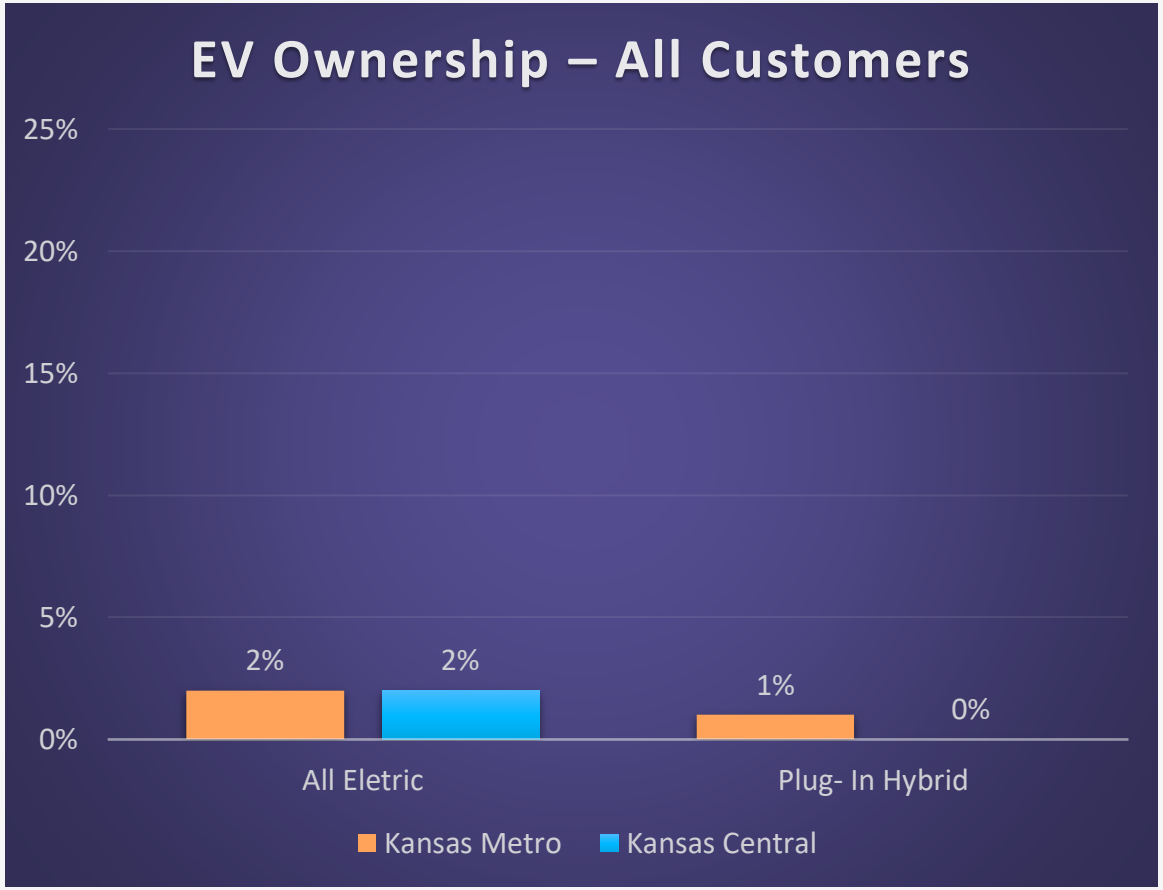
Rooftop Solar and Battery Storage

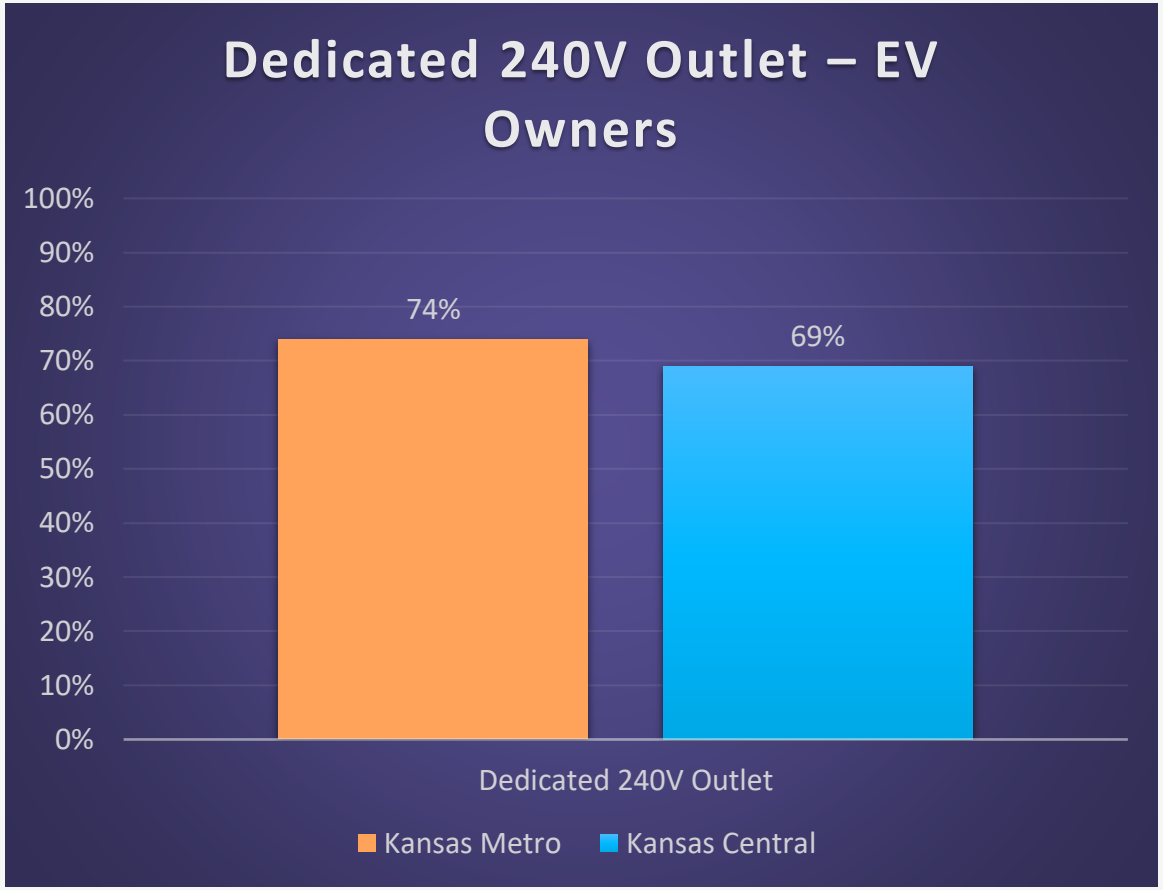
Almost no customers in Kansas have rooftop solar or battery storage.



Electric Vehicles

Very few customers in Kansas have all electric or plug-in hybrid vehicles. The majority of those that do, however, have a dedicated 240V outlet.





Thank You.

AEG
APPLIED ENERGY GROUP

DSM Market Potential Study Results — Evergy West

Prepared for: evergy

Date: May 9, 2023

Table of Contents

Reporting Format

- In support of Evergy's Missouri Integrated Resource Plan (IRP) and Missouri Energy Efficiency Investment Act (MEEIA) Cycle 4 regulations, this presentation summarizes assumptions, methods, inputs and results of the Evergy Demand Side Management (DSM) Market Potential Study.
- Along with this presentation, we provide:
  - A workbook including detailed study inputs and results.
  - A comprehensive report.
- Consistent with 4 CSR 240-22.050, the potential study provides a credible estimation of technical, economic, and achievable potential over the next 20 years.

Energy Efficiency Potential Analysis

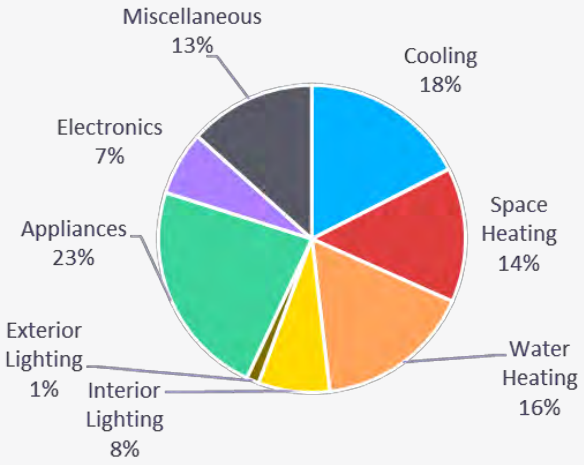
Energy Efficiency Potential Approach

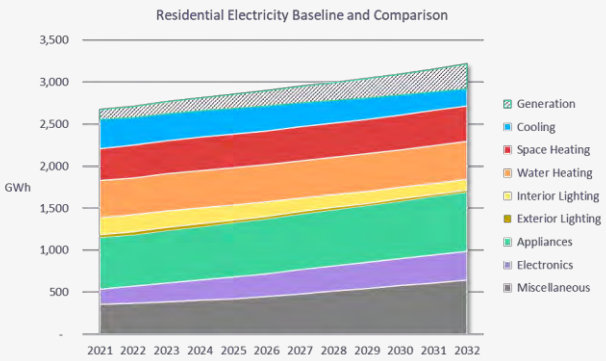
Market Characterization
- Customer Segmentation
- Utility Data
- Residential Survey
- Secondary Data

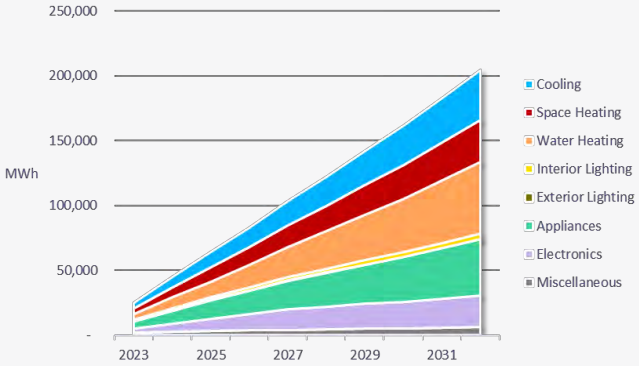
Identify and Characterize Measures
- Efficient Equipment
- Retrofit Opportunities
- Emerging Technologies

Baseline Projection
- Utility Forecasts
- Stock Turnover
- Codes and Standards

Potential Estimation
- Technical, Economic, and Achievable (MAP and RAP)
- Benchmarked against recent program history

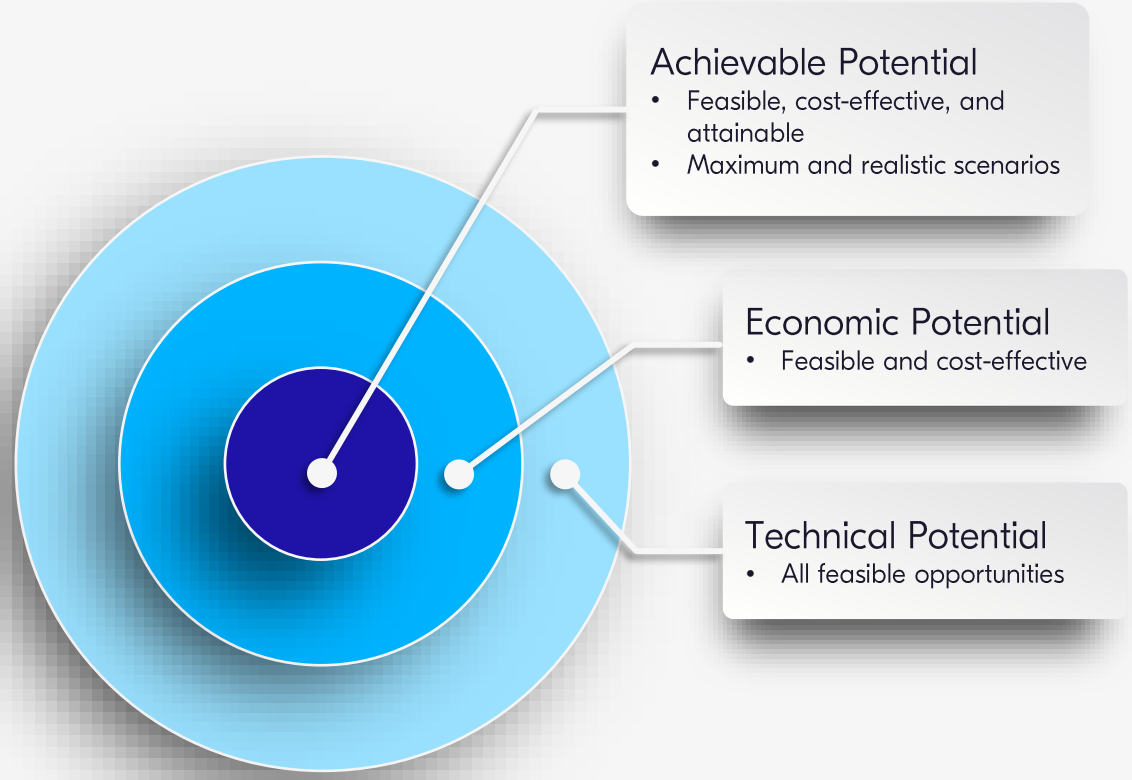






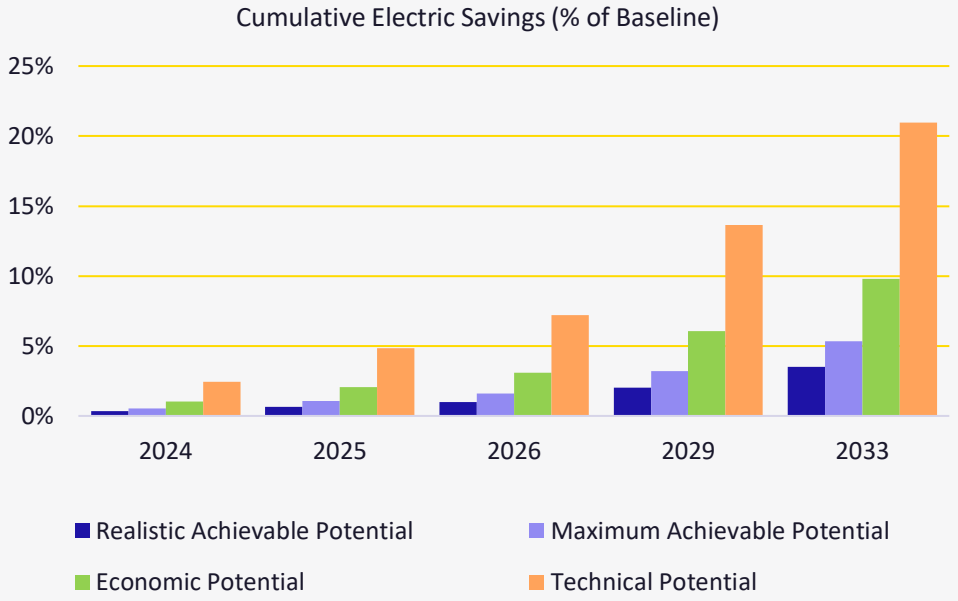
Estimating Energy Efficiency Potential

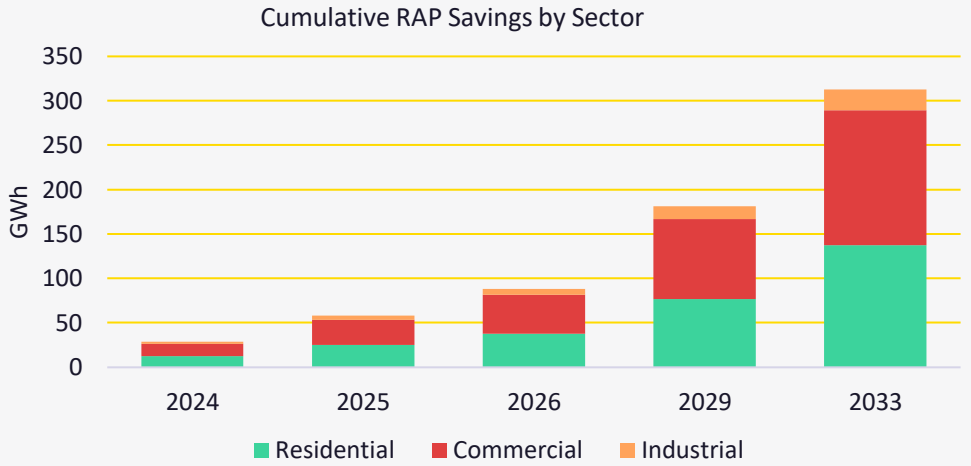
- Potential was estimated by creating an alternate sales forecast incorporating efficient measure adoption and calculating the change from the baseline
- AEG calculated three distinct levels of potential: Technical, Economic, and Achievable
- Achievable potential was assessed under two scenarios:
  - Realistic Achievable Potential (RAP)
  - Maximum Achievable Potential (MAP)

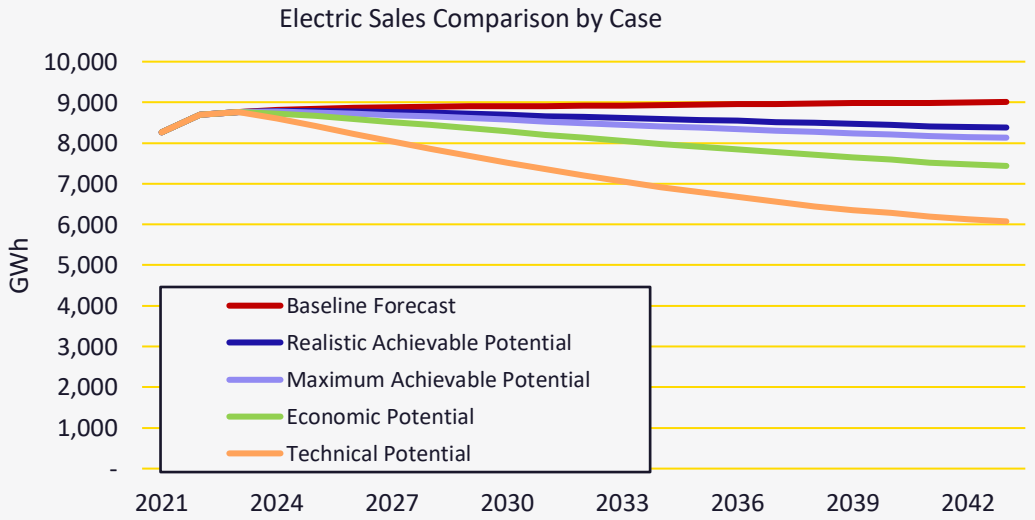


EE Potential Results — Evergy West Summary

- Cumulative RAP is 88.3 GWh by 2026 and 312.8 GWh by 2033, an average of 0.4% of the baseline per year.
- The Commercial sector contributes the most savings, with Residential a close second.
- Cooling and Space Heating savings dominate, with a notable contribution from C&I Lighting.

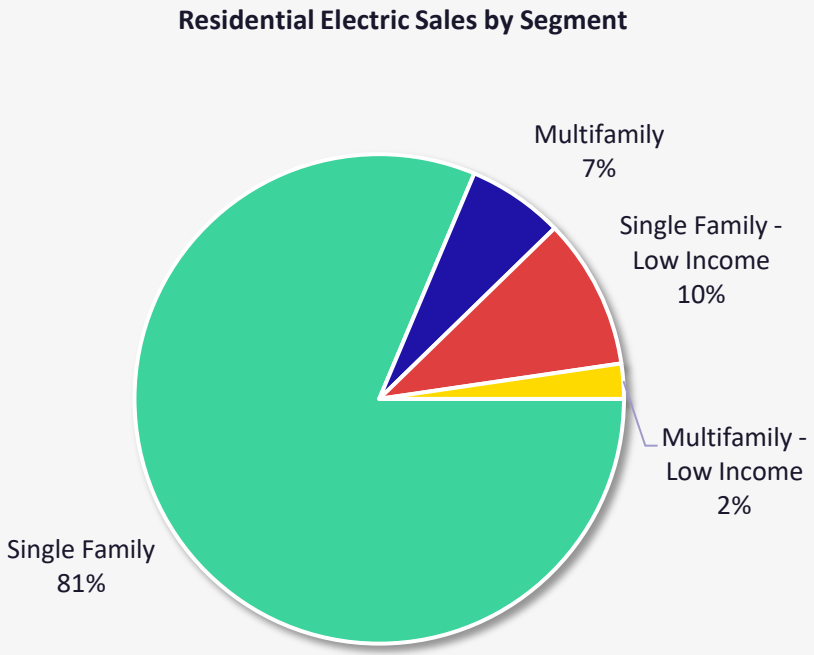






Residential Potential

Residential Market Characterization

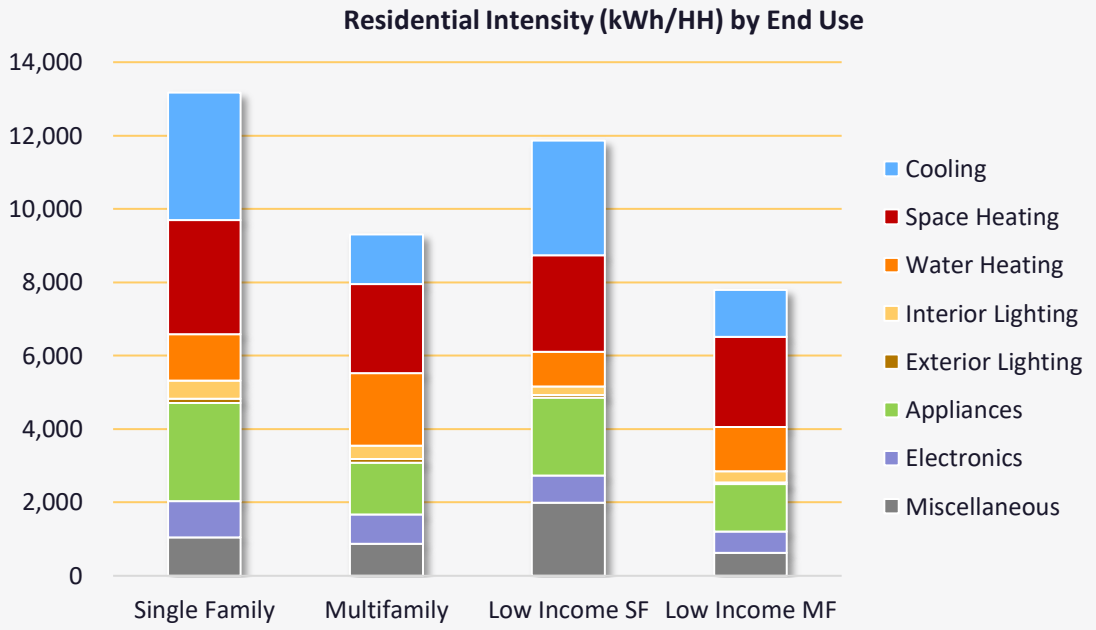


Segment	2021 Electric Use (GWh)	Households	Avg. Use/HH (kWh)	% of Electric Use
Single Family	2,969.8	229,429	12,944	81%
Multifamily	232.2	24,948	9,308	6%
Single Family - Low Income	363.9	30,662	11,868	10%
Multifamily - Low Income	84.6	10,856	7,790	2%
Total	**3,650.5**	**295,895**	**12,337**	**100%**

- Total customers and energy load are taken directly from Evergy's 2021 data and disaggregated into housing types and income groups using a combination of Evergy's system data and demographic information from the US Census
- The majority of homes in Evergy's West territory are single family dwellings, which use 91% of the Residential electricity in the West region.

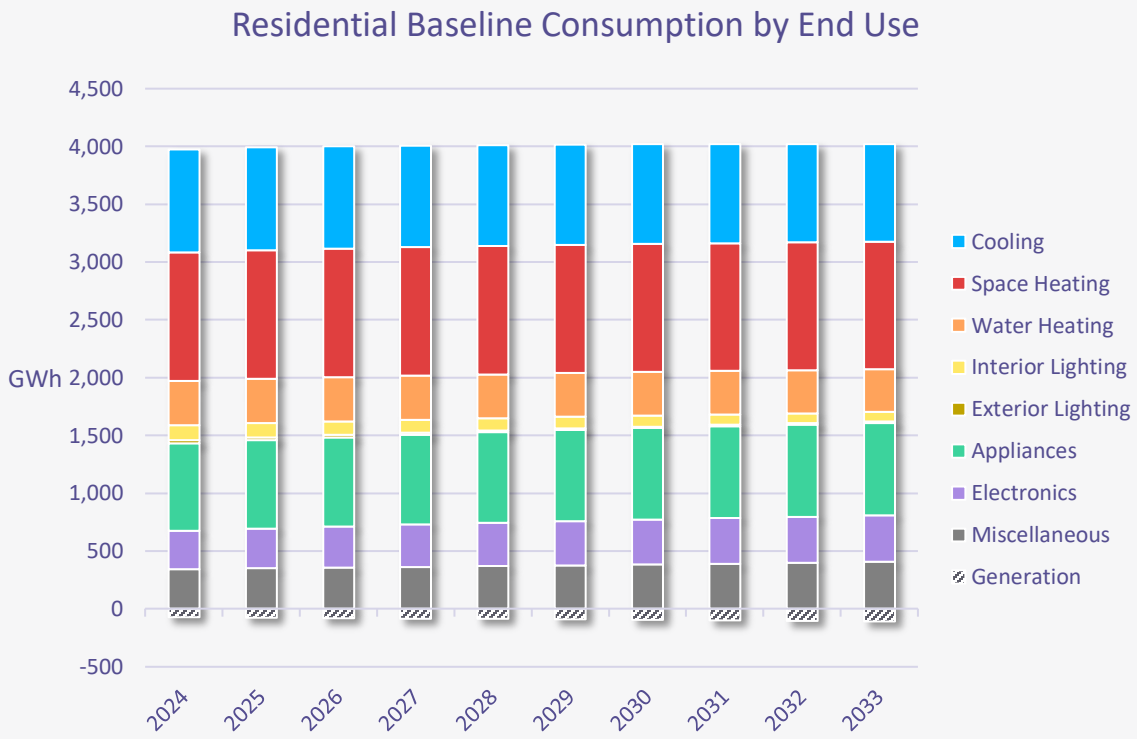
Residential Market Profiles

- The market profile disaggregates energy load per household into specific end uses and technologies.
- Total household **intensity** (kWh per HH) is calibrated to values shown on the previous slide. It is a function of:
  - Saturation – the percentage of homes where equipment is present
  - Unit Energy Consumption – the average annual energy use of a given technology where it is present.
  - Values are taken from well-vetted sources as close to Evergy West's territory as possible
- Key Data Sources
  - Evergy Data
  - Residential Appliance Saturation Survey (RASS)
  - EIA Annual Energy Outlook



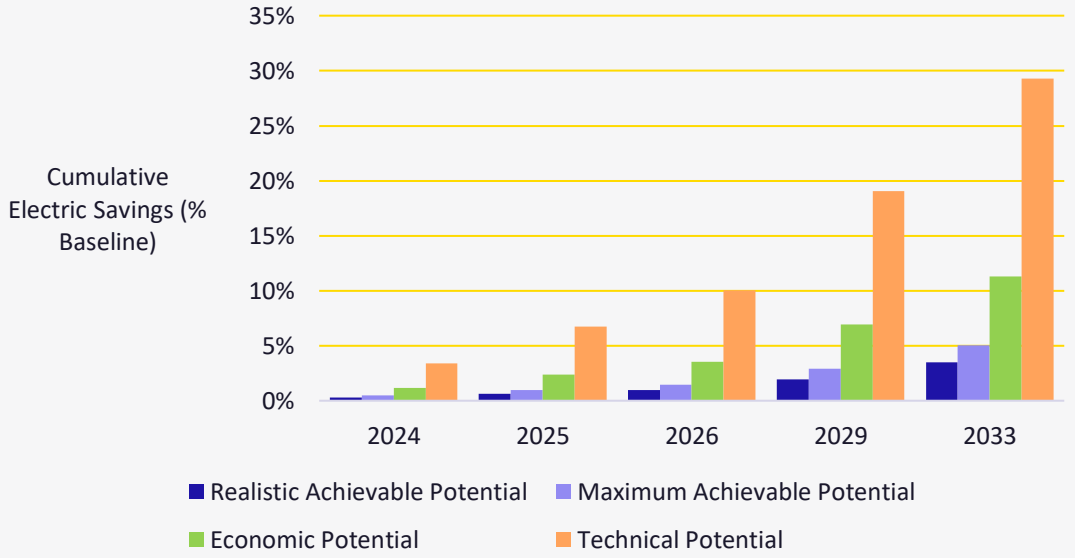
Residential Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Residential Potential Results

- By 2026, cumulative Realistic Achievable Potential (RAP) is 37.5 GWh, or 1.0% of the reference baseline. By 2033, this increases to 137 GWh, or 3.5% of baseline.
  - This is an average of 0.3% per year.
- Maximum Achievable Potential (MAP) reaches 57.4 GWh by 2026, and 196.9 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	3,901	3,912	3,919	3,924	3,912
Cumulative Savings (GWh)					
Realistic Achievable Potential	12	25	38	77	137
Maximum Achievable Potential	19	38	57	114	197
Economic Potential	46	93	140	271	443
Technical Potential	133	265	393	747	1,147
Cumulative as % of Baseline					
Realistic Achievable Potential	0.3%	0.6%	1.0%	1.9%	3.5%
Maximum Achievable Potential	0.5%	1.0%	1.5%	2.9%	5.0%
Economic Potential	1.2%	2.4%	3.6%	6.9%	11.3%
Technical Potential	3.4%	6.8%	10.0%	19.0%	29.3%

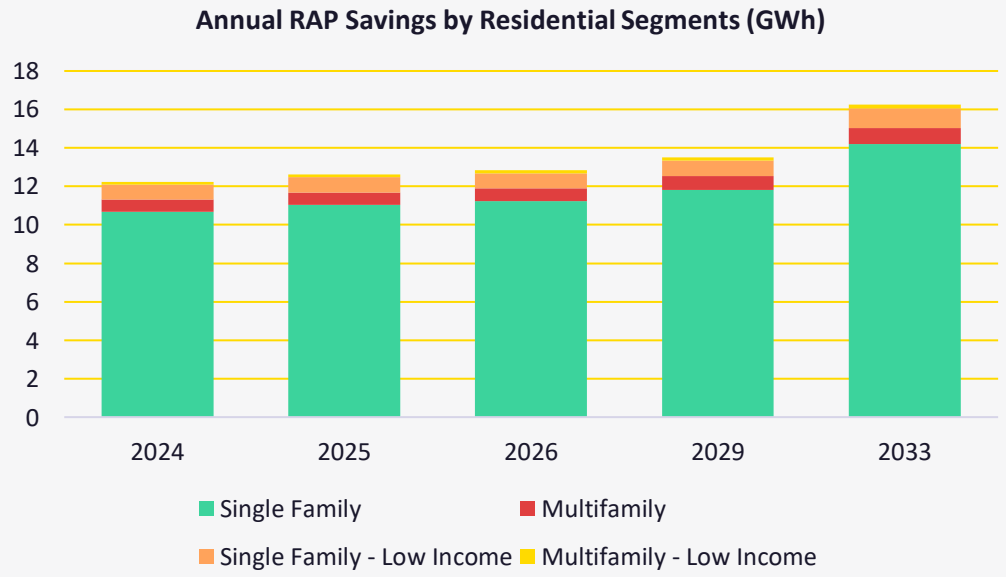
Residential Top Measures - RAP

- HVAC measures provide the bulk of savings:
  - Central Air Conditioner upgrades are the top measure.
  - Converting electric resistance heat to heat pumps is #3.
  - Building shell improvements and controls (e.g., smart thermostats) lower HVAC use.
- LED Lighting is assumed as a baseline condition based on market trends and DOE assumptions, and does not provide program potential.

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	Central AC (SEER 18.0 (CEE Tier 2))	4,210	11.2%
2	Ducting - Repair and Sealing (Sealed)	3,818	10.2%
3	Furnace - Conversion to Air-Source Heat Pump	3,496	9.3%
4	Connected Thermostat - ENERGY STAR (1.0) (Networked Installed)	3,199	8.5%
5	Insulation - Floor Upgrade (R-30)	3,162	8.4%
6	Air-Source Heat Pump (SEER 16.0 / HSPF 9.2 (ENERGY STAR 6.1))	2,809	7.5%
7	Ducting - Repair and Sealing - Aerosol (G.17 Aerosol Duct Sealing)	2,489	6.6%
8	Central Heat Pump - Controls and Commissioning (Central Heat Pump with auxiliary heat control strategy, lockout settings, and other parameters)	1,949	5.2%
9	Building Shell - Liquid-Applied Weather-Resistive Barrier (Liquid-Applied Weather-Resistant Barrier)	1,659	4.4%
10	Water Heater - Drainwater Heat Recovery (Installed)	1,438	3.8%
11	Insulation - Ducting (R-8)	1,185	3.2%
12	Refrigerator (CEE Tier 3 (20% above standard))	1,026	2.7%
13	Insulation - Basement Sidewall (R-11)	848	2.3%
14	Exempted Lighting (LED 2020 (95 lm/W))	532	1.4%
15	Insulation - Radiant Barrier (Installed)	527	1.4%
16	Room AC - Recycling (Unit Removed)	513	1.4%
17	Advanced Power Strips - Load or Occupancy (Tier 1 - Load Sensing)	496	1.3%
18	Building Shell - Whole-Home Aerosol Sealing (Building Sealed)	467	1.2%
19	Insulation - Floor Installation (R-30)	449	1.2%
20	Geothermal Heat Pump (EER 17.1 / COP 3.6 (ENERGY STAR 3.2))	439	1.2%
	Total of Top 20 Measures	**34,712**	**92.6%**
	Total Savings - All Measures	**37,495**	**100.0%**

Residential Potential by Segment

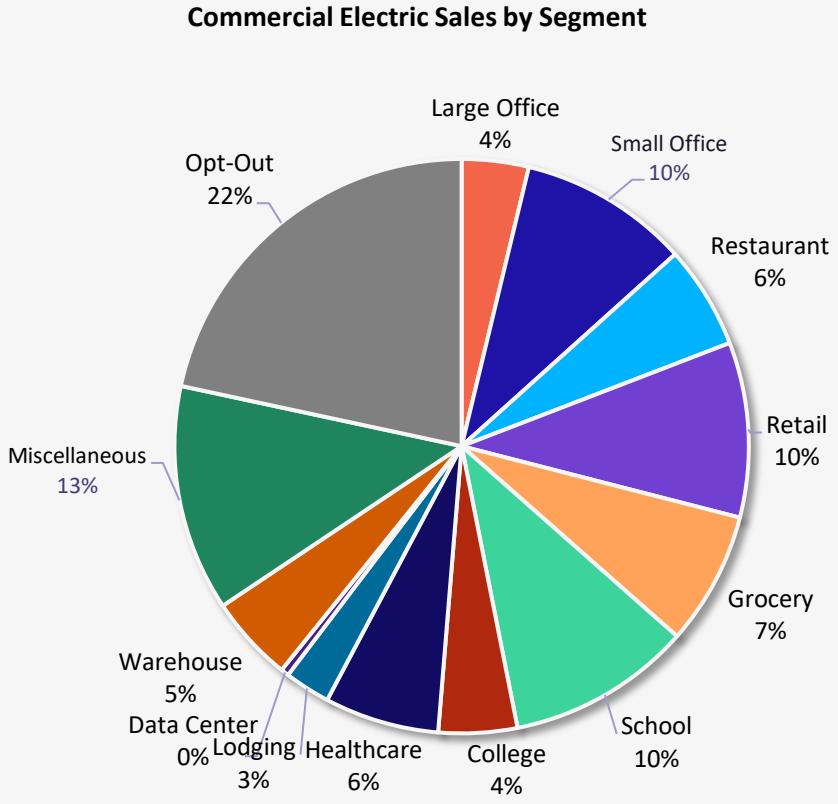
- This slide shows incremental (annual) savings by housing type and income group.
- Savings are a function of consumption, so most savings are in the largest segment — single family homes that are not low-income.
- Low-income segments show potential proportionate to their loads



Cumulative GWh	2024	2025	2026	2029	2033
Realistic Achievable Potential					
Single Family	10.7	11.0	11.2	11.8	14.2
Multifamily	0.6	0.6	0.7	0.7	0.8
Single Family - Low Income	0.8	0.8	0.8	0.8	1.0
Multifamily - Low Income	0.2	0.2	0.2	0.2	0.2
Total	**12.2**	**12.6**	**12.8**	**13.5**	**16.3**
Total Low-Income	***0.9***	***0.9***	***0.9***	***1.0***	***1.2***
Maximum Achievable Potential					
Single Family	16.8	17.1	17.0	17.0	19.3
Multifamily	1.0	1.0	1.0	1.0	1.2
Single Family - Low-Income	1.1	1.1	1.1	1.1	1.3
Multifamily - Low-Income	0.2	0.2	0.2	0.2	0.3
Total	**19.1**	**19.4**	**19.3**	**19.3**	**22.0**
Total Low-Income	***1.3***	***1.3***	***1.3***	***1.3***	***1.6***

Commercial Potential

Commercial Market Characterization

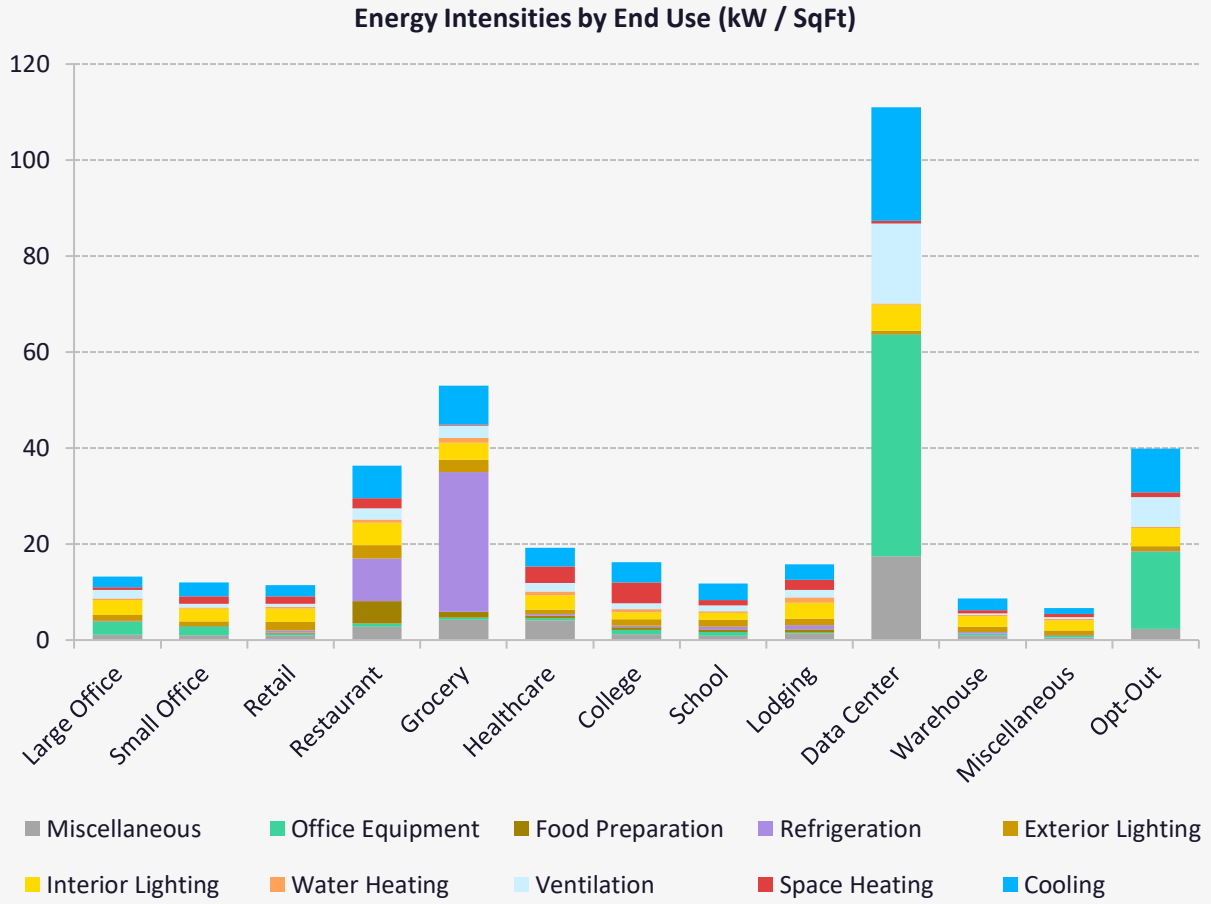


Segment	Electric Use (GWh)	% of Total	Floor Space (Million sqft)	Intensity (kWh/sqft)
Large Office	121.6	4%	9.21	13.20
Small Office	309.5	10%	25.79	12.00
Retail	318.2	10%	5.16	36.36
Restaurant	187.4	6%	27.85	11.42
Grocery	242.5	8%	4.58	52.99
School	335.0	10%	28.48	11.76
College	143.0	4%	8.85	16.16
Healthcare	208.3	6%	10.83	19.24
Lodging	83.3	3%	5.28	15.78
Data Center	14.5	0%	0.13	110.92
Warehouse	156.5	5%	18.05	8.67
Miscellaneous	411.5	13%	62.30	6.60
Opt-Out	698.8	22%	17.54	39.85
Commercial Total	**3,230.0**	**100%**	**224**	**14.42**

- AEG categorized commercial accounts into segments using customer SIC and business data from Evergy.
- Miscellaneous, Small Office, Retail, and School segments dominate the commercial load.
  - The Miscellaneous segment includes nonresidential/non-manufacturing spaces not elsewhere classified or difficult to classify.
- Customers opting out of Evergy programs are separated into their own segment to avoid overstating program potential.

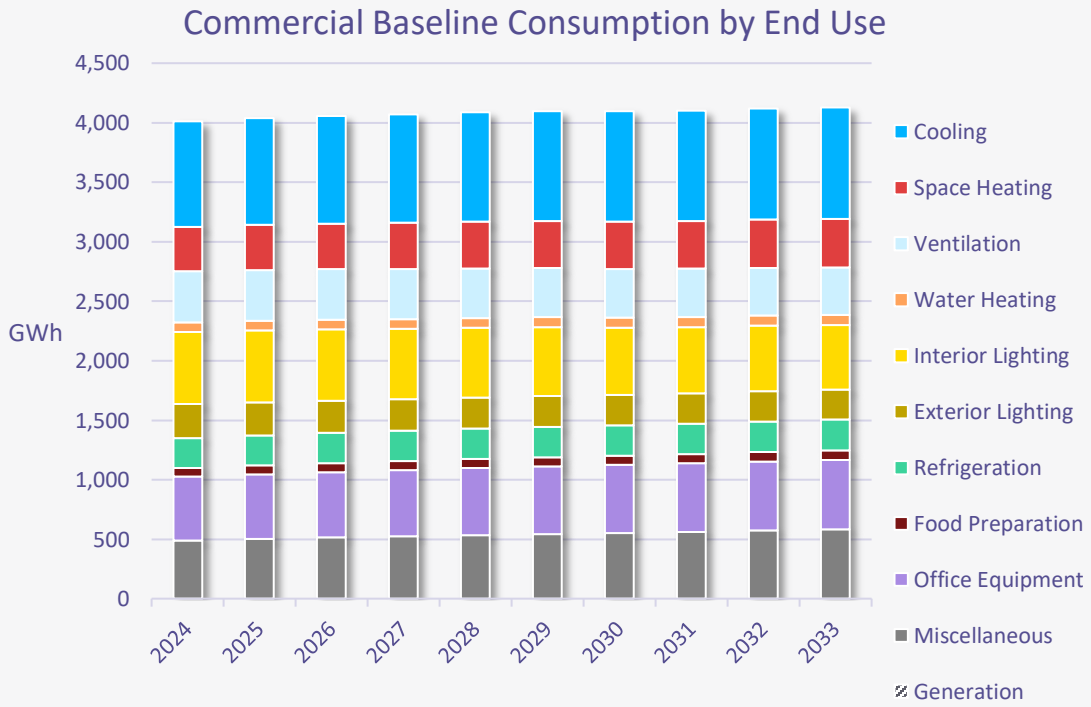
Commercial Market Profiles

- Just like residential, the commercial market profile disaggregates the nonresidential loads into end uses and technologies, calibrating to the appropriate total intensity.
- Key Data Sources
  - Evergy Billing and Load Research Data
  - EIA Commercial Buildings Energy Consumption Survey
  - U.S. DOE Solid State Lighting Forecast Report
  - EIA Annual Energy Outlook
  - AEG Data and Energy Market Profiles



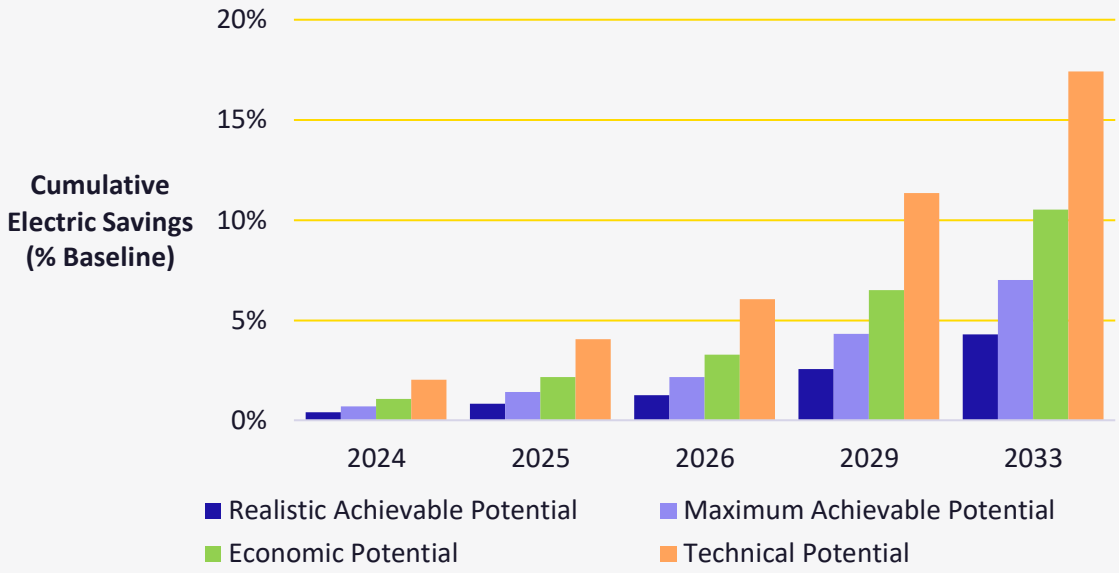
Commercial Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts.
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Commercial Potential Results

- By 2026, cumulative RAP is 43.9 GWh, or 1.3% of the reference baseline. By 2033, this increases to 152.4 GWh, or 4.3% of the baseline.
  - This is an average of 0.4% per year.
- MAP reaches 75.9 GWh by 2026, and 248.5 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	3,460	3,482	3,497	3,525	3,549
Cumulative Savings (GWh)					
Realistic Achievable Potential	14	29	44	90	152
Maximum Achievable Potential	25	50	76	152	249
Economic Potential	37	76	115	230	374
Technical Potential	71	141	212	401	618
Cumulative as % of Baseline					
Realistic Achievable Potential	0.4%	0.8%	1.3%	2.6%	4.3%
Maximum Achievable Potential	0.7%	1.4%	2.2%	4.3%	7.0%
Economic Potential	1.1%	2.2%	3.3%	6.5%	10.5%
Technical Potential	2.0%	4.1%	6.1%	11.4%	17.4%

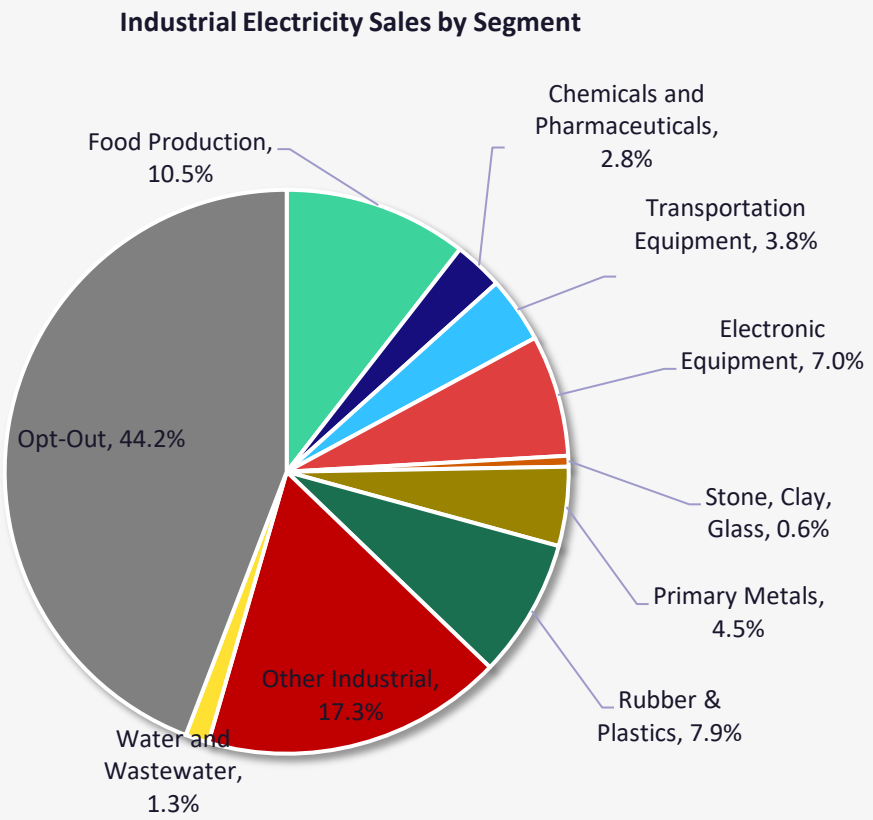
Commercial Top Measures - RAP

- Linear Lighting, Retrocommissioning, and Rooftop Unit (RTU) upgrades have the most significant potential savings.
  - There is significant LED penetration in the baseline for linear and high bay, but this measure is a bundle with embedded controls at the time of fixture replacement, which gives savings above a simple LED.
- Because not all electronics (computers, servers, desktop monitors, etc.) purchased are ENERGY STAR certified, these measures have significant savings potential.
  - However, it can be difficult to incentivize this behavior due to the low/no cost difference between ENERGY STAR and non-certified units.

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	Linear Lighting (LED 2020 (109 lm/W system) w/ Controls)	11,743	27.1%
2	Retrocommissioning	5,224	12.1%
3	RTU (IEER 18.0 - ENERGY STAR (4.0))	5,010	11.6%
4	Ventilation - Demand Controlled (Outdoor air controlled based on occupancy to meet ASHRAE 62.1)	3,016	7.0%
5	Exempted Lighting (LED 2020 (95 lm/W))	2,790	6.5%
6	High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,729	6.3%
7	Server (ENERGY STAR (3.0))	1,384	3.2%
8	Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	1,098	2.5%
9	Ventilation - Variable Speed Control (VSD on fan motor)	844	2.0%
10	RTU - Advanced Controls (Advanced controls on roof top unit)	788	1.8%
11	HVAC - Maintenance (Tune-up of unitary HVAC systems)	776	1.8%
12	Griddle (ENERGY STAR (1.2))	704	1.6%
13	POS Terminal (ENERGY STAR (7.1))	661	1.5%
14	Ducting - Repair and Sealing (Sealed)	621	1.4%
15	Advanced New Construction Designs (exceeding ASHRAE 90.1 requirements)	616	1.4%
16	Refrigeration - High Efficiency Compressor	586	1.4%
17	Refrigeration - Floating Head Pressure (Wetbulb Reset Controls)	473	1.1%
18	Oven (ENERGY STAR (2.2))	382	0.9%
19	Area Lighting (LED 2020 (120 lm/W) w/ Controls)	365	0.8%
20	Connected Thermostat - ENERGY STAR (1.0) (Thermostat connected to building management control system)	333	0.8%
	Total of Top 20 Measures	**40,142**	**92.8%**
	Total Savings - All Measures	**43,871**	**100.0%**

Industrial Potential

Industrial Market Characterization

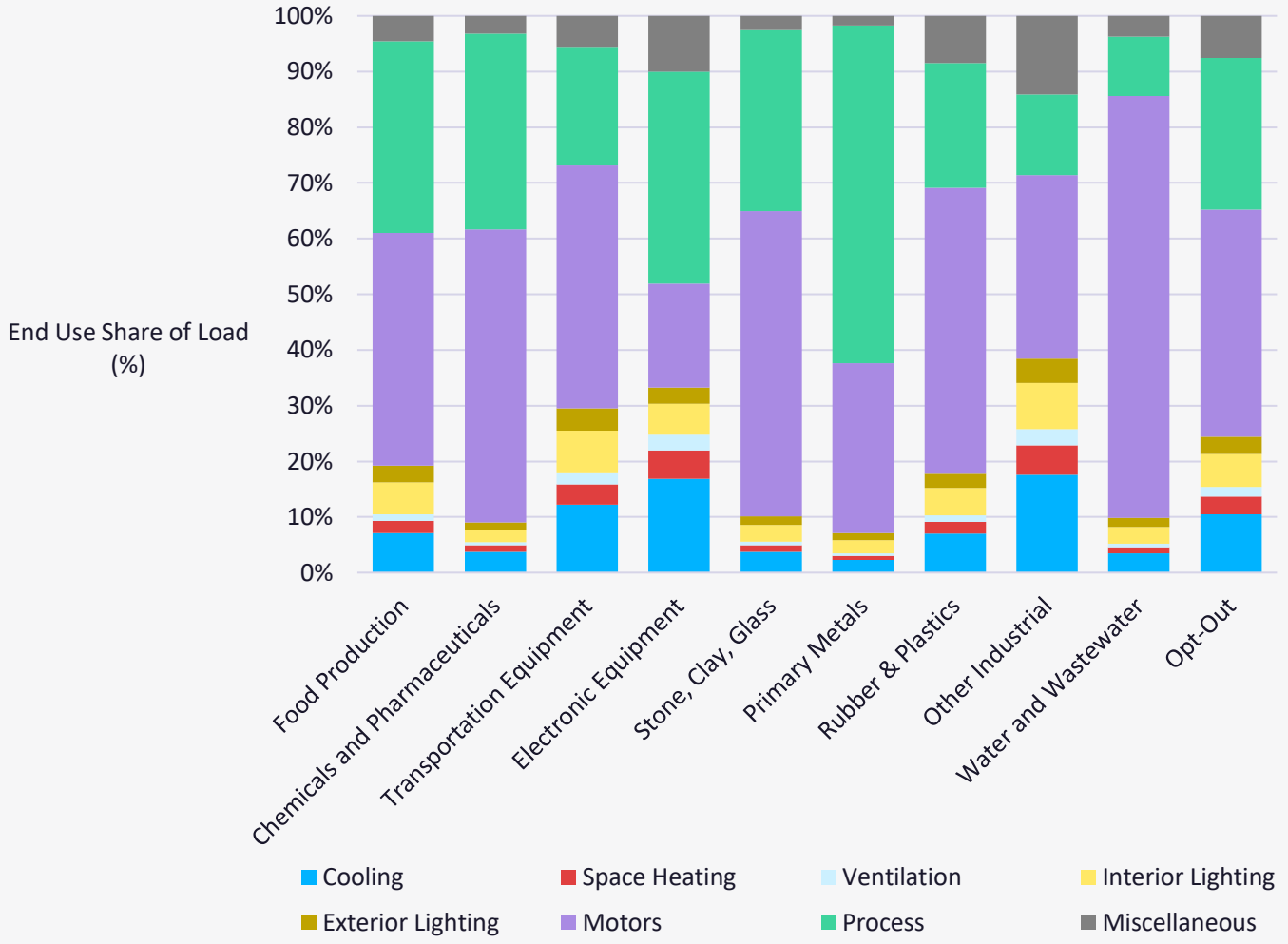


Segment	Electric Use (GWh)	% of Total
Food Production	145.6	11%
Chemicals & Pharmaceuticals	38.9	3%
Electronic Equipment	96.4	7%
Primary Metals	62.7	5%
Stone, Clay, Glass	8.6	1%
Transportation Equipment	52.4	4%
Rubber & Plastics	109.9	8%
Water & Wastewater	18.6	1%
Other Industrial	239.2	17%
Opt-Out	611.0	44%
Industrial Total	**1,383.3**	**100%**

- AEG categorized industrial accounts into segments using SIC codes and customer data from Evergy.
- A greater portion of Industrial facilities are eligible to opt out of programs compared to non-manufacturing commercial.
- The largest non-opt-out characterized segments are Other Industrial, Food Production, Electronic Equipment, and Rubber & Plastics.
- The Other Industrial segment includes the NAICS "Misc. Manufacturing" class and the tail of load in categories not elsewhere classified.

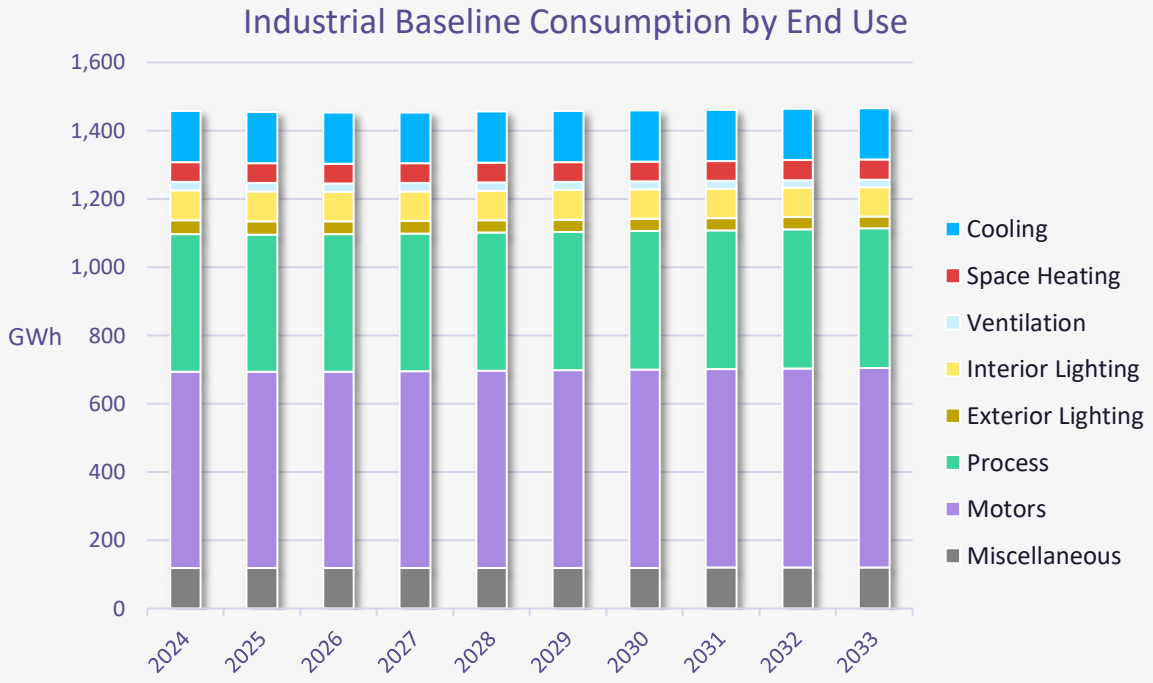
Industrial Market Profiles

- The industrial market profile disaggregates the loads into segments and intensity, calibrating to the appropriate total intensity.
- Key Data Sources
  - SIC codes by customer
  - U.S. DOE Manufacturing Energy Consumption Survey



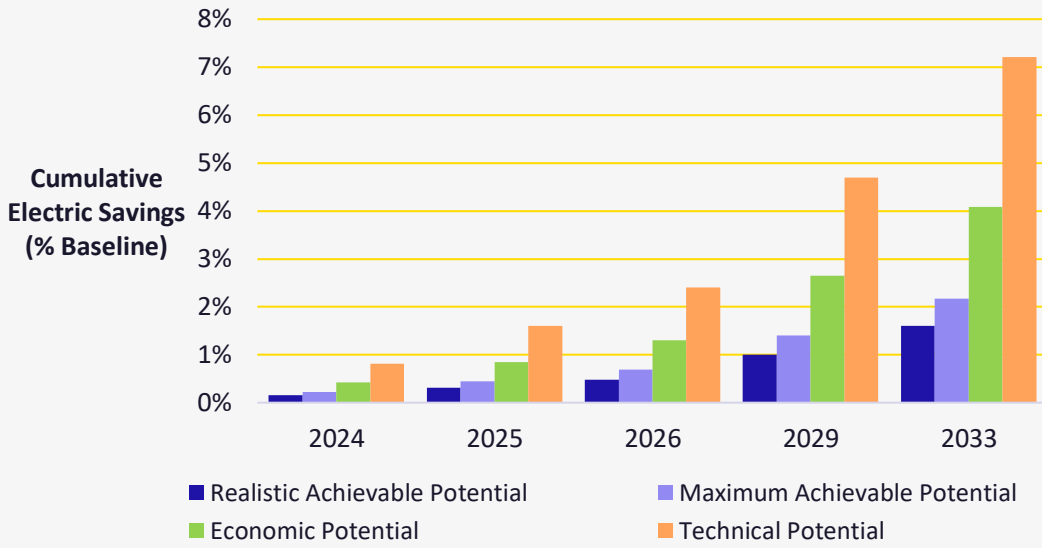
Industrial Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts.
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Industrial Potential Results

- By 2026, cumulative RAP is 7 GWh, or 0.5% of the reference baseline. By 2033, this increases to 23.4 GWh, or 1.6% of the baseline.
  - This is an average of 0.16% per year.
- MAP reaches 10 GWh by 2026, and 31.8 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	1,457	1,454	1,452	1,458	1,465
Cumulative Savings (GWh)					
Realistic Achievable Potential	2	5	7	15	23
Maximum Achievable Potential	3	7	10	21	32
Economic Potential	6	12	19	39	60
Technical Potential	12	23	35	69	106
Cumulative as % of Baseline					
Realistic Achievable Potential	0.2%	0.3%	0.5%	1.0%	1.6%
Maximum Achievable Potential	0.2%	0.5%	0.7%	1.4%	2.2%
Economic Potential	0.4%	0.9%	1.3%	2.7%	4.1%
Technical Potential	0.8%	1.6%	2.4%	4.7%	7.2%

Industrial Top Measures - RAP

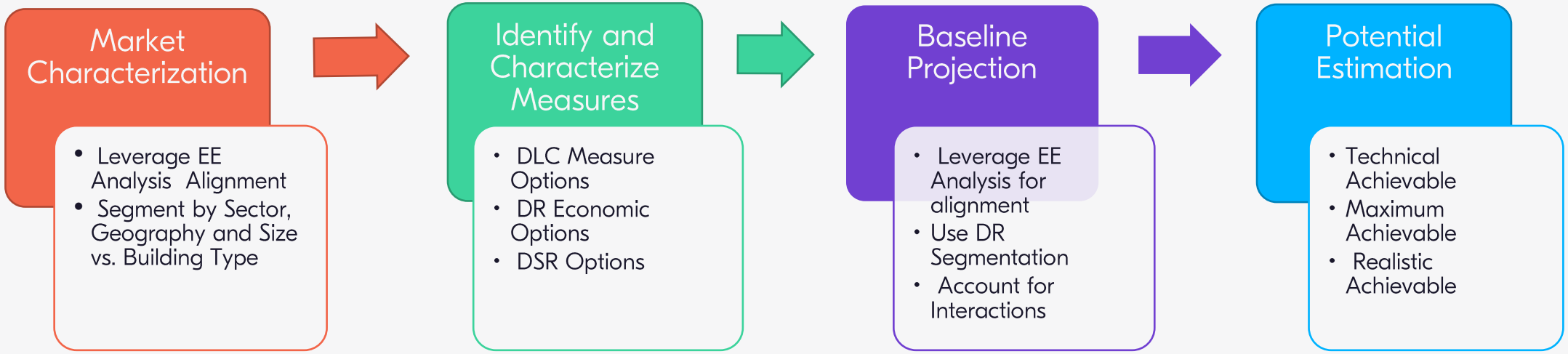
- As in commercial, LED fixture replacements including bundles with controls provide savings opportunities, contributing more than half of Industrial potential.
- Ventilation and HVAC chillers have some savings, though HVAC is not the largest portion of Industrial load.
- System upgrades and optimizations for various processes and motor systems make up a long tail of smaller measures in the top 20.

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,437	36.1%
2	Linear Lighting (LED 2020 (109 lm/W system))	1,532	22.7%
3	Indoor Agriculture - LED Lighting	454	6.7%
4	Ventilation (Variable Air Volume)	392	5.8%
5	Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	272	4.0%
6	Advanced Industrial Motors	208	3.1%
7	Pumping System - System Optimization	182	2.7%
8	Compressed Air - End Use Optimization	167	2.5%
9	Paper - Efficient Agitator	159	2.4%
10	Fan System - Equipment Upgrade	135	2.0%
11	Compressed Air - Variable Speed Drive	114	1.7%
12	Air-Cooled Chiller (COP 4.10 (IPLV 14.0))	105	1.6%
13	Pumping System - Variable Speed Drive	98	1.4%
14	Pumping System - Equipment Upgrade	74	1.1%
15	Refrigeration - System Maintenance	70	1.0%
16	Refrigeration - System Upgrade	70	1.0%
17	Material Handling - Variable Speed Drive	66	1.0%
18	Compressed Air - Equipment Upgrade	47	0.7%
19	Fan System - Variable Speed Drive	44	0.7%
20	Compressed Air - System Controls	36	0.5%
	Total of Top 20 Measures	**6,664**	**98.8%**
	Total Savings - All Measures	**6,954**	**100.0%**

DR/DSR Potential Analysis

DR and DSR Potential Approach

- General methodology for estimating DR and DSR potential is similar to energy efficiency
- Our approach accounts for two key differences:
  - **Neither exists outside of a programmatic structure (i.e., there is no naturally occurring DR)**
  - **Focus on Maximum Achievable and Realistic Achievable Potential**



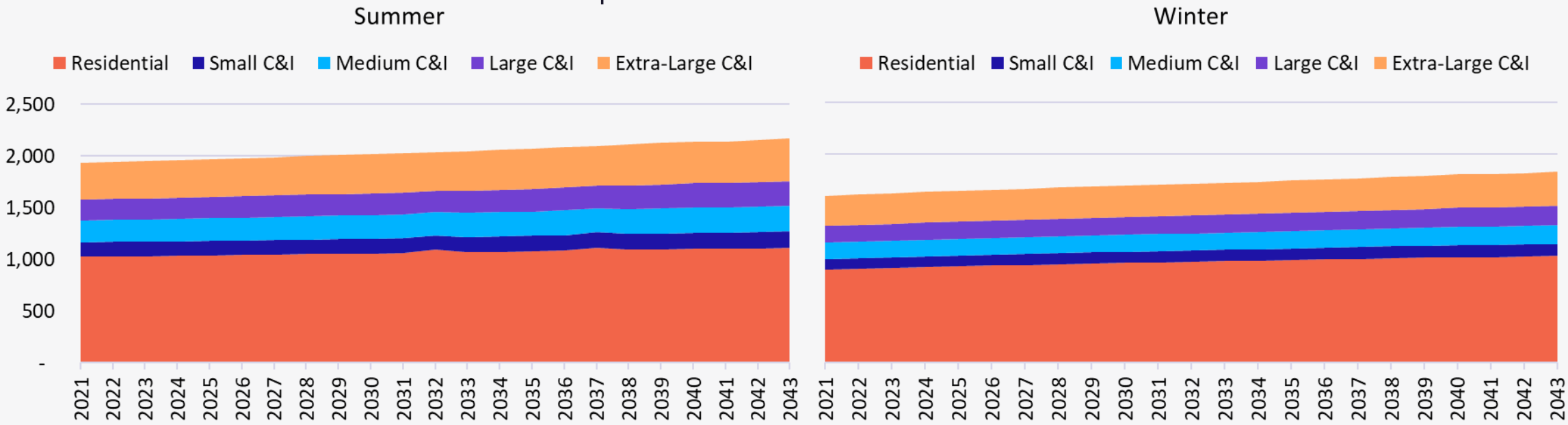
Market Characterization

Used billing data to segment C&I customers into size bins (max annual peak)

Small C&I	< 30 kW
Medium C&I	≥ 30 kW, < 150 kW
Large C&I	≥ 150 kW, < 1,000 kW
Extra-Large C&I	> 1,000 kW

Residential consumption accounts for ~50% of Evergy West peak demand in both summer and winter.

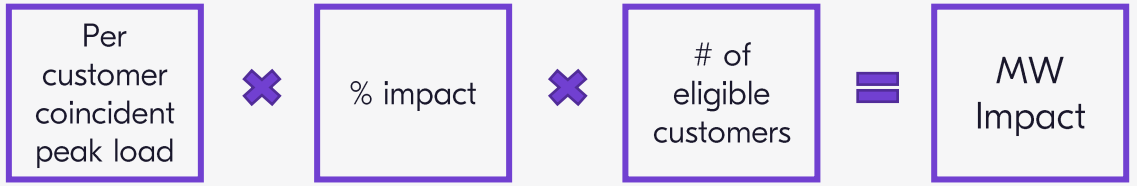
C&I winter peak demand is 20%-35% less than winter peak across size bins. Residential winter peak demand reaches ~10% of summer peak demand.



Program Characterization

DR Options	DSR Options
DLC – End Use • Connected Thermostats – Res and C&I • Switches (heating/cooling) • Smart Homes • Electric Vehicles • Water Heating (including grid-interactive models) • Smart Solar PV Inverter • Battery Storage • Thermal Energy Storage **Economic – Whole Facility** • Firm Curtailment/Tariff • C&I Automatic DR (ADR) • Residential Behavioral Demand Response	**Rate-Based** • Critical Peak Pricing • Time-Related Pricing • Time-of-Use Rates • TOU Rate for EV Owners

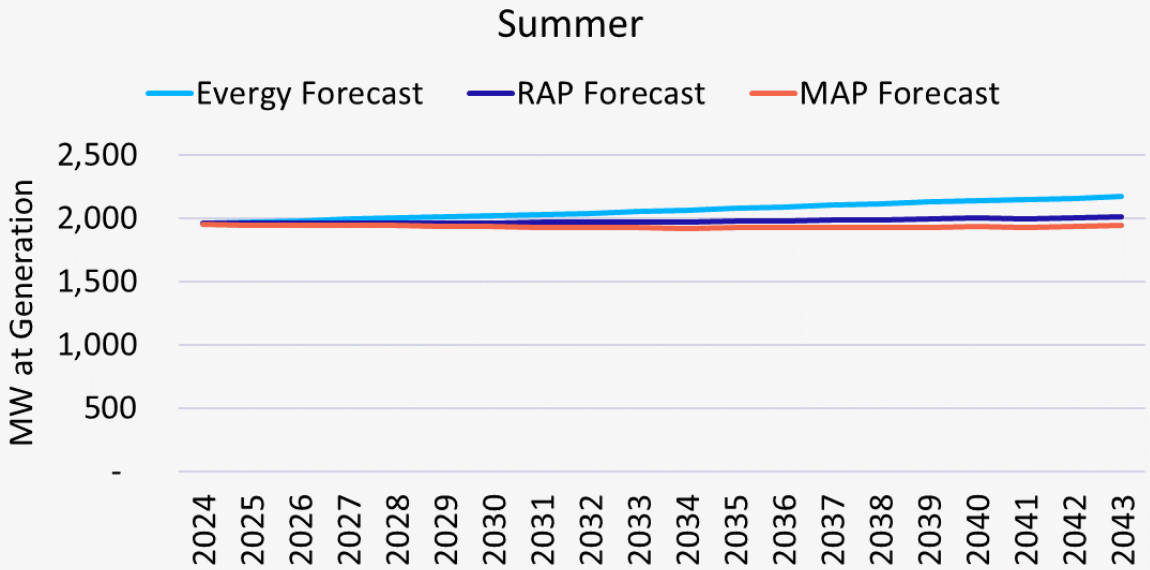
- Participation rates
  - Define eligible customers for each given option and reflect appliance saturation rates, customer segmentation, and the hierarchy
- Customer impacts
  - Percentages or kW values that reflect the total load reduction during an event
- Participant/program costs
  - Incentives and enabling technology costs, program development and administration costs, marketing and recruitment costs, O&M costs

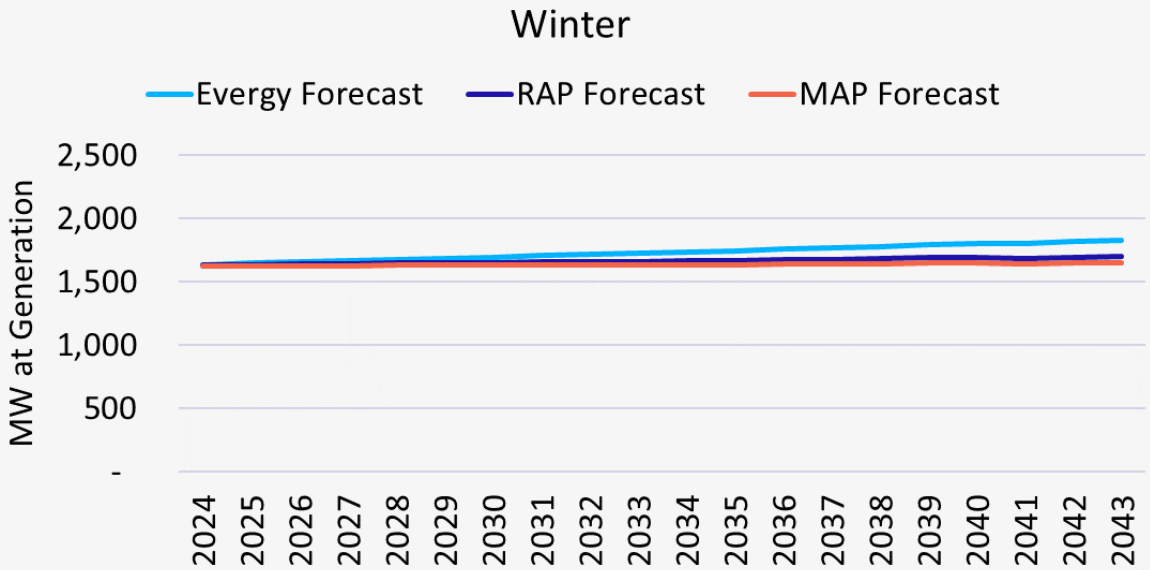


Baseline Projection

AEG developed the baseline peak demand forecasts by:

- Using the Evergy peak demand forecast by sector and territory
- Removing the peak demand savings potential generated through energy efficiency adoption forecasted in the MAP and RAP scenarios
- Summer baseline dropped by 8% (RAP) and 11% (MAP) by 2043





MAP Scenario

MAP Scenario

The Maximum Achievable Potential (MAP) scenario:

- Included all cost-effective programs
- Incorporated growth in Evergy's existing programs to benchmarked participation levels
- Lowered baseline projection for the peak demand savings generated through MAP-forecasted energy efficiency adoption.

MAP Sensitivity Analysis:

The Missouri PSC ordered Evergy to transition all residential customers to mandatory TOU rates by October 1, 2023.

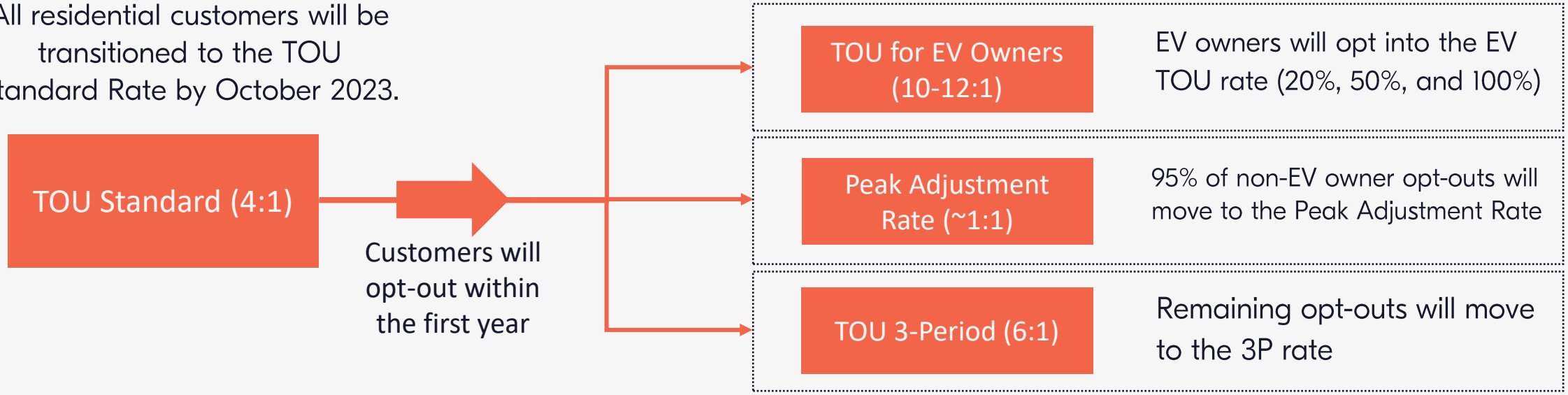
In response, AEG and Evergy focused the MAP analysis on how the mandatory TOU rates would affect the baseline projection.

Customer response to pricing signals will reduce the demand available for other DR programs to impact during peak hours.

MAP Sensitivity Analysis

Evergy plans to offer four residential TOU rates:

All residential customers will be transitioned to the TOU Standard Rate by October 2023.



How the TOU rate order affects residential peak demand depends on (1) TOU Standard customer retention and (2) the TOU rate that opt-out customers move onto instead.

MAP Sensitivity Analysis

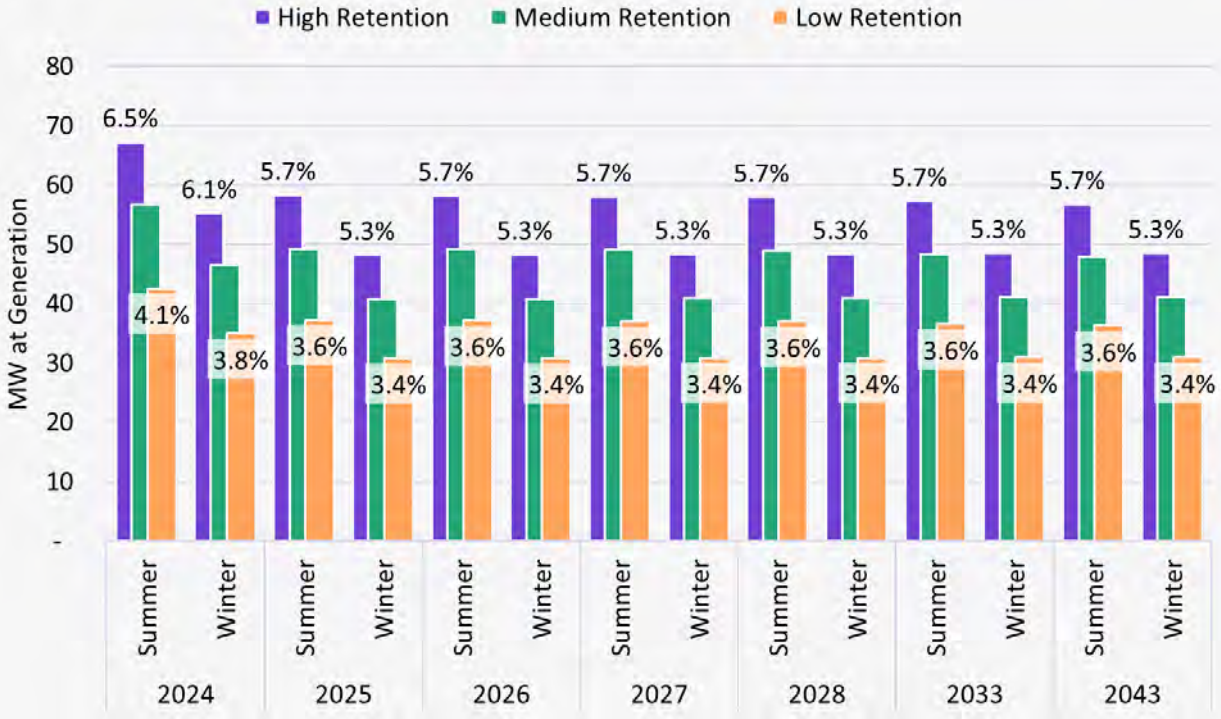
AEG analyzed two sensitivities in addition to the MAP scenario (which is based on a low retention rate of 50%).

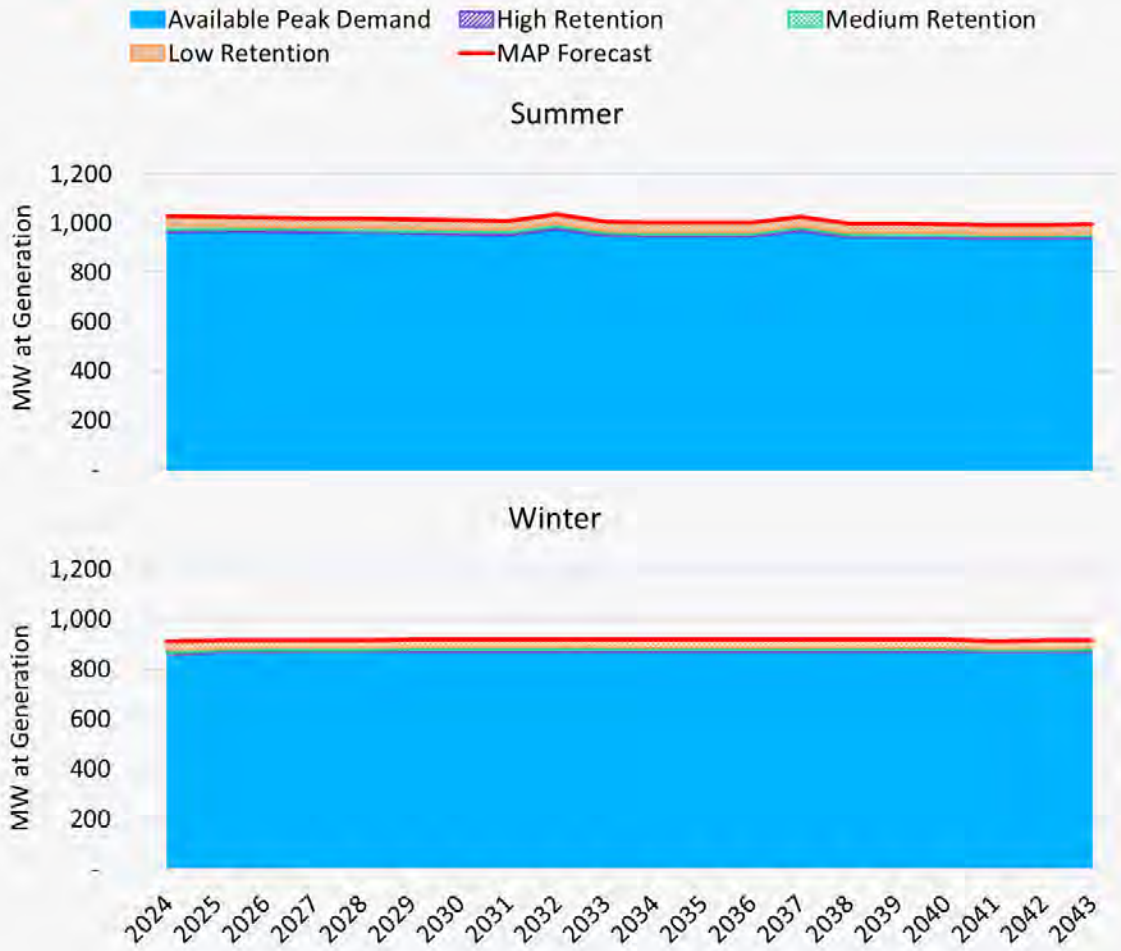
- The Medium- and Low-Retention sensitivities increase the impacts from the mandatory TOU rates and reduce the demand available for other DR program options.

Sensitivity	TOU Standard	TOU for EV Owners	Peak Adjustment Rate	3-Period TOU
MAP	50% of all residential customers	20% of EV owners who opt out of TOU Standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs
MAP Medium-Retention	70% of all residential customers	50% of EV owners who opt out of TOU Standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs
MAP High - Retention	85% of all residential customers	100% of EV owners who opt out of TOU standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs

MAP Sensitivity Analysis

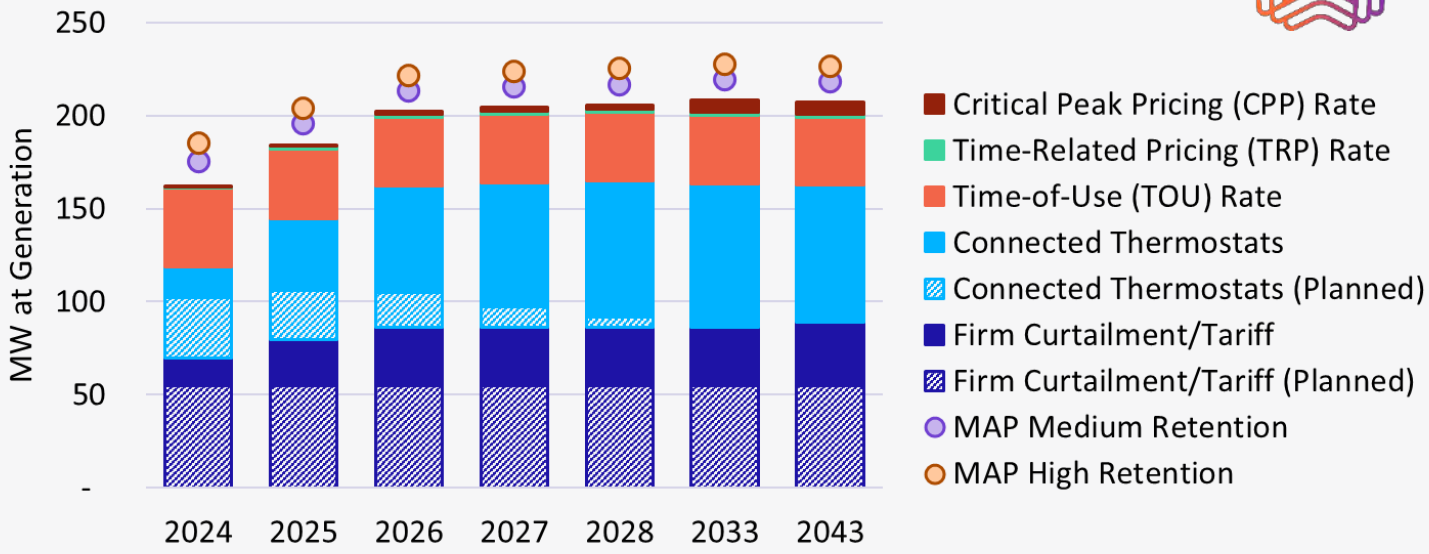
By 2043, the TOU rates reduce the summer residential peak demand baseline by 3.6%-5.7% (3.4%-5.3% in winter). While impacts are not insignificant (36 MW-57 MW in summer), the adjustments relative to the MAP baseline are small.





MAP Summer Potential Results

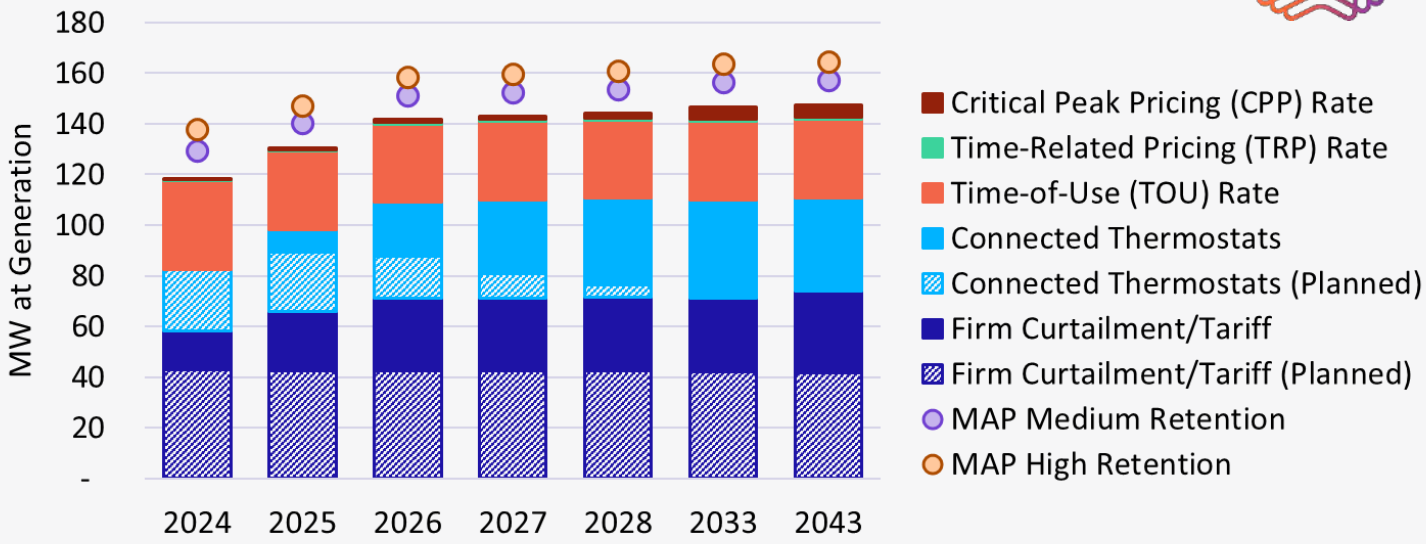
- By 2043, DR/DSR potential is estimated to reduce the summer peak demand baseline by 10%.
  - Firm Curtailment and Connected Thermostats generate over 7% of this reduction and account for nearly 80% of the 2043 DR/DSR potential.
  - TOU rates contribute another 17% to total potential in 2043 and reduce the baseline by another 2%.
  - Over 40% of the potential comes from planned (and existing) programs.
- MAP Medium- and High-Retention analyses increase total summer potential by 11 MW-19 MW.
  - As TOU impacts increase, impacts from other DR resources decrease, netting out some of the mandatory rate effects.



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)
Firm Curtailment/Tariff	15 (1%)	25 (1%)	31 (2%)	31 (2%)	31 (2%)	31 (2%)	34 (2%)
Connected Thermostats (Planned)	33 (2%)	26 (1%)	18 (1%)	11 (1%)	6 (0%)	0 (0%)	0 (0%)
Connected Thermostats	16 (1%)	39 (2%)	57 (3%)	66 (3%)	73 (4%)	77 (4%)	74 (3%)
Time-of-Use (TOU) Rate	43 (2%)	37 (2%)	37 (2%)	37 (2%)	37 (2%)	37 (2%)	36 (2%)
Time-Related Pricing (TRP) Rate	1 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	2 (0%)	2 (0%)	7 (0%)	7 (0%)
MAP Total	162 (8%)	184 (9%)	202 (10%)	204 (10%)	206 (10%)	208 (10%)	207 (10%)
MAP Medium Retention	175 (9%)	195 (10%)	213 (11%)	215 (11%)	217 (11%)	219 (11%)	218 (10%)
MAP High Retention	185 (9%)	204 (10%)	222 (11%)	224 (11%)	225 (11%)	227 (11%)	226 (10%)

MAP Winter Potential Results

- By 2043, DR/DSR potential is estimated to reduce the winter peak demand baseline by 7%.
  - Firm Curtailment and Connected Thermostats generate over 5% of this reduction and account for over 75% of the 2043 DR/DSR potential.
  - TOU rates contribute another 21% to total potential in 2043 and reduce the baseline by another 1.4%.
  - Almost 30% of the potential comes from planned (and existing) programs.
- MAP Medium- and High-Retention analyses increase total summer potential by 10 MW-17 MW.
  - As TOU impacts increase, impacts from other DR resources decrease, netting out some of the mandatory rate effects.



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	43 (2%)	43 (2%)	43 (2%)	43 (2%)	43 (2%)	42 (2%)	42 (2%)
Firm Curtailment/Tariff	15 (1%)	23 (1%)	29 (1%)	29 (1%)	29 (1%)	29 (1%)	32 (1%)
Connected Thermostats (Planned)	25 (1%)	23 (1%)	16 (1%)	10 (0%)	5 (0%)	0 (0%)	0 (0%)
Connected Thermostats	0 (0%)	9 (0%)	22 (1%)	29 (1%)	34 (2%)	39 (2%)	37 (2%)
Time-of-Use (TOU) Rate	35 (2%)	31 (2%)	31 (2%)	31 (2%)	31 (2%)	31 (2%)	31 (1%)
Time-Related Pricing (TRP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	2 (0%)	5 (0%)	5 (0%)
MAP Total	118 (6%)	130 (7%)	142 (7%)	143 (7%)	144 (7%)	147 (7%)	148 (7%)
MAP Medium Retention	129 (7%)	140 (7%)	151 (8%)	152 (8%)	154 (8%)	156 (8%)	157 (7%)
MAP High Retention	138 (7%)	147 (7%)	158 (8%)	160 (8%)	161 (8%)	163 (8%)	164 (8%)

RAP Scenario

RAP Scenario

The Realistic Achievable Potential (RAP) scenario:

- Included all cost-effective programs
- Restricted growth in Evergy's existing programs to current achieved participation levels
- Lowered baseline projection for the peak demand savings generated through RAP-forecasted energy efficiency adoption
- Used the TOU Low-Retention rate of 50% and dampened TOU impacts for the first few years to simulate a learning curve (i.e., assuming customers become more effective at responding appropriately to pricing signals over time)

RAP Sensitivity Analysis:

Tested the sensitivity of DR/DSR potential to changes in participation rates in all program options.

RAP Sensitivity Analysis

AEG analyzed two sensitivities in addition to the RAP scenario.

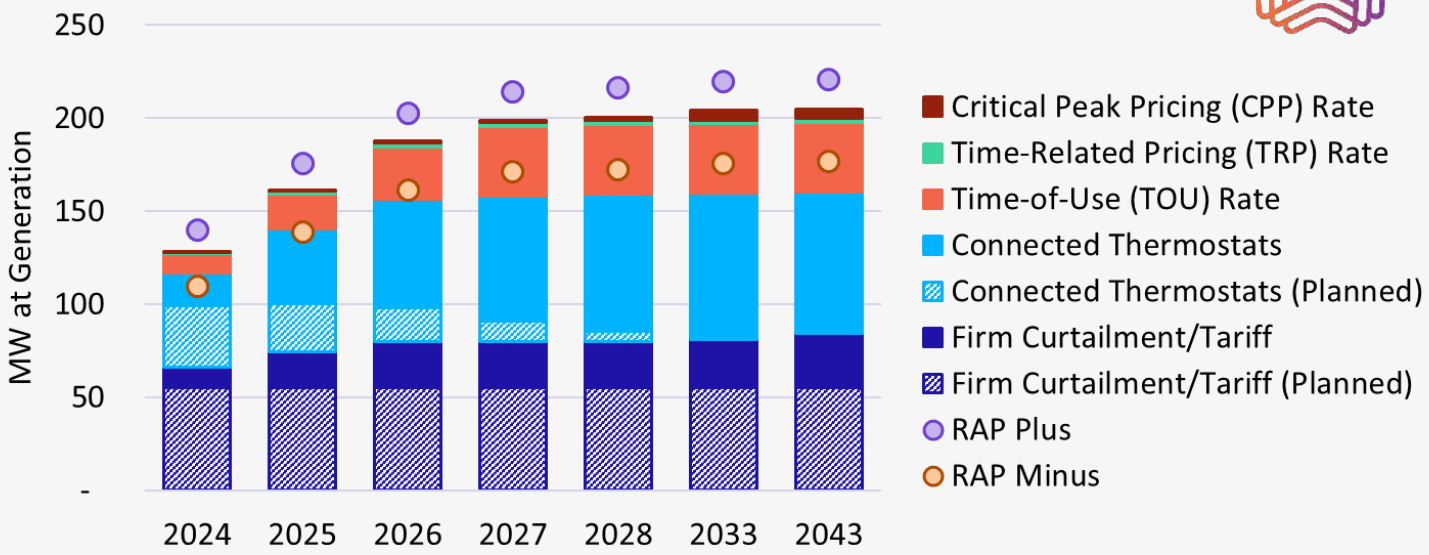
- The RAP Plus scenario increases participation in DR/DSR program options, providing an upper bound around potential under RAP circumstances.
- The RAP Minus scenario provided a lower bound around potential.

Sensitivity	Participation Adjustments	Cost Adjustments	TOU Standard Retention	TOU Impacts
RAP	N/A	N/A	50% of all residential customers	4-year learning curve
RAP Plus[1]	10% increase from RAP	No cost adjustment	50% of all residential customers	4-year learning curve
RAP Minus	15% decrease from RAP	No cost adjustment	43% of all residential customers (15% decrease from RAP)	4-year learning curve

[1]AEG did not increase the TOU retention rate (i.e., TOU Standard participation) in this sensitivity.

RAP Summer Potential Results

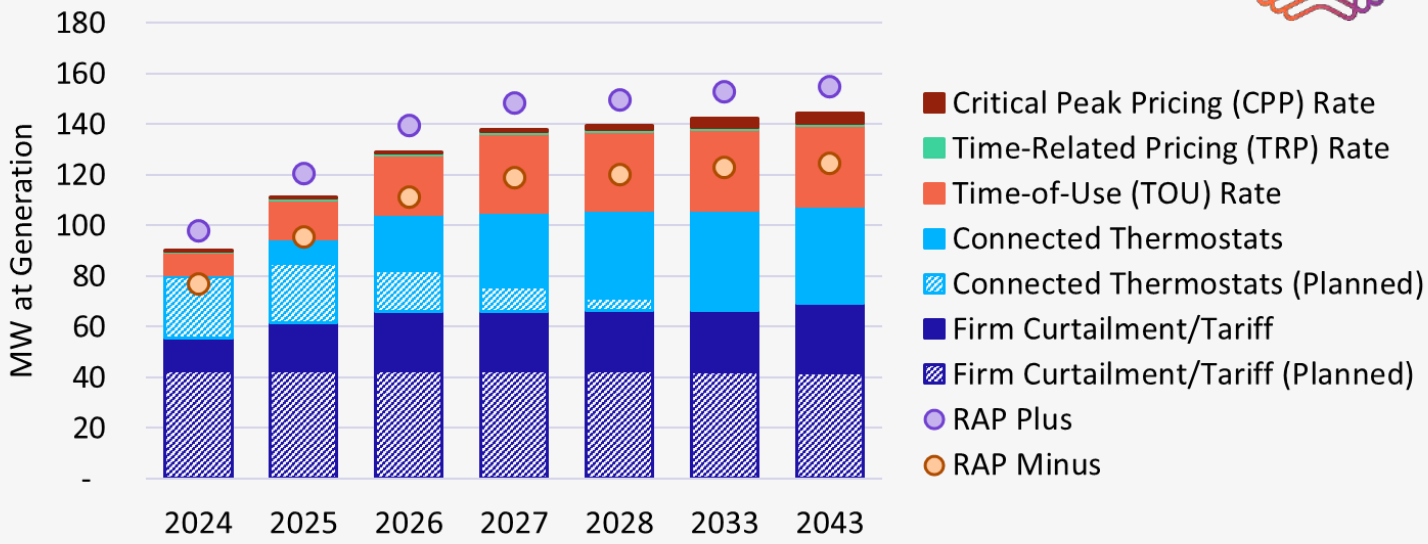
- By 2043, DR/DSR potential is estimated to reduce the summer peak demand baseline by 9%.
  - Firm Curtailment and Connected Thermostats generate over 7% of this reduction and account for nearly 80% of the 2043 DR/DSR potential.
  - TOU rates contribute another 18% to total potential in 2043 and reduce the baseline by another 2%.
  - Over 40% of the potential comes from planned (and existing) programs.
- RAP Plus increased potential by 16 MW
  RAP Minus decreased potential 28 MW



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)	55 (3%)
Firm Curtailment/Tariff	11 (1%)	19 (1%)	25 (1%)	25 (1%)	25 (1%)	26 (1%)	29 (1%)
Connected Thermostats (Planned)	33 (2%)	26 (1%)	18 (1%)	11 (1%)	6 (0%)	0 (0%)	0 (0%)
Connected Thermostats	18 (1%)	40 (2%)	58 (3%)	67 (3%)	74 (4%)	79 (4%)	76 (4%)
Time-of-Use (TOU) Rate	11 (1%)	19 (1%)	28 (1%)	37 (2%)	37 (2%)	37 (2%)	37 (2%)
Time-Related Pricing (TRP) Rate	1 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	2 (0%)	5 (0%)	5 (0%)
RAP Total	128 (7%)	161 (8%)	187 (9%)	199 (10%)	200 (10%)	204 (10%)	205 (9%)
RAP Plus	140 (7%)	175 (9%)	203 (10%)	214 (11%)	216 (11%)	220 (11%)	221 (10%)
RAP Minus	110 (6%)	138 (7%)	161 (8%)	171 (9%)	172 (9%)	176 (9%)	177 (8%)

RAP Winter Potential Results

- By 2043, DR/DSR potential is estimated to reduce the winter peak demand baseline by 7%.
  - Firm Curtailment and Connected Thermostats generate 5% of this reduction and account for 75% of the 2043 DR/DSR potential.
  - TOU rates contribute another 22% to total potential in 2043 and reduce the baseline by another 1.5%.
  - Almost 30% of the potential comes from planned (and existing) programs.
- RAP Plus increased potential by 11 MW
  RAP Minus decreased potential 20 MW



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	43 (2%)	43 (2%)	43 (2%)	43 (2%)	43 (2%)	42 (2%)	42 (2%)
Firm Curtailment/Tariff	13 (1%)	19 (1%)	23 (1%)	23 (1%)	24 (1%)	24 (1%)	28 (1%)
Connected Thermostats (Planned)	25 (1%)	23 (1%)	16 (1%)	10 (0%)	5 (0%)	0 (0%)	0 (0%)
Connected Thermostats	1 (0%)	10 (1%)	22 (1%)	29 (1%)	35 (2%)	40 (2%)	38 (2%)
Time-of-Use (TOU) Rate	9 (0%)	15 (1%)	23 (1%)	31 (2%)	31 (2%)	32 (2%)	32 (1%)
Time-Related Pricing (TRP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	0 (0%)	1 (0%)	1 (0%)	1 (0%)	4 (0%)	4 (0%)
RAP Total	90 (5%)	111 (6%)	129 (7%)	138 (7%)	139 (7%)	142 (7%)	144 (7%)
RAP Plus	98 (5%)	121 (6%)	139 (7%)	148 (7%)	150 (7%)	153 (7%)	155 (7%)
RAP Minus	77 (4%)	96 (5%)	111 (6%)	119 (6%)	120 (6%)	123 (6%)	124 (6%)

Standalone Potential

Key Assumptions

Standalone potential provides a view of each program option in isolation, before accounting for any competition between DR/DSR resources.

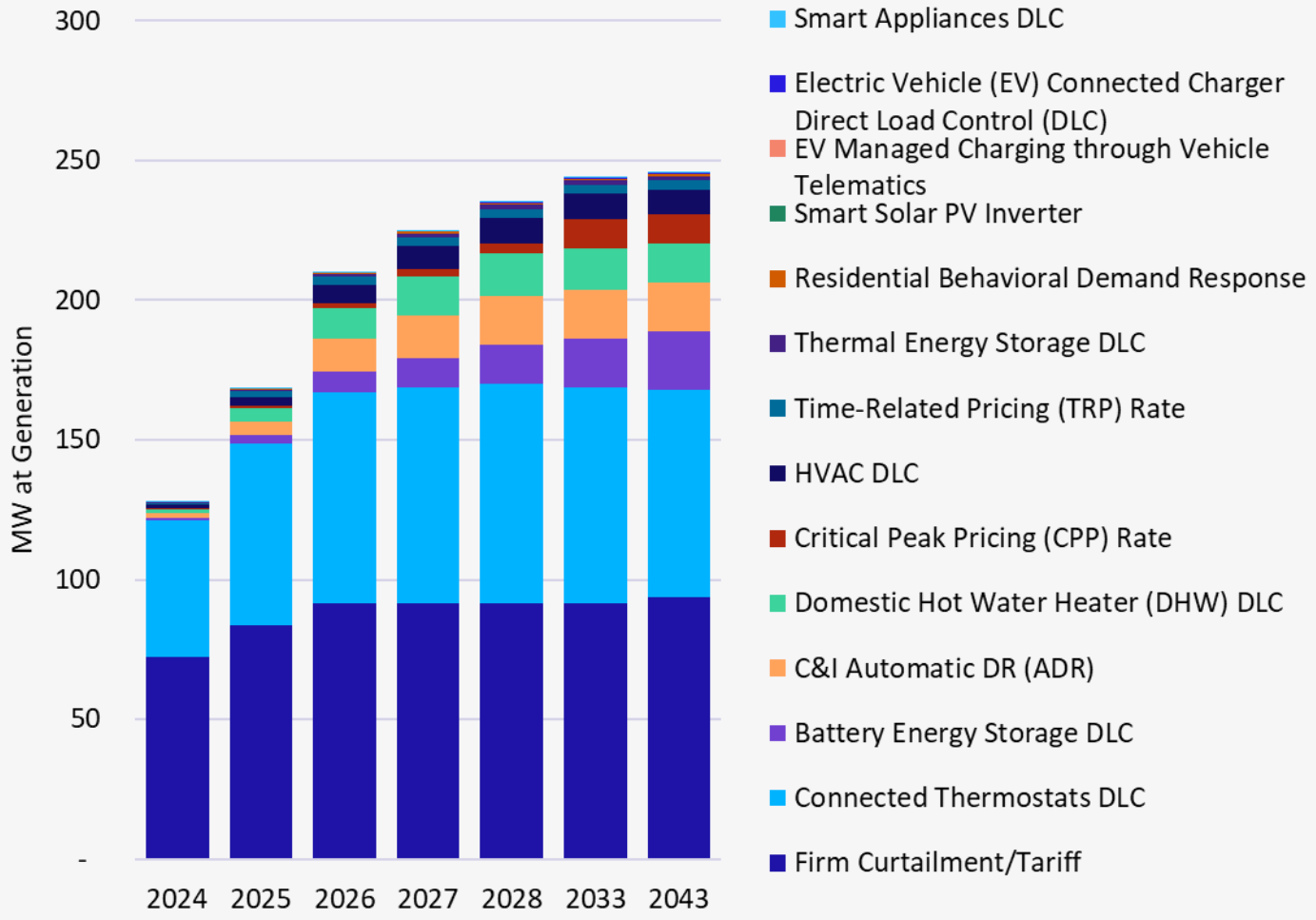
- Maximizes the potential each DR/DSR could provide if no other programs were offered that targeted the same demand during peak hours.
- The economic screen uses standalone potential, because programs will only become less cost-effective once program competition reduces the available capacity to target.

The economic screen identified cost-effective programs for inclusion in the MAP and RAP scenarios.

- Economic screening based on cumulative potential, i.e., including existing resources
- Only considered summer benefits
- Screen based on the Utility Cost Test, i.e., including incentive costs
- Modeled potential at the sector/segment level but screened for cost-effectiveness at the whole-program level
- If a program passed in one region, we included it in both.

Standalone Potential Results

- Existing programs contribute nearly double the summer potential generated by the remaining DR/DSR programs combined, even in 2043.
- After accounting for resource competition:
  - Participation in C&I programs like C&I Automatic DR and Thermal Energy Storage goes down because the Firm Curtailment program option targets these same customers
  - Participation in residential programs like Domestic Hot Water Heater DLC and EV Managed Charging decreases because the Connected Thermostats program targets the same customers



Economic Screen

- Evergy's existing programs and both C&I DSR options passed the economic screen.
- The C&I ADR program was on the edge of being cost-effective, but many of these customers will be captured through the Firm Curtailment program.
- Many programs fell short of the threshold because of installation costs (e.g., switches), equipment and O&M costs (e.g., Battery and Smart Solar PV DLC), and overhead costs.
- Residential Behavioral DR was saddled with full development and administrative costs, i.e., independent of an HER program.

Program Option	UCT
Firm Curtailment/Tariff	3.17
Connected Thermostats DLC	3.14
Time-Related Pricing (TRP) Rate	3.08
Critical Peak Pricing (CPP) Rate	2.10
C&I Automatic DR (ADR)	0.93
HVAC DLC	0.86
Domestic Hot Water Heater (DHW) DLC	0.52
Residential Behavioral Demand Response	0.19
Battery Energy Storage DLC	0.12
Electric Vehicle (EV) Connected Charger Direct Load Control (DLC)	0.12
Smart Solar PV Inverter	0.08
Smart Appliances DLC	0.04
EV Managed Charging through Vehicle Telematics	0.04
Thermal Energy Storage DLC	0.00

Thank You.

AEG
APPLIED ENERGY GROUP

DSM Market Potential Study Results — Evergy Metro

Prepared for: evergy

Date: May 9, 2023

Table of Contents

Reporting Format

- In support of Evergy's Missouri Integrated Resource Plan (IRP) and Missouri Energy Efficiency Investment Act (MEEIA) Cycle 4 regulations, this presentation summarizes assumptions, methods, inputs, and results of the Evergy Demand Side Management (DSM) Market Potential Study.
- Along with this presentation, we provide:
  - A workbook including detailed study inputs and results.
  - A comprehensive report.
- Consistent with 4 CSR 240-22.050, the potential study provides a credible estimation of technical, economic, and achievable potential over the next 20 years.

Energy Efficiency Potential Analysis

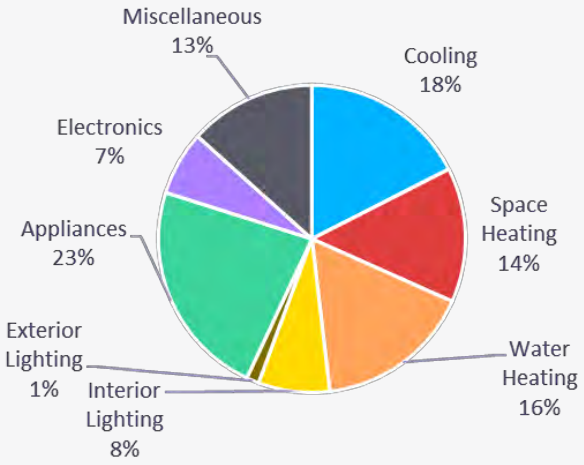
Energy Efficiency Potential Approach

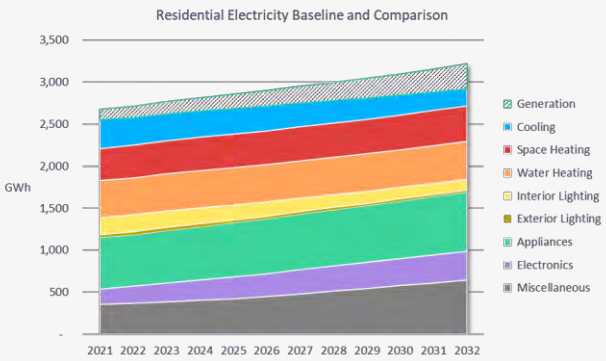
Market Characterization
- Customer Segmentation
- Utility Data
- Residential Survey
- Secondary Data

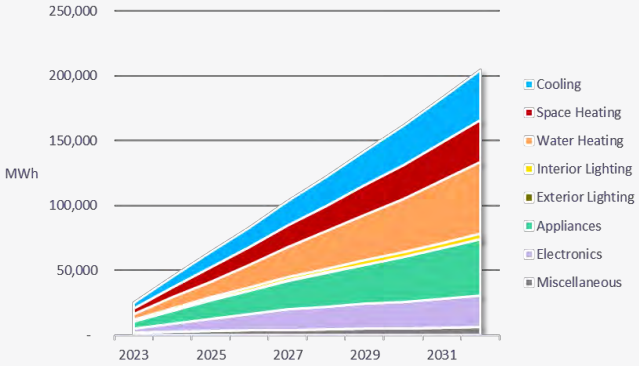
Identify and Characterize Measures
- Efficient Equipment
- Retrofit Opportunities
- Emerging Technologies

Baseline Projection
- Utility Forecasts
- Stock Turnover
- Codes and Standards

Potential Estimation
- Technical, Economic, and Achievable (MAP and RAP)
- Benchmarked against recent program history

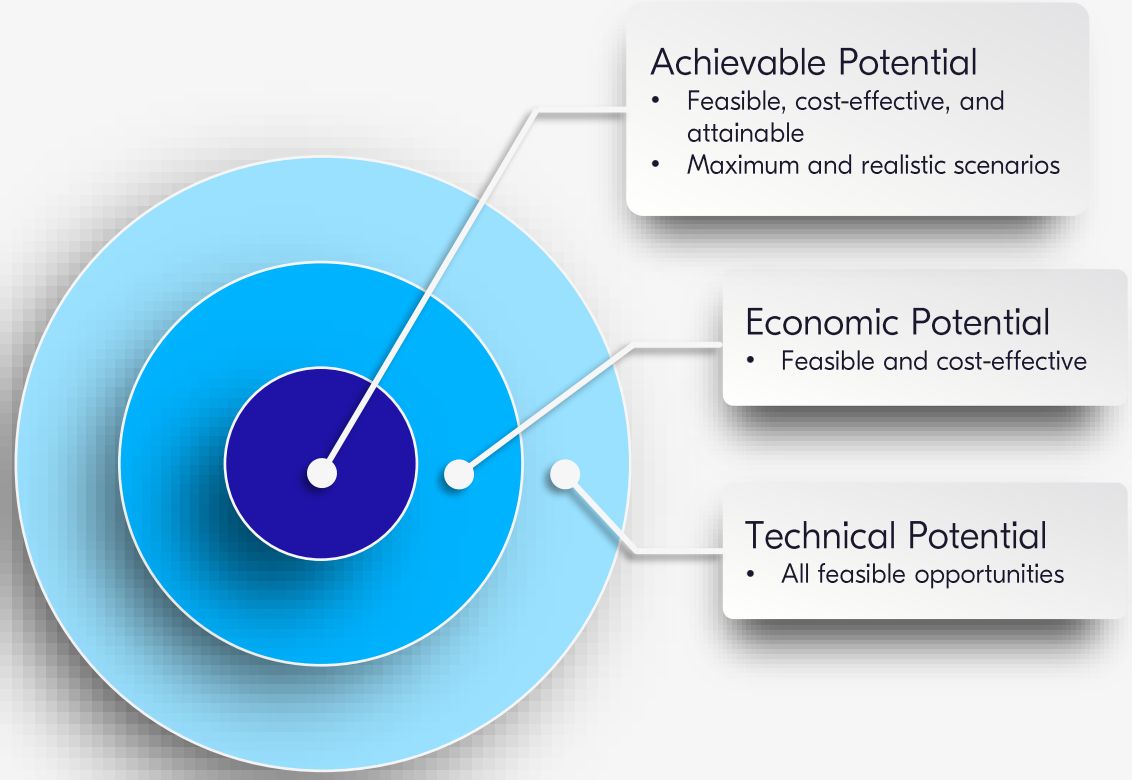






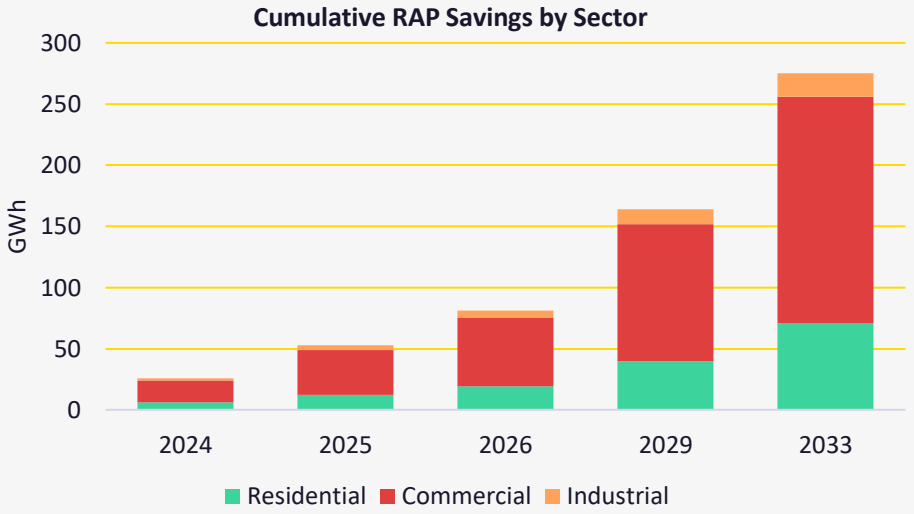
Estimating Energy Efficiency Potential

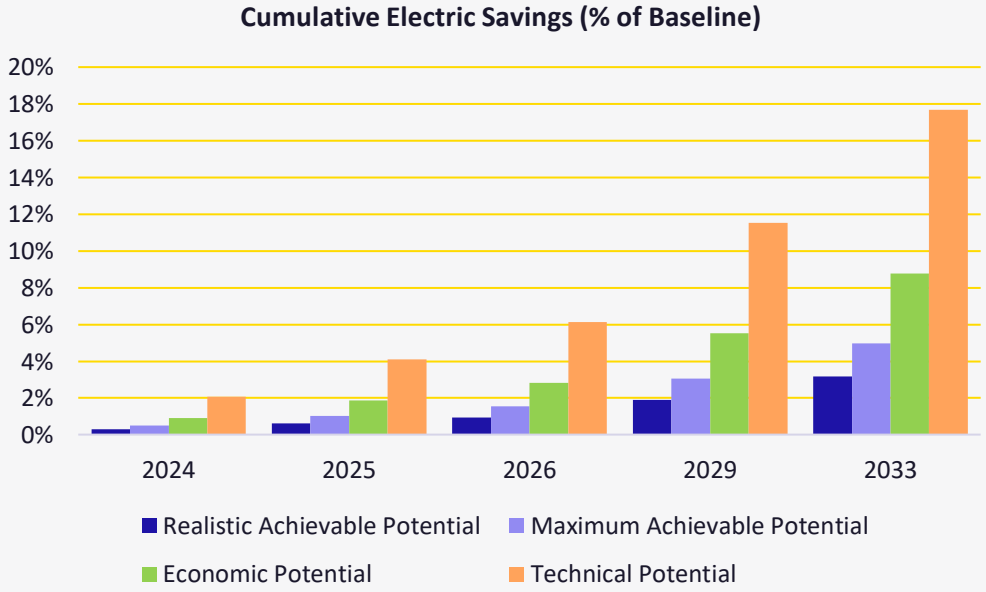
- Potential was estimated by creating an alternate sales forecast incorporating efficient measure adoption and calculating the change from the baseline
- AEG calculated three distinct levels of potential: Technical, Economic, and Achievable
- Achievable potential was assessed under two scenarios:
  - Realistic Achievable Potential (RAP)
  - Maximum Achievable Potential (MAP)

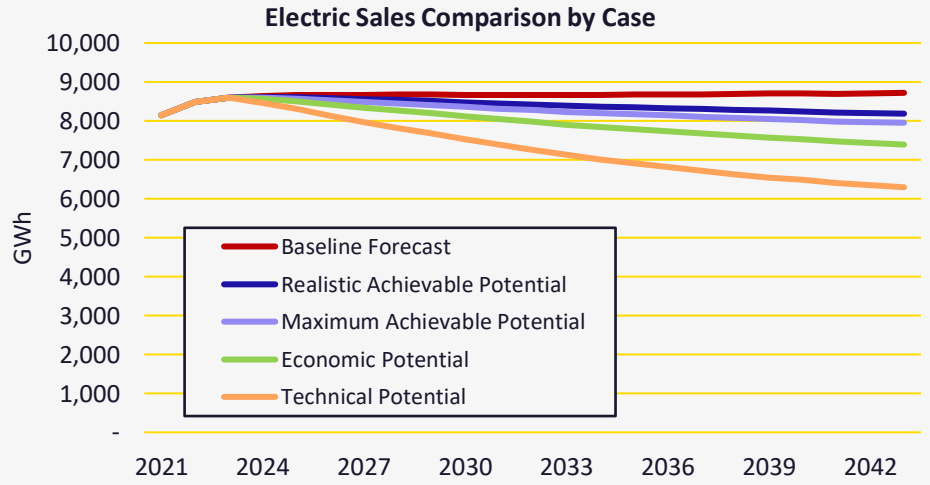


EE Potential Results — Evergy Metro Summary

- Cumulative RAP savings are 81.2 GWh by 2026 and 275.3 GWh by 2033, an average of 0.3% of the baseline per year.
- The Commercial sector contributes the most savings.
- Cooling contributes the most to savings, followed by Commercial Lighting and Space Heating.

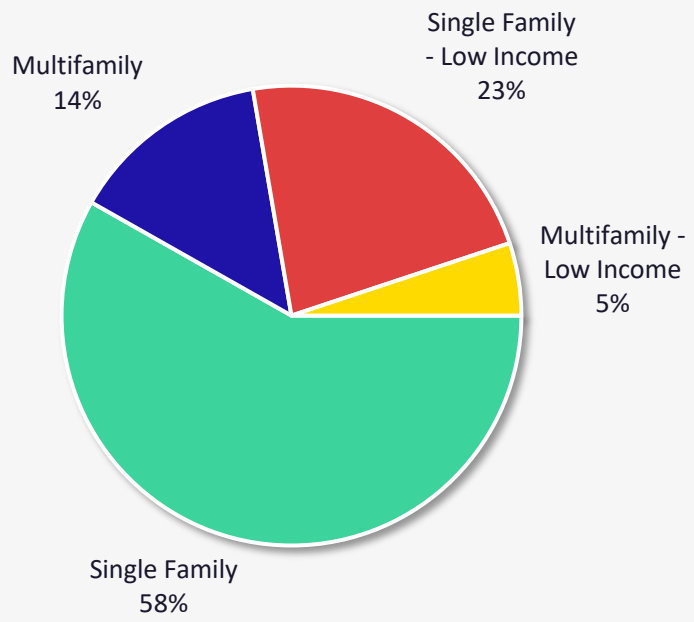






Residential Potential

Residential Market Characterization

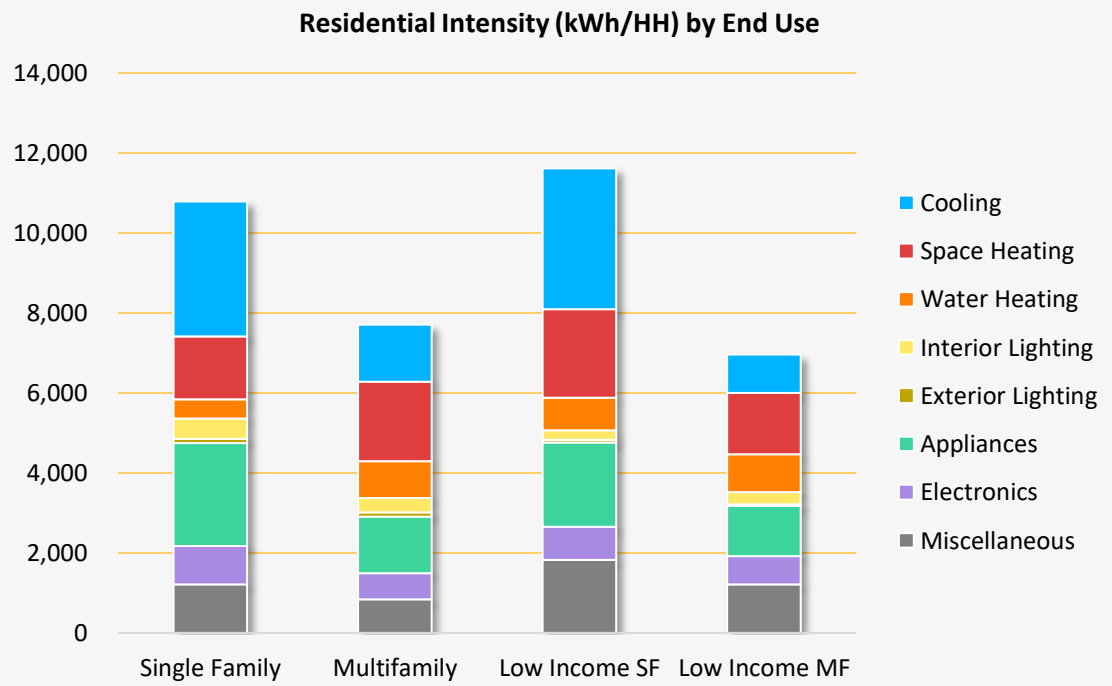


Segment	Electric Use (GWh)	Households	Avg. Use/HH (kWh)	% of Electric Use
Single Family	1,552.3	146,443	10,600	58%
Multifamily	376.3	48,822	7,707	14%
Single Family - Low Income	602.7	51,858	11,621	23%
Multifamily - Low Income	136.1	19,539	6,965	5%
Total	**2,667.3**	**266,662**	**10,003**	**100%**

- Total customers and energy load are taken directly from Evergy's 2021 data and disaggregated into housing types and income groups using a combination of Evergy's system data and demographic information from the US Census.
- The majority of homes in Evergy's Metro territory are single family dwellings, which use 81% of the Residential electricity in the Metro region.

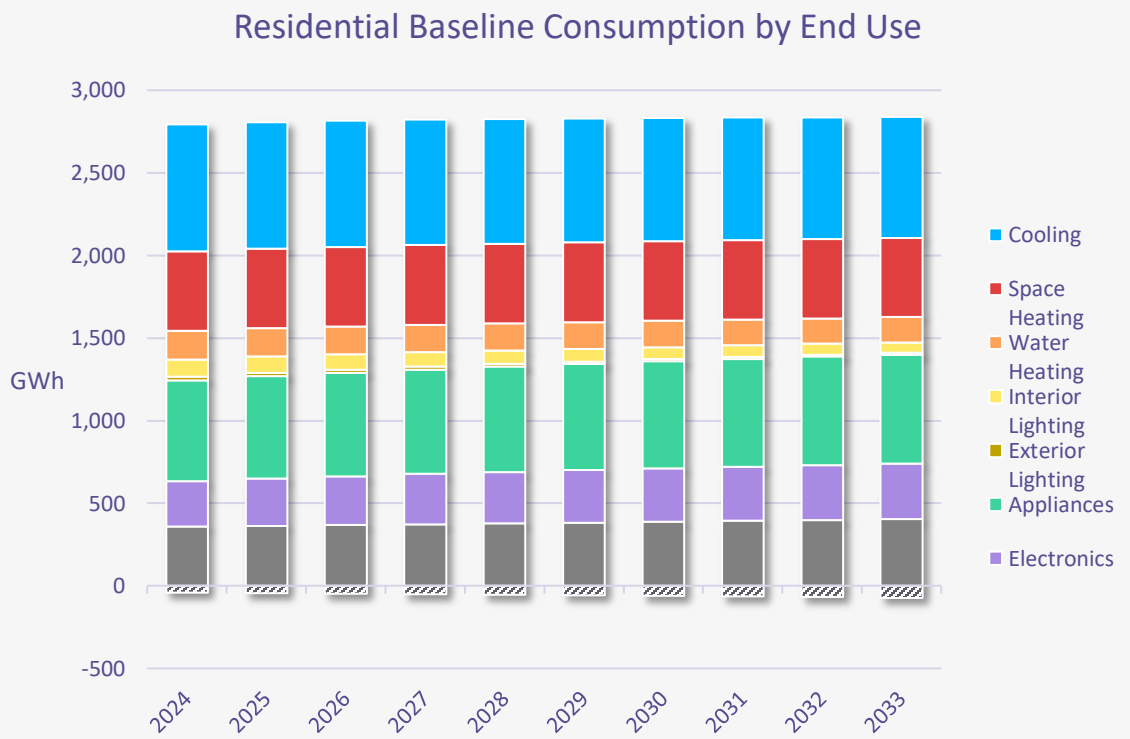
Residential Market Profiles

- The market profile disaggregates energy load per household into specific end uses and technologies.
- Total household **intensity** (kWh per HH) is calibrated to values shown on the previous slide. It is a function of:
  - Saturation – the percentage of homes where equipment is present
  - Unit Energy Consumption – the average annual energy use of a given technology where it is present.
  - Values are taken from well-vetted sources as close to Evergy Metro's territory as possible
- Key Data Sources
  - Evergy Metro Data
  - Residential Appliance Saturation Survey (RASS)
  - EIA Annual Energy Outlook



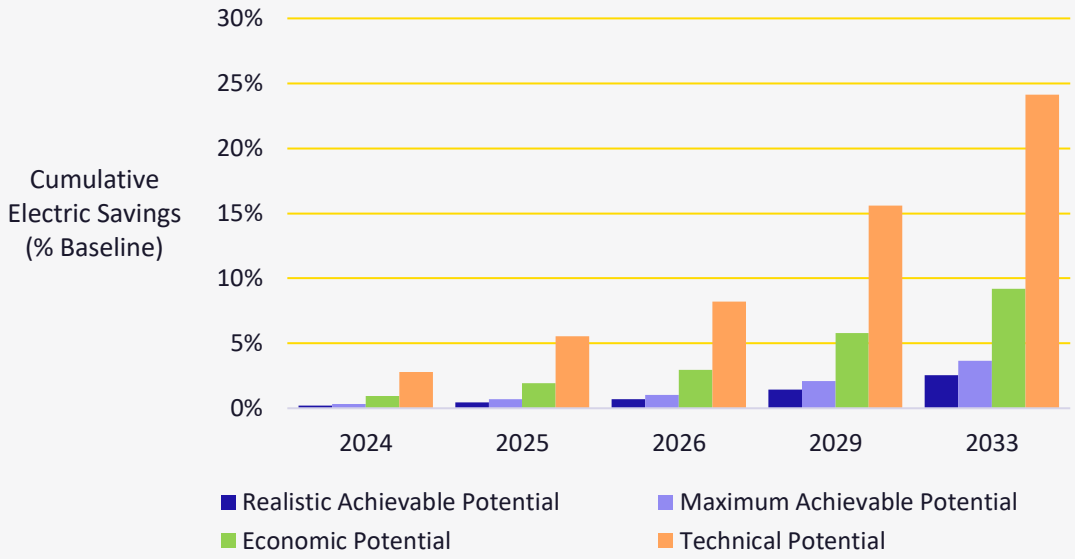
Residential Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Residential Potential Results

- By 2026, cumulative Realistic Achievable Potential (RAP) is 19.1 GWh, or 0.7% of the reference baseline. By 2033, this increases to 70.8 GWh, or 2.6% of the baseline.
  - This is an average of 0.26% per year.
- Maximum Achievable Potential (MAP) reaches 28.9 GWh by 2026, and 101.2 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	2,755	2,765	2,771	2,773	2,766
Cumulative Savings (GWh)					
Realistic Achievable Potential	6	12	19	40	71
Maximum Achievable Potential	9	19	29	59	101
Economic Potential	27	54	82	160	255
Technical Potential	77	153	227	433	668
Cumulative as % of Baseline					
Realistic Achievable Potential	0.2%	0.4%	0.7%	1.4%	2.6%
Maximum Achievable Potential	0.3%	0.7%	1.0%	2.1%	3.7%
Economic Potential	1.0%	1.9%	3.0%	5.8%	9.2%
Technical Potential	2.8%	5.5%	8.2%	15.6%	24.1%

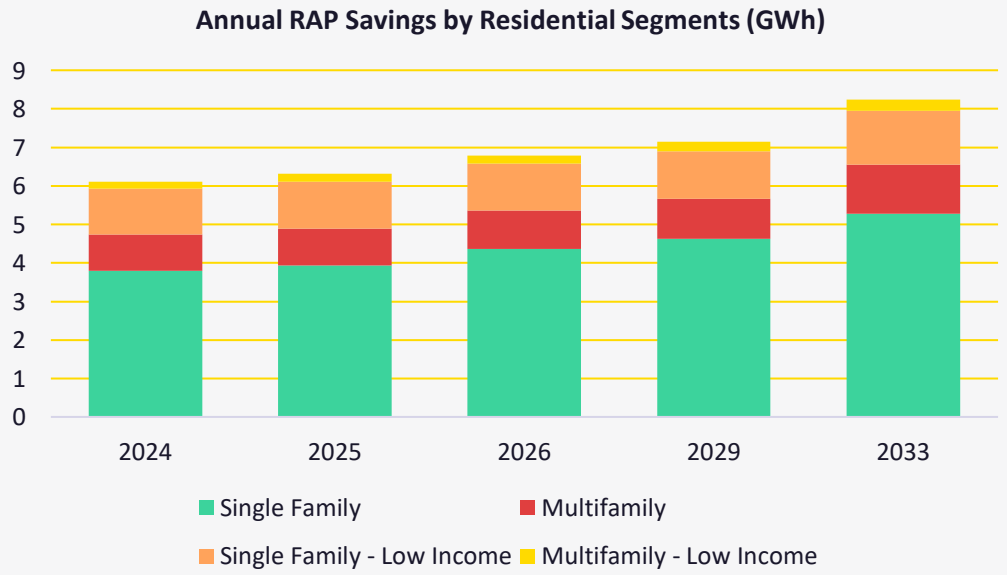
Residential Top Measures - RAP

- Central AC upgrades are the top measure.
- Thermostats and duct/building shell sealing to reduce HVAC use round out the top 5.
  - Collectively, the top 5 measures are half the achievable savings.
- LED Lighting is assumed as a baseline condition based on market trends and DOE assumptions, and does not provide program potential here aside from some small savings in EISA-exempt lighting

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	Central AC (SEER 18.0 (CEE Tier 2))	3,653	19.1%
2	Connected Thermostat - ENERGY STAR (1.0) (Networked Thermostat Installed)	2,118	11.1%
3	Ducting - Repair and Sealing (Sealed)	2,070	10.8%
4	Ducting - Repair and Sealing - Aerosol (G.17 Aerosol Duct Sealing)	1,276	6.7%
5	Building Shell - Liquid-Applied Weather-Resistive Barrier (Liquid-Applied Weather-Resistant Barrier)	958	5.0%
6	Room AC - Recycling (Unit Removed)	948	5.0%
7	Refrigerator (CEE Tier 3 (20% above standard))	915	4.8%
8	Water Heater (> 55 Gal) (Heat Pump (UEF 3.9))	807	4.2%
9	Furnace - Conversion to Air-Source Heat Pump	622	3.3%
10	Insulation - Basement Sidewall (R-11)	621	3.3%
11	Air-Source Heat Pump (SEER 16.0 / HSPF 9.2 (ENERGY STAR 6.1))	578	3.0%
12	Insulation - Ducting (R-8)	550	2.9%
13	Room AC (CEER 13.9)	490	2.6%
14	Advanced Power Strips - Load or Occupancy (Tier 1 - Load Sensing)	436	2.3%
15	Exempted Lighting (LED 2020 (95 lm/W))	400	2.1%
16	Central Heat Pump - Controls and Commissioning (Central Heat Pump with auxiliary heat control strategy, lockout settings, and other operational parameters)	387	2.0%
17	Insulation - Radiant Barrier (Installed)	369	1.9%
18	Water Heater - Drainwater Heat Recovery (Installed)	278	1.5%
19	Second Refrigerator (CEE Tier 3 (20% above standard))	233	1.2%
20	Air Purifier (ENERGY STAR (2.0) (2.7 CADR/W))	179	0.9%
	Total of Top 20 Measures	**17,889**	**93.6%**
	Total Savings - All Measures	**19,115**	**100.0%**

Residential Potential by Segment

- This slide shows incremental (annual) savings by housing type and income group.

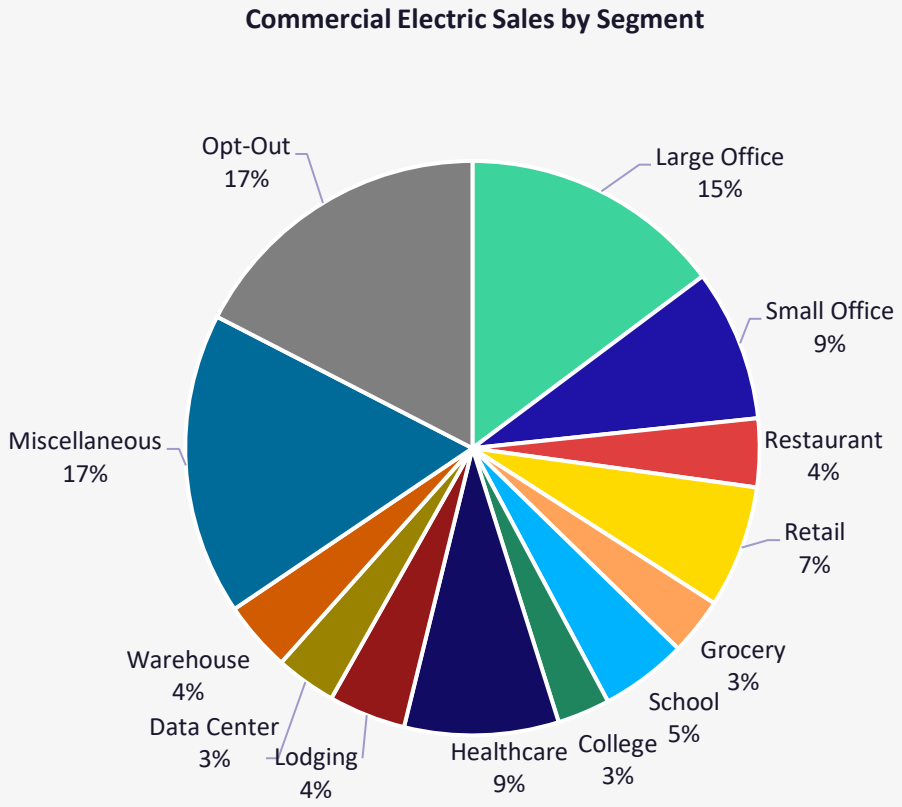


- Savings are a function of consumption, so most savings are coming from the largest segment – single family homes that are not low-income.
- Low-income segments show potential proportionate to their loads

Cumulative GWh	2024	2025	2026	2029	2033
Realistic Achievable Potential					
Single Family	3.8	3.9	4.4	4.6	5.3
Multifamily	0.9	1.0	1.0	1.0	1.3
Single Family - Low Income	1.2	1.2	1.2	1.2	1.4
Multifamily - Low Income	0.2	0.2	0.2	0.2	0.3
Total	**6.1**	**6.3**	**6.8**	**7.1**	**8.2**
Total Low-Income	***1.4***	***1.4***	***1.4***	***1.5***	***1.7***
Maximum Achievable Potential					
Single Family	6.0	6.1	6.7	6.7	7.2
Multifamily	1.5	1.5	1.5	1.5	1.7
Single Family - Low-Income	1.7	1.7	1.7	1.6	1.8
Multifamily - Low-Income	0.2	0.3	0.3	0.3	0.4
Total	**9.4**	**9.6**	**10.1**	**10.2**	**11.1**
Total Low-Income	***1.9***	***2.0***	***2.0***	***2.0***	***2.2***

Commercial Potential

Commercial Market Characterization

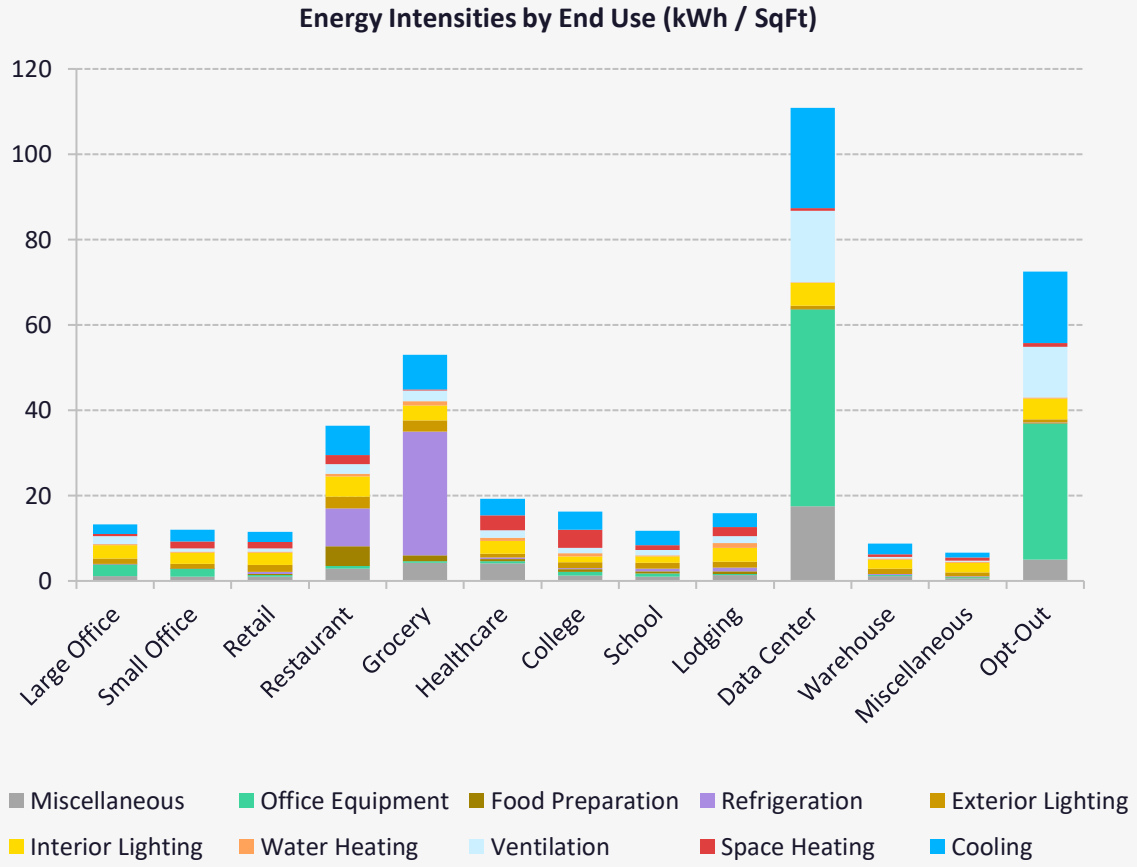


Segment	Electric Use (GWh)	% of Total	Floor Space (Million sqft)	Intensity (kWh/sqft)
Large Office	602.2	15%	45.63	13.20
Small Office	348.1	9%	29.01	12.00
Retail	280.7	7%	4.32	36.36
Restaurant	157.0	4%	24.57	11.42
Grocery	131.1	3%	2.47	52.99
School	198.9	5%	16.91	11.76
College	120.8	3%	7.47	16.16
Healthcare	353.8	9%	18.39	19.24
Lodging	176.8	4%	11.21	15.78
Data Center	139.2	3%	1.26	110.92
Warehouse	161.0	4%	18.57	8.67
Miscellaneous	693.3	17%	104.97	6.60
Opt-Out	710.1	17%	9.79	72.56
Commercial Total	**4,073.1**	**100%**	**294.57**	**13.83**

- AEG categorized commercial accounts into segments using customer SIC and business data from Evergy.
- Miscellaneous and Large Office segments dominate the commercial load.
  - The Miscellaneous segment includes nonresidential/non-manufacturing spaces not elsewhere classified or difficult to classify.
- Customers opting out of Evergy programs are separated into their own segment to avoid overstating program potential.

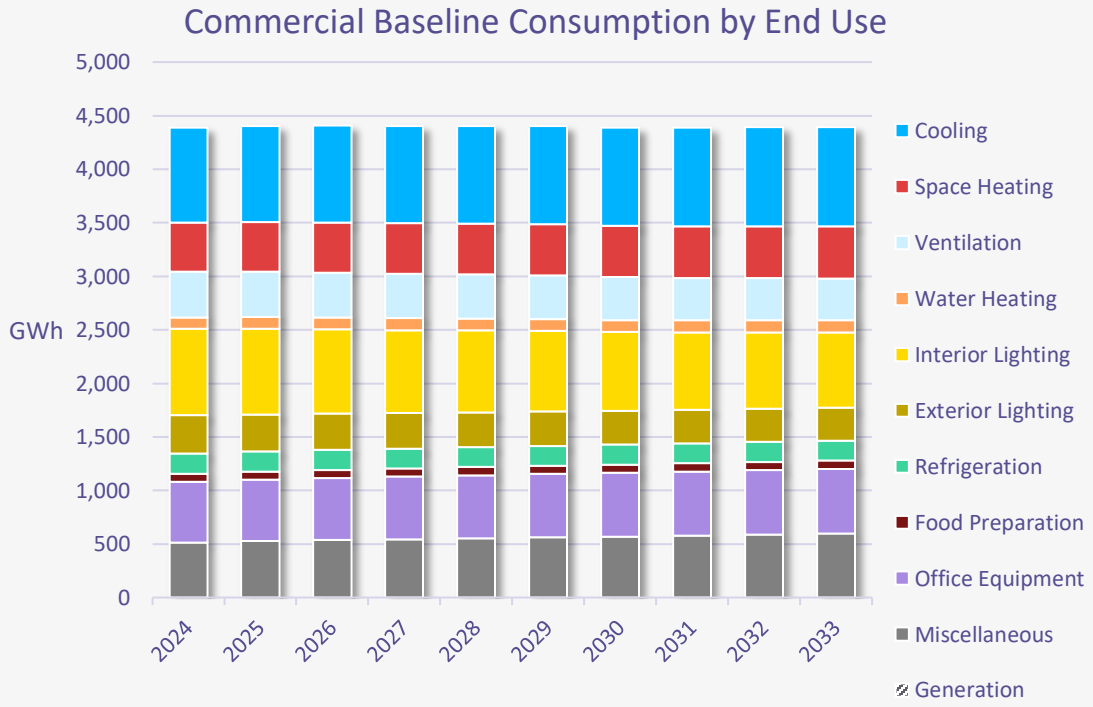
Commercial Market Profiles

- Just like residential, the commercial market profile disaggregates the nonresidential loads into end uses and technologies, calibrating to the appropriate total intensity.
- Key Data Sources
  - Evergy Billing and Load Research Data
  - 2012 EIA Commercial Buildings Energy Consumption Survey (CBECS)
  - U.S. DOE Solid State Lighting Forecast Report (2019)
  - EIA Annual Energy Outlook (AEO)
  - AEG Data and Energy Market Profiles



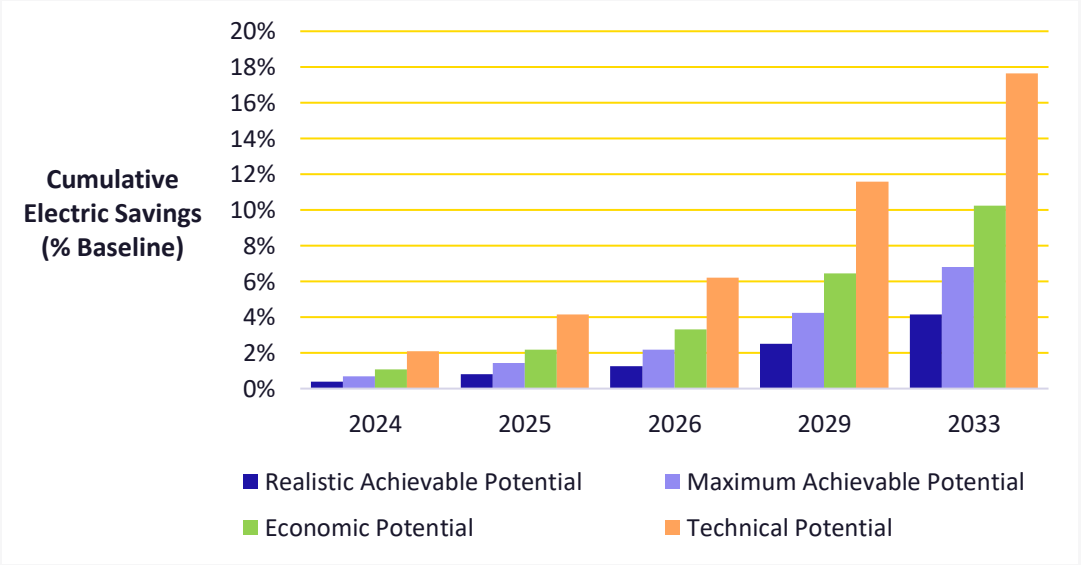
Commercial Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts.
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Commercial Potential Results

- By 2026, cumulative RAP is 56.3 GWh, or 1.3% of the reference baseline. By 2033, this increases to 185.3 GWh, or 4.2% of the baseline.
  - This is an average of 0.4% per year.
- MAP reaches 97.1 GWh by 2026, and 303 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	4,419	4,434	4,440	4,444	4,438
Cumulative Net Savings (GWh)					
Realistic Achievable Potential	18	37	56	112	185
Maximum Achievable Potential	31	64	97	189	303
Economic Potential	48	97	148	287	455
Technical Potential	92	185	276	515	783
Cumulative as % of Baseline					
Realistic Achievable Potential	0.4%	0.8%	1.3%	2.5%	4.2%
Maximum Achievable Potential	0.7%	1.4%	2.2%	4.3%	6.8%
Economic Potential	1.1%	2.2%	3.3%	6.5%	10.3%
Technical Potential	2.1%	4.2%	6.2%	11.6%	17.6%

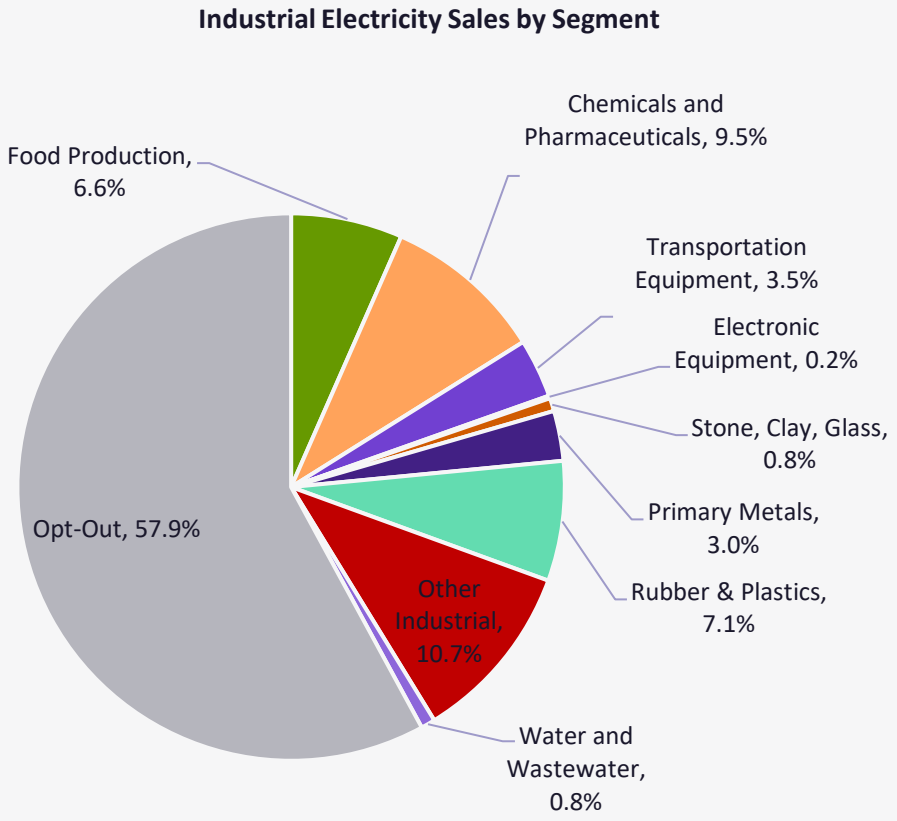
Commercial Top Measures - RAP

- Linear Lighting, Retrocommissioning, and Rooftop Unit (RTU) upgrades have the most significant potential savings.
  - There is significant LED penetration in the baseline for linear and high bay, but this measure is a bundle with embedded controls at the time of fixture replacement, which gives savings above a simple LED.
- Because not all electronics (computers, servers, desktop monitors, etc.) purchased are ENERGY STAR certified, these measures have significant savings potential.
  - However, it can be difficult to incentivize this behavior due to the low/no cost difference between ENERGY STAR and non-certified units.

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	Linear Lighting (LED 2020 (109 lm/W system) w/ Controls)	16,233	28.8%
2	Retrocommissioning	6,455	11.5%
3	RTU (IEER 18.0 - ENERGY STAR (4.0))	5,917	10.5%
4	Exempted Lighting (LED 2020 (95 lm/W))	4,296	7.6%
5	Ventilation - Demand Controlled (Outdoor air controlled based on occupancy to meet ASHRAE 62.1)	4,082	7.3%
6	High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	3,200	5.7%
7	Server (ENERGY STAR (3.0))	2,656	4.7%
8	Ventilation - Variable Speed Control (VSD on fan motor)	1,297	2.3%
9	Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	1,086	1.9%
10	POS Terminal (ENERGY STAR (7.1))	1,057	1.9%
11	HVAC - Maintenance (Tune-up of unitary HVAC systems.)	986	1.8%
12	RTU - Advanced Controls (Advanced controls on roof top unit.)	901	1.6%
13	Griddle (ENERGY STAR (1.2))	734	1.3%
14	Ducting - Repair and Sealing (Sealed)	681	1.2%
15	Data Center - Best Practice Measures	642	1.1%
16	Area Lighting (LED 2020 (120 lm/W) w/ Controls)	616	1.1%
17	Advanced New Construction Designs (exceeding ASHRAE 90.1 requirements)	410	0.7%
18	Oven (ENERGY STAR (2.2))	409	0.7%
19	Chiller - Variable Speed Fans (VSD on fan motors)	409	0.7%
20	Connected Thermostat - ENERGY STAR (1.0) (Thermostat connected to building management control system)	363	0.6%
	Total of Top 20 Measures	**52,429**	**93.2%**
	Total Savings - All Measures	**56,281**	**100.0%**

Industrial Potential

Industrial Market Characterization

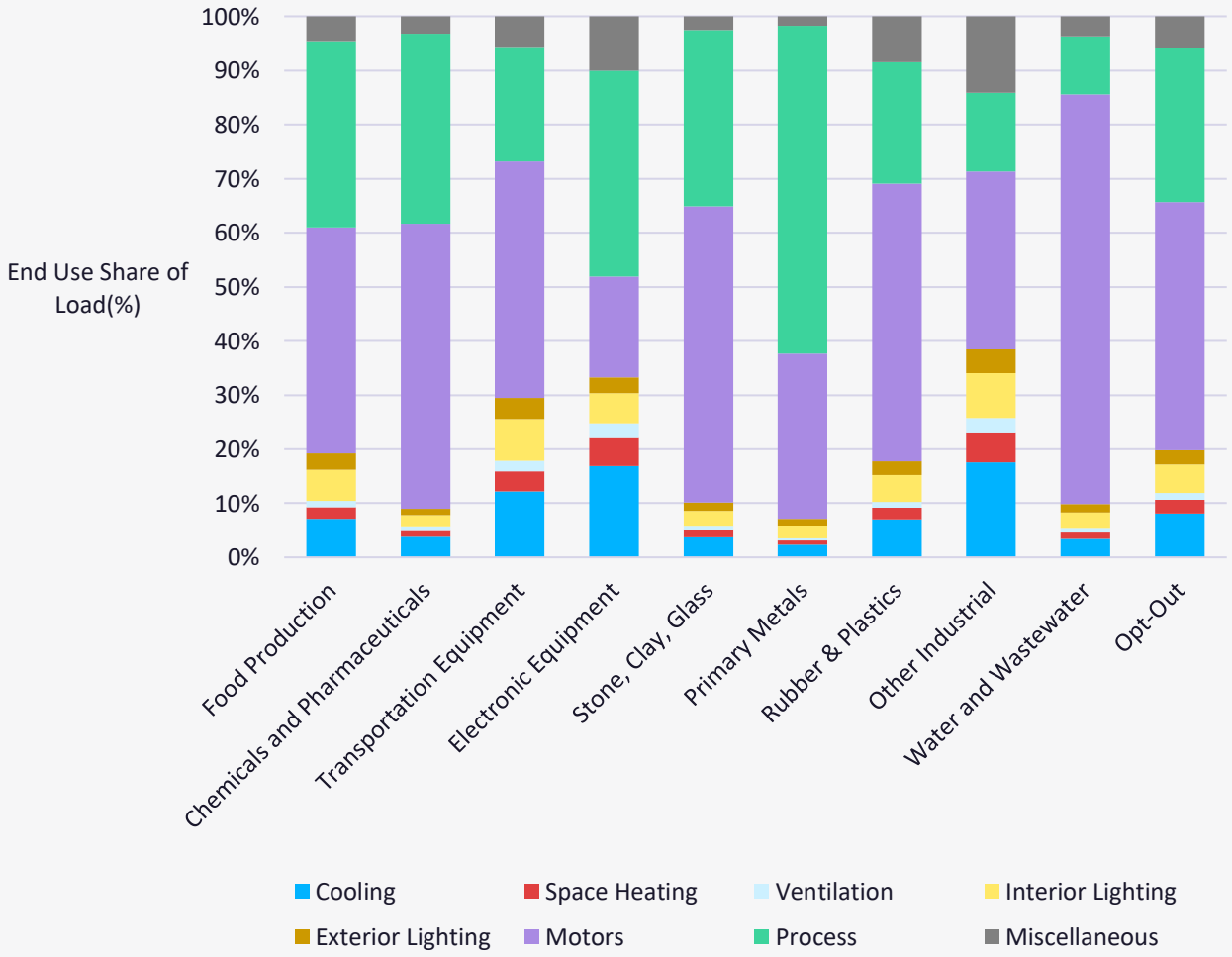


Segment	Electric Use (GWh)	% of Total
Food Production	93.0	7%
Chemicals & Pharmaceuticals	134.3	10%
Electronic Equipment	2.2	0%
Primary Metals	41.7	3%
Stone, Clay, Glass	10.9	1%
Transportation Equipment	49.1	3%
Rubber & Plastics	100.0	7%
Water & Wastewater	11.9	1%
Other Industrial	150.8	11%
Opt-Out	817.5	58%
Industrial Total	**1,411.4**	**100%**

- AEG categorized industrial accounts into segments using SIC codes and customer data from Evergy.
- A greater portion of Industrial facilities are eligible to opt out of programs compared to non-manufacturing commercial.
- The largest non-opt-out characterized segments are Other Industrial, Chemicals & Pharmaceuticals, Food Production, and Rubber & Plastics.
- The Other Industrial segment includes the NAICS "Misc. Manufacturing" class and the tail of load in categories not elsewhere classified.

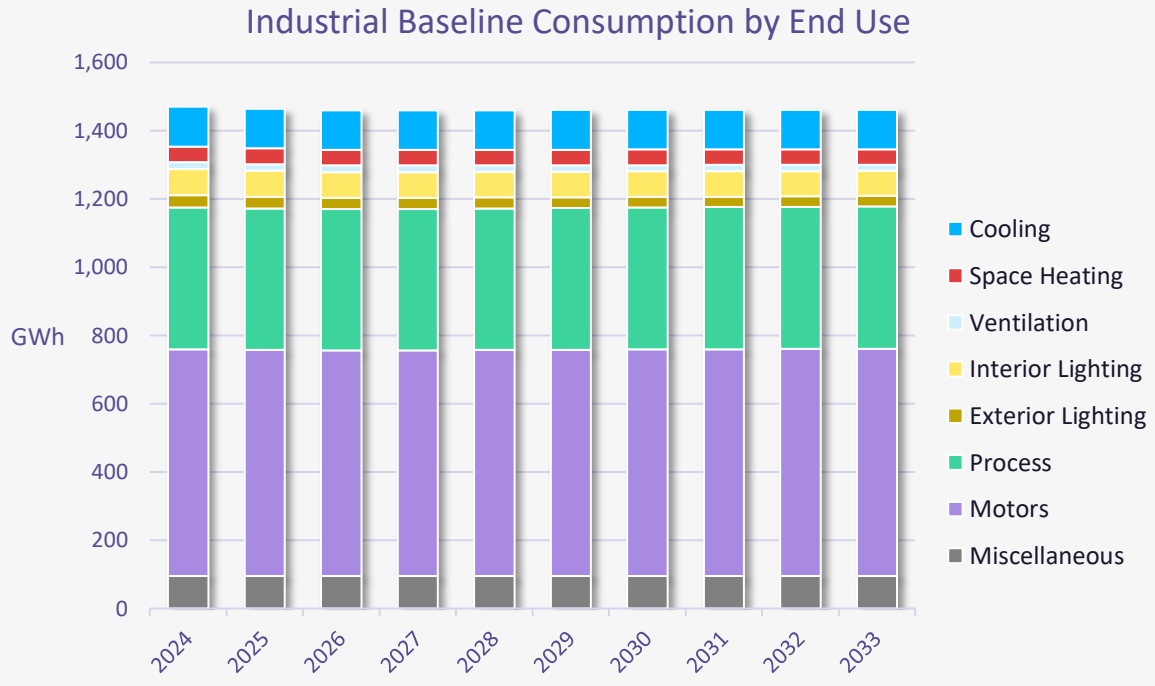
Industrial Market Profiles

- The industrial market profile disaggregates the loads into segments and intensity, calibrating to the appropriate total intensity.
- Key Data Sources
  - SIC codes by customer
  - U.S. DOE Manufacturing Energy Consumption Survey



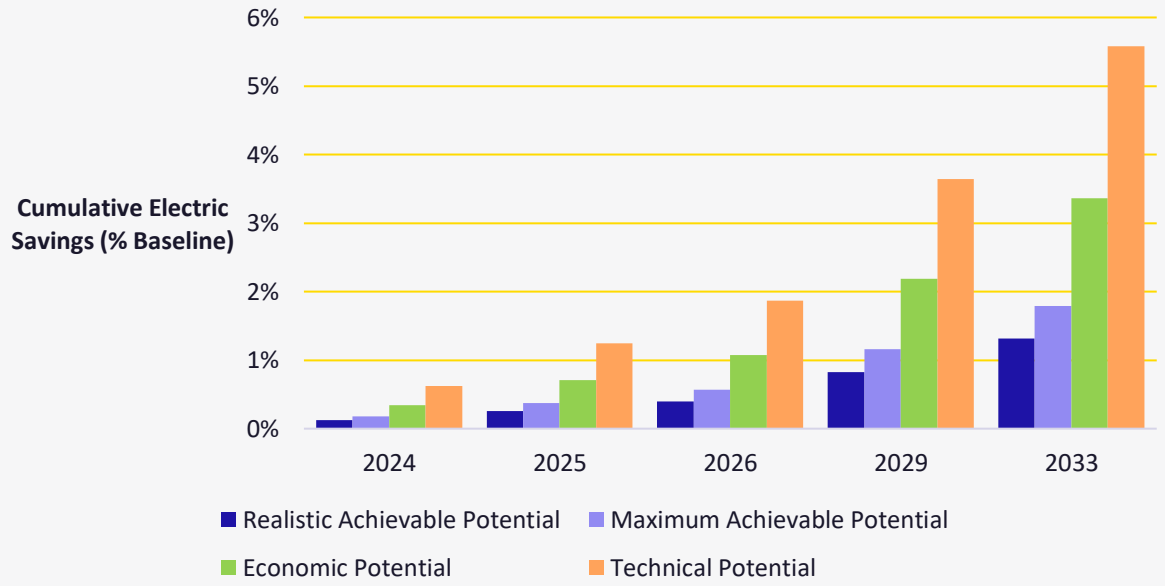
Industrial Baseline Projection

- Project a reference baseline for potential that **excludes** future DSM efforts.
- Accounts for:
  - Differences in sector and segment
  - Base-year market characterization
  - Customer growth
  - Codes and standards
  - Equipment turnover rates
  - Efficient measure penetration
  - Trends in equipment saturations
  - Weather (CDD, HDD) and other forecast drivers provided by Evergy



Industrial Potential Results

- By 2026, cumulative RAP is 5.8 GWh, or 0.4% of the reference baseline. By 2033, this increases to 19.2 GWh, or 1.3% of the baseline.
  - This is an average of 0.13% per year.
- MAP reaches 8.3 GWh by 2026, and 26.1 GWh by 2033.



	2024	2025	2026	2029	2033
Baseline Projection (GWh)	1,471	1,464	1,459	1,460	1,461
Cumulative Net Savings (GWh)					
Realistic Achievable Potential	1.8	3.8	5.8	12.0	19.2
Maximum Achievable Potential	2.7	5.5	8.3	16.9	26.1
Economic Potential	5.1	10.3	15.7	31.9	49.2
Technical Potential	9.2	18.2	27.3	53.2	81.6
Cumulative as % of Baseline					
Realistic Achievable Potential	0.1%	0.3%	0.4%	0.8%	1.3%
Maximum Achievable Potential	0.2%	0.4%	0.6%	1.2%	1.8%
Economic Potential	0.3%	0.7%	1.1%	2.2%	3.4%
Technical Potential	0.6%	1.2%	1.9%	3.6%	5.6%

Industrial Top Measures - RAP

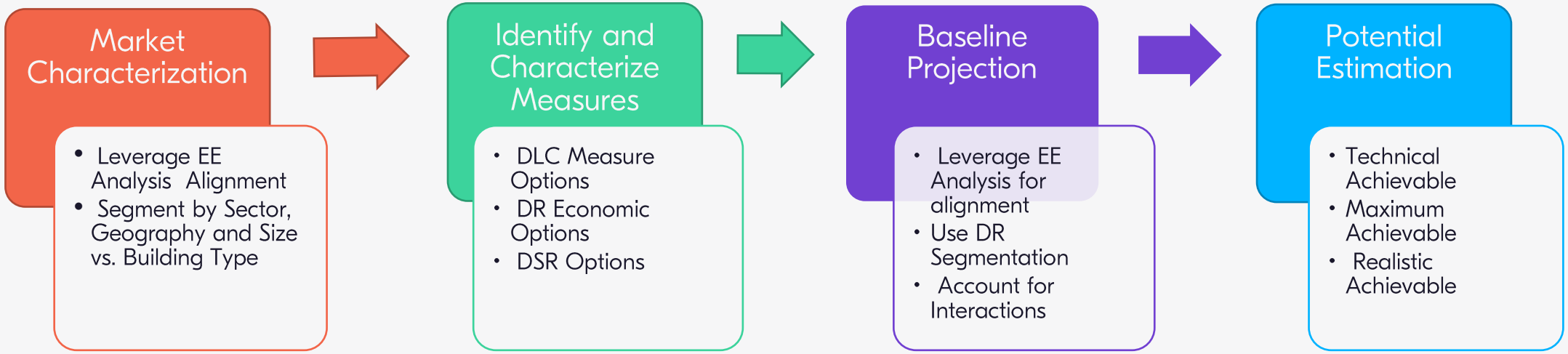
- As in commercial, LED fixture replacements, including bundles with controls, provide savings opportunities, contributing more than half of Industrial potential.
- Ventilation and HVAC chillers have some savings, though HVAC is not the largest portion of Industrial load.
- System upgrades and optimizations for various processes and motor systems make up a long tail of smaller measures in the top 20.

Rank	Measure Name	Cumulative Savings (MWh) 2026	% of Total
1	High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,066	35.7%
2	Linear Lighting (LED 2020 (109 lm/W system))	1,334	23.0%
3	Indoor Agriculture - LED Lighting (TBD)	353	6.1%
4	Ventilation (Variable Air Volume)	311	5.4%
5	Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	182	3.1%
6	Advanced Industrial Motors (TBD)	181	3.1%
7	Pumping System - System Optimization (TBD)	164	2.8%
8	Compressed Air - End Use Optimization (TBD)	156	2.7%
9	Fan System - Equipment Upgrade (TBD)	117	2.0%
10	Compressed Air - Variable Speed Drive (TBD)	101	1.7%
11	Paper - Efficient Agitator (TBD)	99	1.7%
12	Pumping System - Variable Speed Drive (TBD)	88	1.5%
13	Compressed Air - Equipment Upgrade (TBD)	79	1.4%
14	Air-Cooled Chiller (COP 4.10 (IPLV 14.0))	70	1.2%
15	Pumping System - Equipment Upgrade (TBD)	67	1.2%
16	Material Handling - Variable Speed Drive (TBD)	57	1.0%
17	Refrigeration - System Upgrade (TBD)	49	0.8%
18	Refrigeration - System Maintenance (TBD)	47	0.8%
19	Fan System - Variable Speed Drive (TBD)	38	0.7%
20	Compressed Air - System Controls (TBD)	32	0.5%
	Total of Top 20 Measures	**5,592**	**96.6%**
	Total Savings - All Measures	**5,788**	**100.0%**

DR/DSR Potential Analysis

DR and DSR Potential Approach

- General methodology for estimating DR and DSR potential is similar to energy efficiency
- Our approach accounts for two key differences:
  - **Neither exist outside of a programmatic structure (i.e., there is no naturally occurring DR)**
  - **Focus on Maximum Achievable and Realistic Achievable Potential**



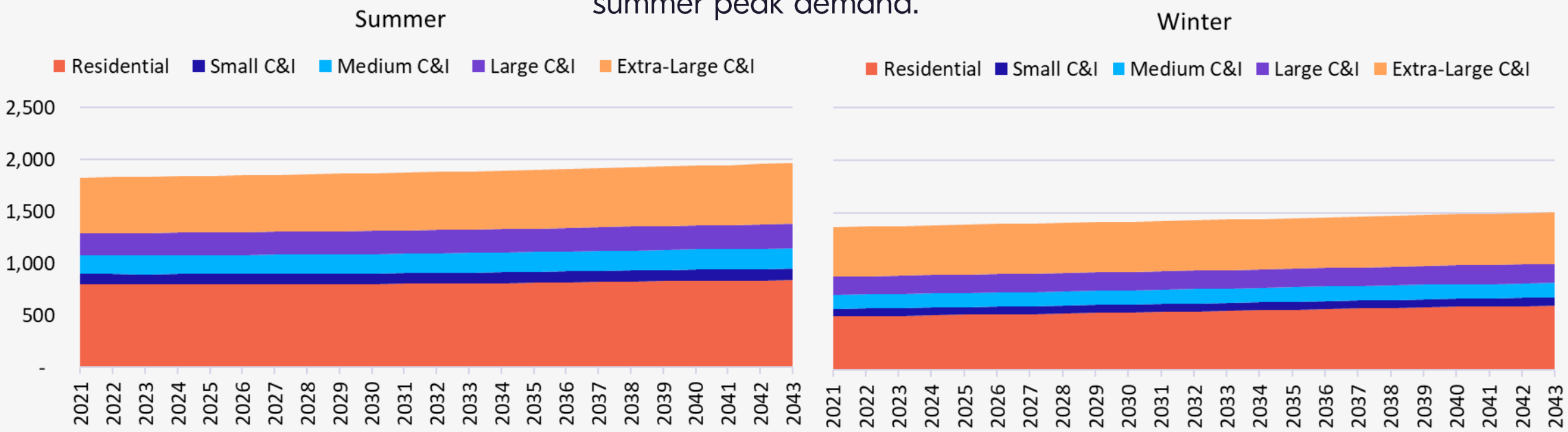
Market Characterization

Used billing data to segment C&I customers into size bins (max annual peak)

Small C&I	< 30 kW
Medium C&I	≥ 30 kW, < 150 kW
Large C&I	≥ 150 kW, < 1,000 kW
Extra-Large C&I	> 1,000 kW

Residential consumption accounts for ~45% of Evergy Metro peak demand in summer (38% in winter).

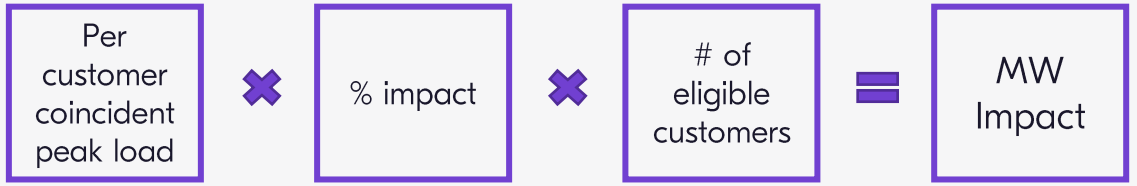
C&I winter peak demand is 20%-35% less than winter peak across size bins. Residential winter peak demand reaches only ~65% of summer peak demand.



Program Characterization

DR Options	DSR Options
DLC – End Use • Connected Thermostats – Res and C&I • Switches (heating/cooling) • Smart Homes • Electric Vehicles • Water Heating (including grid-interactive models) • Smart Solar PV Inverter • Battery Storage • Thermal Energy Storage **Economic – Whole Facility** • Firm Curtailment/Tariff • C&I Automatic DR (ADR) • Residential Behavioral Demand Response	**Rate-Based** • Critical Peak Pricing • Time-Related Pricing • Time-of-Use Rates • TOU Rate for EV Owners

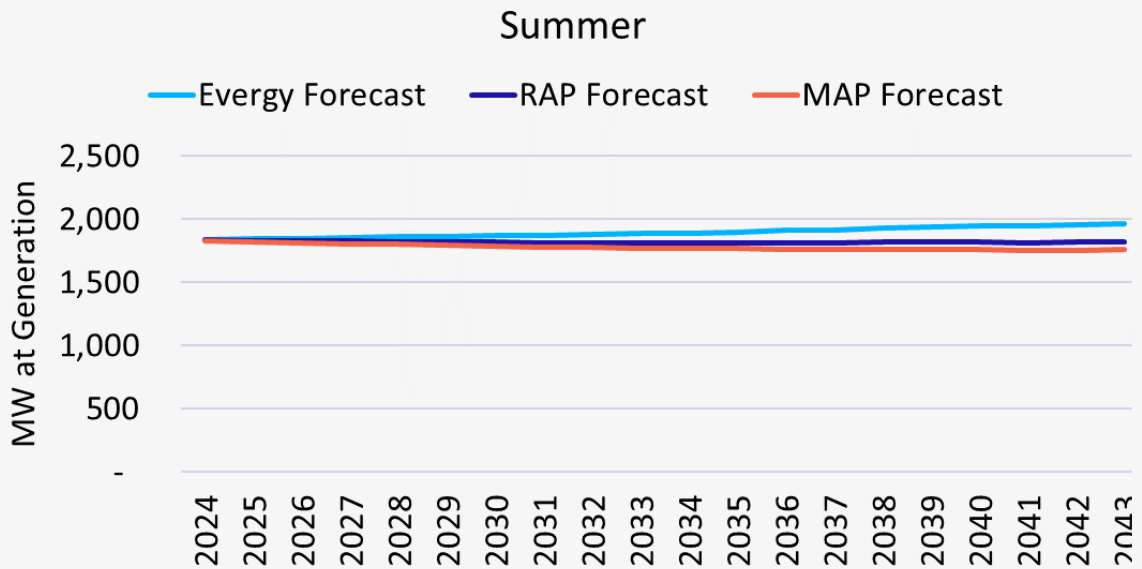
- Participation rates
  - Define eligible customers for each given option and reflect appliance saturation rates, customer segmentation, and the hierarchy
- Customer impacts
  - Percentages or kW values that reflect the total load reduction during an event
- Participant/program costs
  - Incentives and enabling technology costs, program development and administration costs, marketing and recruitment costs, O&M costs

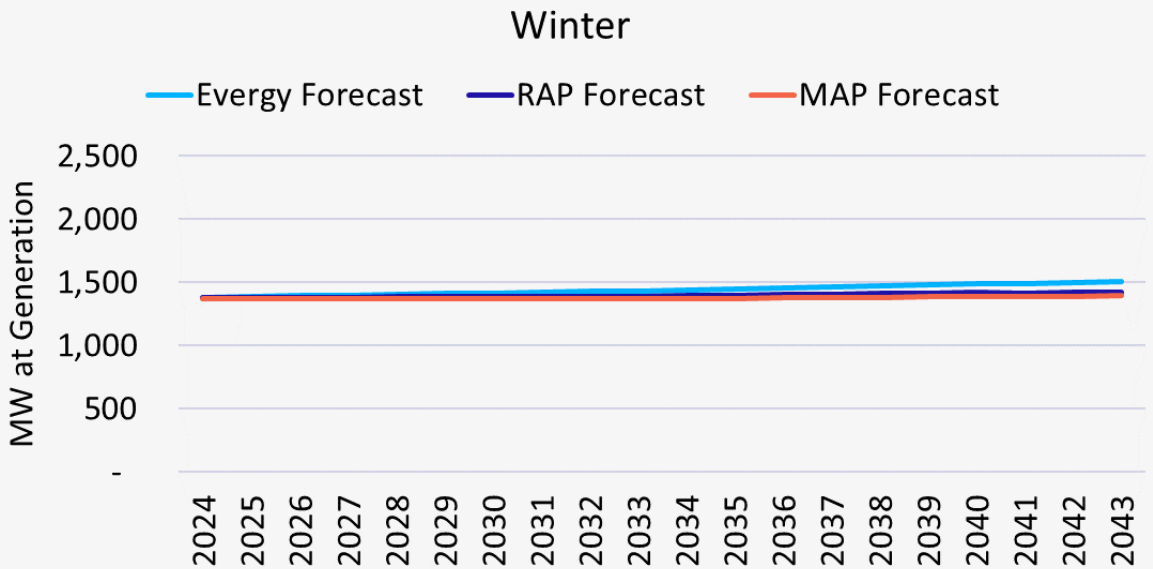


Baseline Projection

AEG developed the baseline peak demand forecasts by:

- Using the Evergy peak demand forecast by sector and territory
- Removing the peak demand savings potential generated through energy efficiency adoption forecasted in the MAP and RAP scenarios
- Summer baseline dropped by 7% (RAP) and 11% (MAP) by 2043





MAP Scenario

MAP Scenario

The Maximum Achievable Potential (MAP) scenario:

- Included all cost-effective programs
- Incorporated growth in Evergy's existing programs to benchmarked participation levels
- Lowered baseline projection for the peak demand savings generated through MAP-forecasted energy efficiency adoption.

MAP Sensitivity Analysis:

The Missouri PSC ordered Evergy to transition all residential customers to mandatory TOU rates by October 1, 2023.

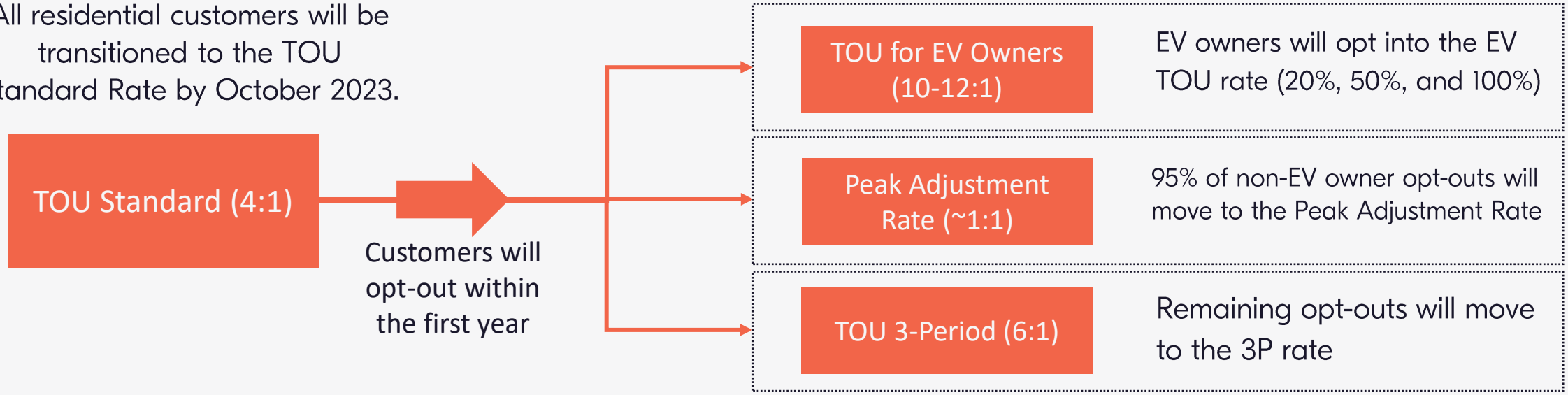
In response, AEG and Evergy focused the MAP analysis on how the mandatory TOU rates would affect the baseline projection.

Customer response to pricing signals will reduce the demand available for other DR programs to impact during peak hours.

MAP Sensitivity Analysis

Evergy plans to offer four residential TOU rates:

All residential customers will be transitioned to the TOU Standard Rate by October 2023.



How the TOU rate order affects residential peak demand depends on (1) TOU Standard customer retention and (2) the TOU rate that opt-out customers move onto instead.

MAP Sensitivity Analysis

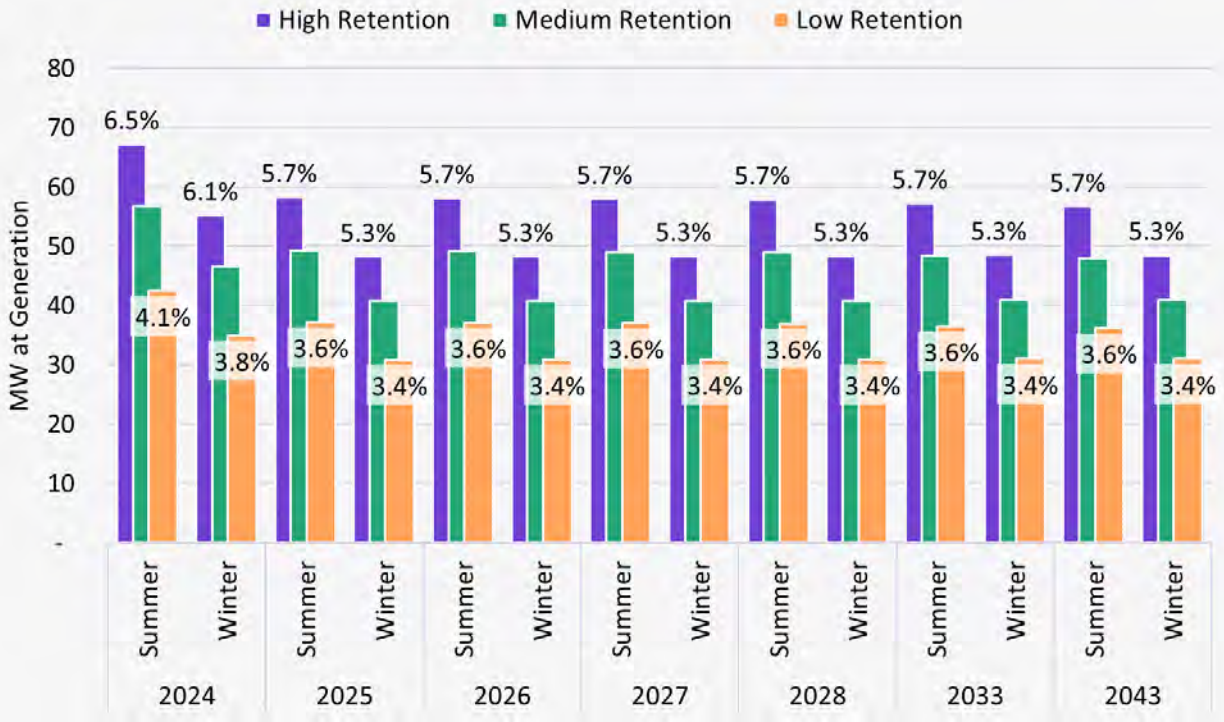
AEG analyzed two sensitivities in addition to the MAP scenario (which is based on a low retention rate of 50%).

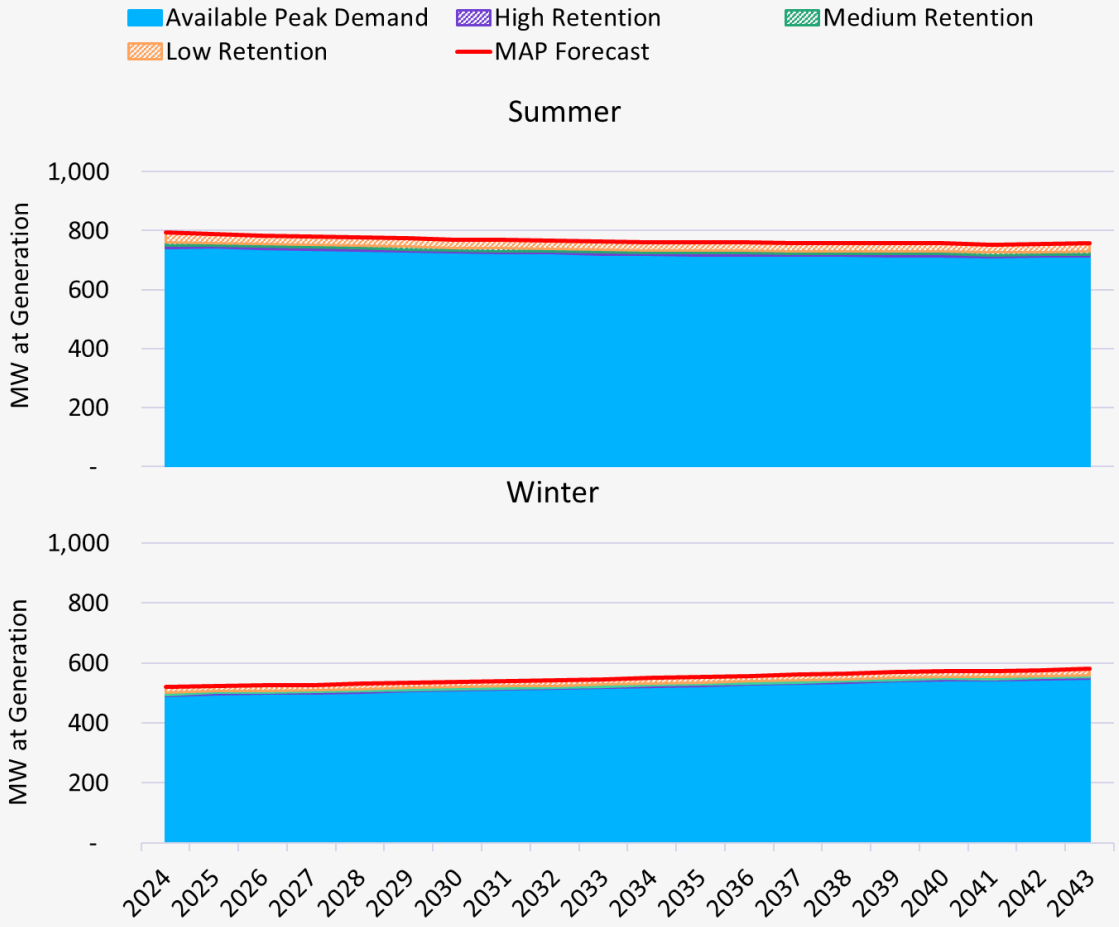
- The Medium- and Low-Retention sensitivities increase the impacts from the mandatory TOU rates and reduce the demand available for other DR program options.

Sensitivity	TOU Standard	TOU for EV Owners	Peak Adjustment Rate	3-Period TOU
MAP	50% of all residential customers	20% of EV owners who opt out of TOU Standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs
MAP Medium-Retention	70% of all residential customers	50% of EV owners who opt out of TOU Standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs
MAP High - Retention	85% of all residential customers	100% of EV owners who opt out of TOU standard	95% of remaining TOU Standard opt-outs	Other TOU Standard opt-outs

MAP Sensitivity Analysis

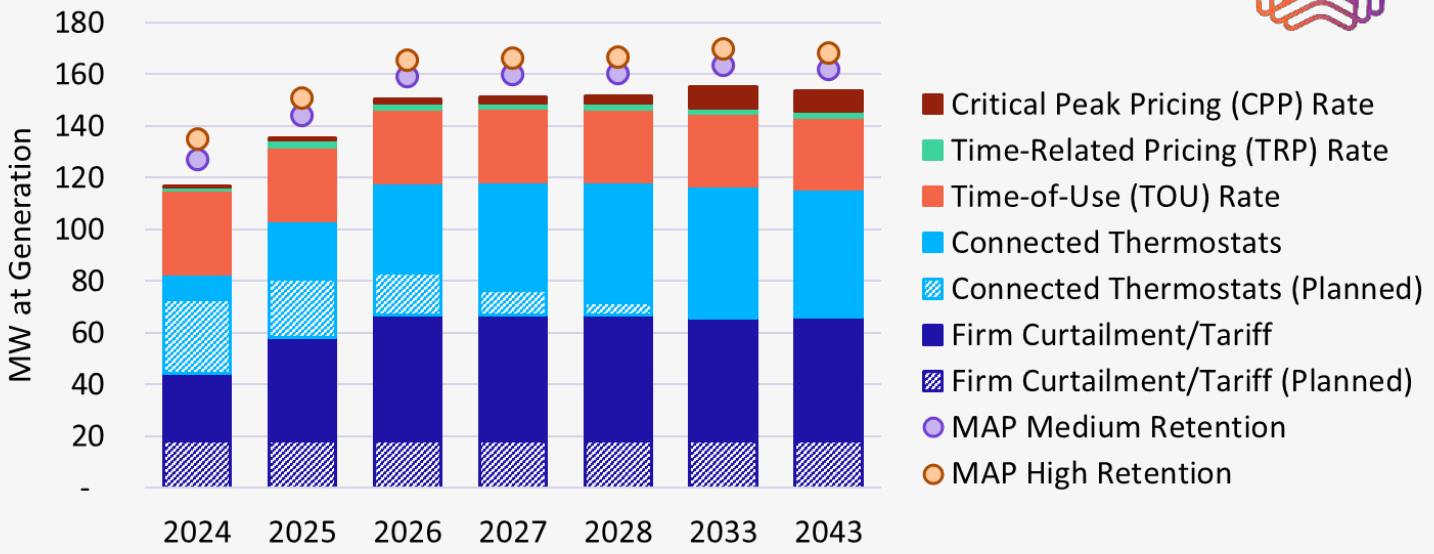
By 2043, the TOU rates reduce the summer residential peak demand baseline by 3.6%-5.7% (3.4%-5.3% in winter). While impacts are not insignificant (28 MW-43 MW in summer), the adjustments relative to the MAP baseline are small.





MAP Summer Potential Results

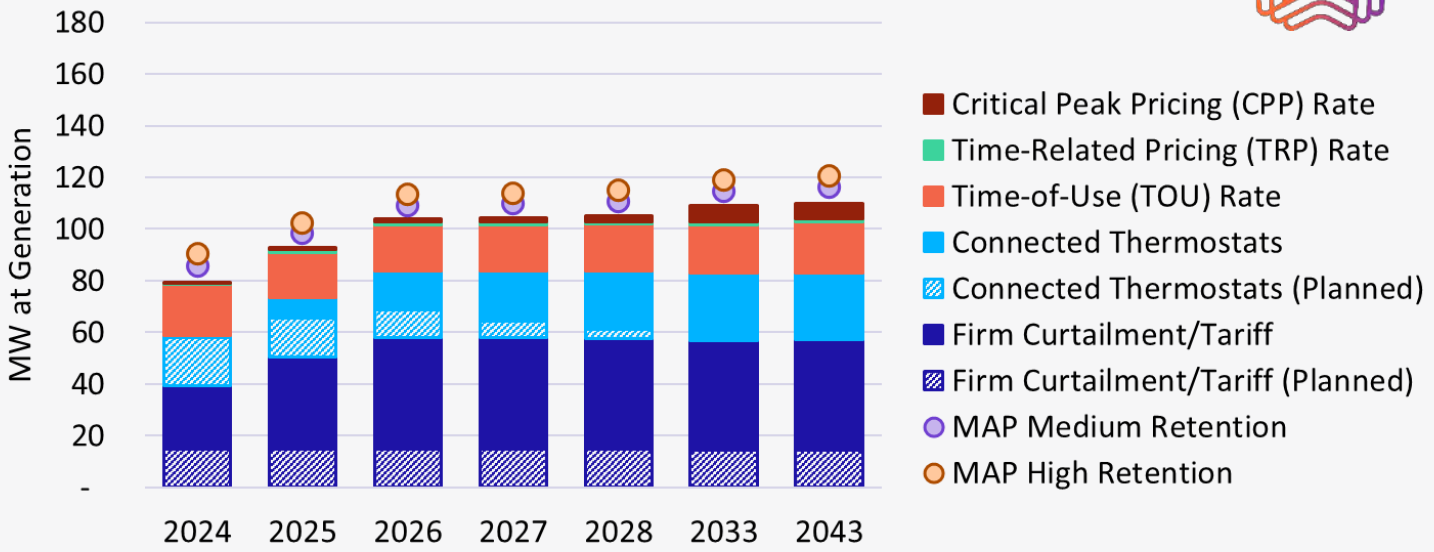
- By 2043, DR/DSR potential is estimated to reduce the summer peak demand baseline by 8%.
  - Firm Curtailment and Connected Thermostats generate over 6% of this reduction and account for 56% of the 2043 DR/DSR potential.
  - TOU rates contribute another 13% to total potential in 2043 and reduce the baseline by another 1.5%.
  - 12% of the potential comes from planned (and existing) programs.
- MAP Medium- and High-Retention analyses increase total summer potential by 8 MW-15 MW.
  - As TOU impacts increase, impacts from other DR resources decrease, netting out some of the mandatory rate effects.



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)
Firm Curtailment/Tariff	26 (1%)	40 (2%)	49 (3%)	49 (3%)	49 (3%)	48 (3%)	48 (3%)
Connected Thermostats (Planned)	28 (2%)	23 (1%)	16 (1%)	10 (1%)	5 (0%)	0 (0%)	0 (0%)
Connected Thermostats	10 (1%)	22 (1%)	35 (2%)	42 (2%)	47 (3%)	51 (3%)	50 (3%)
Time-of-Use (TOU) Rate	33 (2%)	29 (2%)	29 (2%)	28 (2%)	28 (2%)	28 (2%)	28 (2%)
Time-Related Pricing (TRP) Rate	1 (0%)	3 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)	2 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	2 (0%)	2 (0%)	3 (0%)	8 (0%)	8 (0%)
MAP Total	117 (6%)	135 (7%)	150 (8%)	151 (8%)	152 (8%)	155 (9%)	154 (8%)
MAP Medium Retention	127 (7%)	144 (8%)	159 (9%)	160 (9%)	160 (9%)	163 (9%)	162 (9%)
MAP High Retention	135 (7%)	151 (8%)	165 (9%)	166 (9%)	167 (9%)	170 (9%)	168 (9%)

MAP Winter Potential Results

- By 2043, DR/DSR potential is estimated to reduce the winter peak demand baseline by 6%.
  - Firm Curtailment and Connected Thermostats generate almost 5% of this reduction and account for 40% of the 2043 DR/DSR potential.
  - TOU rates contribute another 10% to total potential in 2043 and reduce the baseline by another 1.1%.
  - 13% of the potential comes from planned (and existing) programs.
- MAP Medium- and High-Retention analyses increase total summer potential by 6 MW-11 MW.
  - As TOU impacts increase, impacts from other DR resources decrease, netting out some of the mandatory rate effects.



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	14 (1%)
Firm Curtailment/Tariff	25 (1%)	36 (2%)	43 (2%)	43 (2%)	43 (2%)	42 (2%)	43 (2%)
Connected Thermostats (Planned)	19 (1%)	15 (1%)	11 (1%)	6 (0%)	3 (0%)	0 (0%)	0 (0%)
Connected Thermostats	1 (0%)	8 (0%)	15 (1%)	20 (1%)	23 (1%)	26 (1%)	26 (1%)
Time-of-Use (TOU) Rate	20 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	19 (1%)	20 (1%)
Time-Related Pricing (TRP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	2 (0%)	2 (0%)	6 (0%)	6 (0%)
MAP Total	79 (4%)	93 (5%)	104 (6%)	104 (6%)	105 (6%)	109 (6%)	110 (6%)
MAP Medium Retention	86 (5%)	98 (5%)	109 (6%)	110 (6%)	111 (6%)	115 (6%)	116 (6%)
MAP High Retention	91 (5%)	102 (6%)	113 (6%)	114 (6%)	115 (6%)	119 (7%)	121 (7%)

RAP Scenario

RAP Scenario

The Realistic Achievable Potential (RAP) scenario:

- Included all cost-effective programs
- Restricted growth in Evergy's existing programs to current achieved participation levels
- Lowered baseline projection for the peak demand savings generated through RAP-forecasted energy efficiency adoption
- Used the TOU Low-Retention rate of 50% and dampened TOU impacts for the first few years to simulate a learning curve (i.e., assuming customers become more effective at responding appropriately to pricing signals over time)

RAP Sensitivity Analysis:

Tested the sensitivity of DR/DSR potential to changes in participation rates in all program options.

RAP Sensitivity Analysis

AEG analyzed two sensitivities in addition to the RAP scenario.

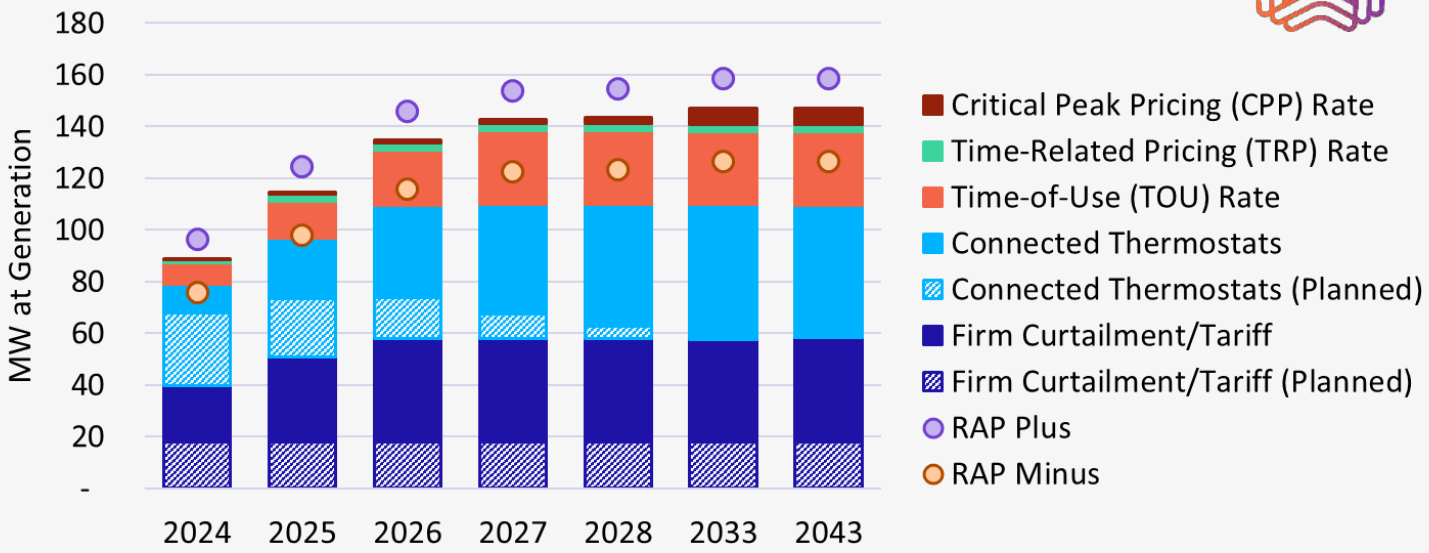
- The RAP Plus scenario increases participation in DR/DSR program options, providing an upper bound around potential under RAP circumstances.
- The RAP Minus scenario provided a lower bound around potential.

Sensitivity	Participation Adjustments	Cost Adjustments	TOU Standard Retention	TOU Impacts
RAP	N/A	N/A	50% of all residential customers	4-year learning curve
RAP Plus[1]	10% increase from RAP	No cost adjustment	50% of all residential customers	4-year learning curve
RAP Minus	15% decrease from RAP	No cost adjustment	43% of all residential customers (15% decrease from RAP)	4-year learning curve

[1]AEG did not increase the TOU retention rate (i.e., TOU Standard participation) in this sensitivity.

RAP Summer Potential Results

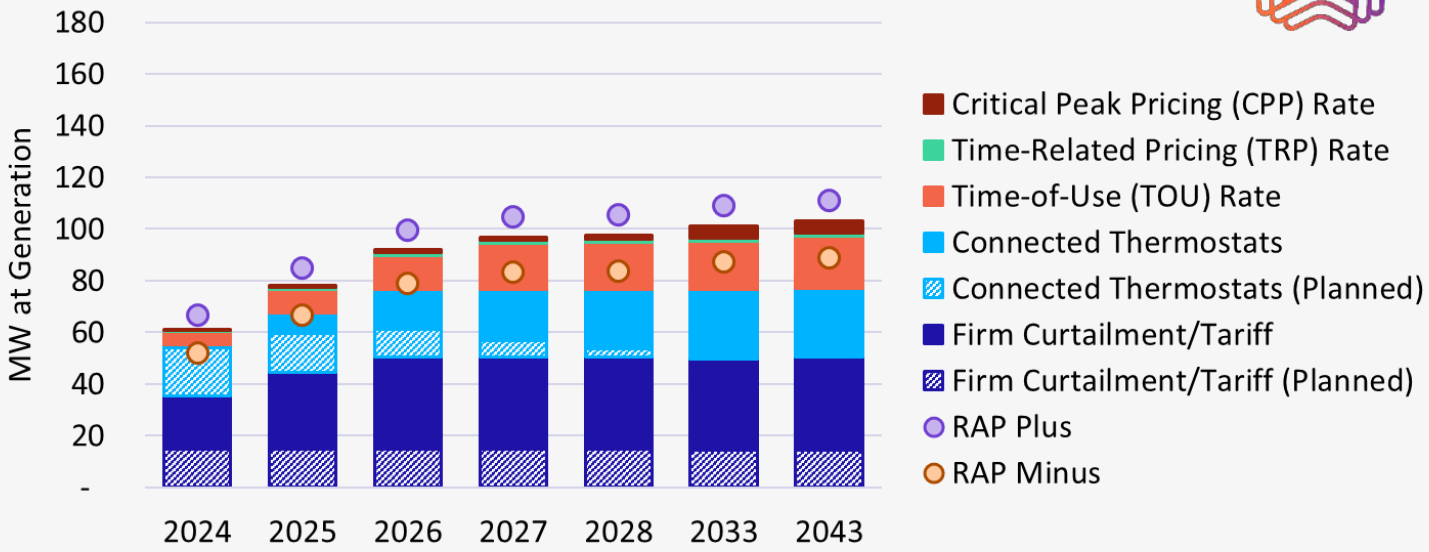
- By 2043, DR/DSR potential is estimated to reduce the summer peak demand baseline by 8%.
  - Firm Curtailment and Connected Thermostats generate 6% of this reduction and account for over 50% of the 2043 DR/DSR potential.
  - TOU rates contribute another 14% to total potential in 2043 and reduce the baseline by another 1.6%.
  - 12% of the potential comes from planned (and existing) programs.
- RAP Plus increased potential by 11 MW
  RAP Minus decreased potential 20 MW



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)	18 (1%)
Firm Curtailment/Tariff	22 (1%)	33 (2%)	40 (2%)	40 (2%)	40 (2%)	40 (2%)	40 (2%)
Connected Thermostats (Planned)	28 (2%)	23 (1%)	16 (1%)	10 (1%)	5 (0%)	0 (0%)	0 (0%)
Connected Thermostats	11 (1%)	23 (1%)	36 (2%)	42 (2%)	47 (3%)	52 (3%)	51 (3%)
Time-of-Use (TOU) Rate	8 (0%)	14 (1%)	22 (1%)	29 (2%)	29 (2%)	28 (2%)	28 (2%)
Time-Related Pricing (TRP) Rate	1 (0%)	3 (0%)	3 (0%)	3 (0%)	3 (0%)	3 (0%)	3 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	2 (0%)	2 (0%)	6 (0%)	6 (0%)
RAP Total	89 (5%)	115 (6%)	135 (7%)	143 (8%)	143 (8%)	147 (8%)	147 (8%)
RAP Plus	97 (5%)	124 (7%)	146 (8%)	154 (8%)	155 (8%)	159 (9%)	159 (9%)
RAP Minus	76 (4%)	98 (5%)	116 (6%)	123 (7%)	123 (7%)	127 (7%)	127 (7%)

RAP Winter Potential Results

- By 2043, DR/DSR potential is estimated to reduce the winter peak demand baseline by 6%.
  - Firm Curtailment and Connected Thermostats generate over 4% of this reduction and account for almost 40% of the 2043 DR/DSR potential.
  - TOU rates contribute another 22% to total potential in 2043 and reduce the baseline by another 1.1%.
  - 14% of the potential comes from planned (and existing) programs.
- RAP Plus increased potential by 8 MW
  RAP Minus decreased potential 14 MW



Program Option	MW at Generation (% of Baseline)						
	2024	2025	2026	2027	2028	2033	2043
Firm Curtailment/Tariff (Planned)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	15 (1%)	14 (1%)
Firm Curtailment/Tariff	21 (1%)	30 (2%)	36 (2%)	36 (2%)	36 (2%)	35 (2%)	36 (2%)
Connected Thermostats (Planned)	19 (1%)	15 (1%)	11 (1%)	6 (0%)	3 (0%)	0 (0%)	0 (0%)
Connected Thermostats	1 (0%)	8 (0%)	15 (1%)	20 (1%)	23 (1%)	27 (1%)	26 (1%)
Time-of-Use (TOU) Rate	5 (0%)	9 (0%)	13 (1%)	18 (1%)	18 (1%)	19 (1%)	20 (1%)
Time-Related Pricing (TRP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)	1 (0%)
Critical Peak Pricing (CPP) Rate	0 (0%)	1 (0%)	1 (0%)	1 (0%)	2 (0%)	5 (0%)	5 (0%)
RAP Total	61 (3%)	78 (4%)	92 (5%)	97 (5%)	98 (5%)	101 (6%)	103 (6%)
RAP Plus	67 (4%)	85 (5%)	100 (5%)	105 (6%)	105 (6%)	109 (6%)	111 (6%)
RAP Minus	52 (3%)	67 (4%)	79 (4%)	83 (5%)	84 (5%)	87 (5%)	89 (5%)

Standalone Potential

Key Assumptions

Standalone potential provides a view of each program option in isolation, before accounting for any competition between DR/DSR resources.

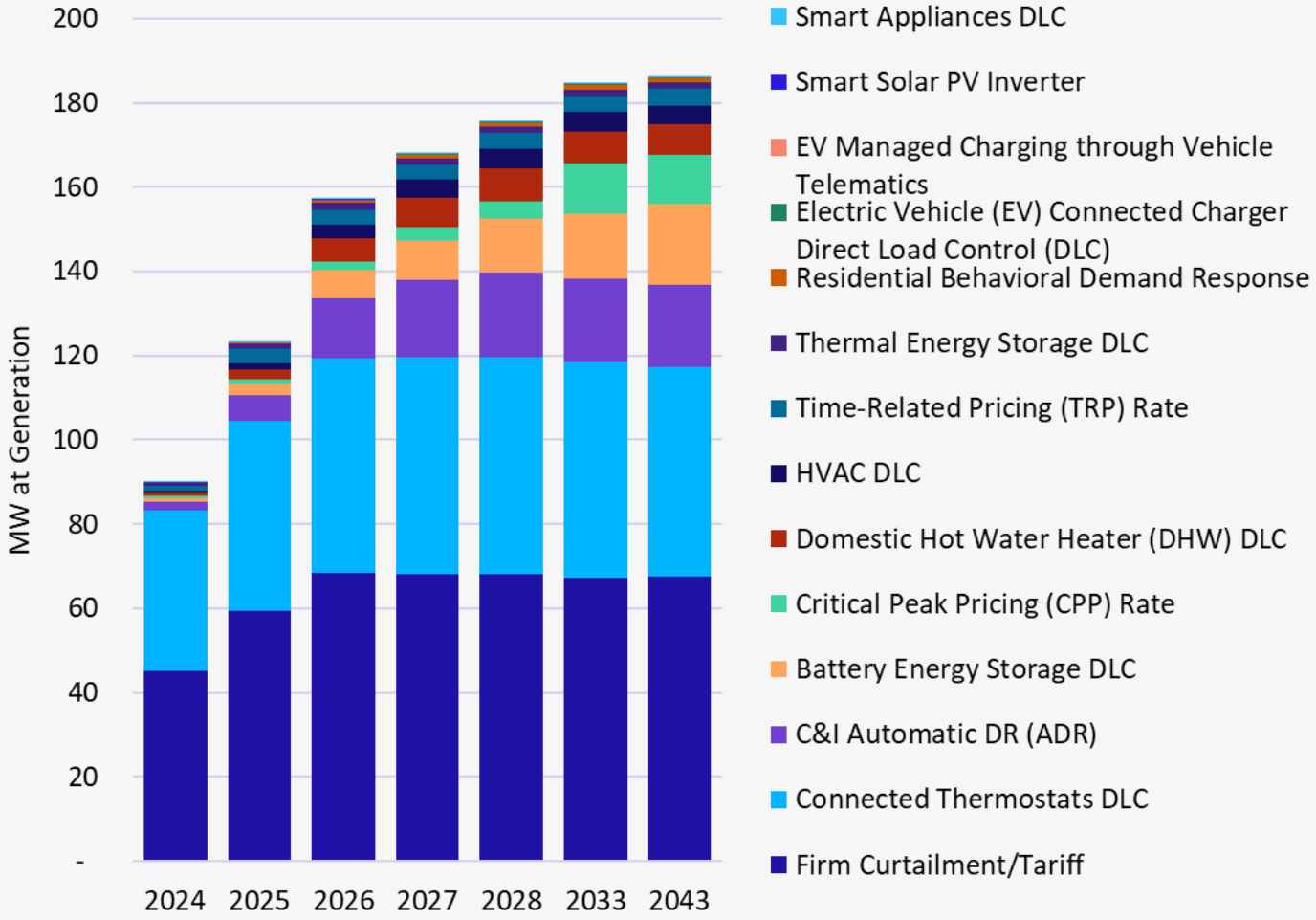
- Maximizes the potential each DR/DSR could provide if no other programs were offered that targeted the same demand during peak hours.
- The economic screen uses standalone potential, because programs will only become less cost-effective once program competition reduces the available capacity to target.

The economic screen identified cost-effective programs for inclusion in the MAP and RAP scenarios.

- Economic screening based on cumulative potential, i.e., including existing resources
- Only considered summer benefits
- Screen based on the Utility Cost Test, i.e., including incentive costs
- Used the MAP scenario to run the cost-effectiveness screen

Standalone Potential Results

- Existing programs contribute more summer potential than all remaining DR/DSR programs combined, even in 2043.
- After accounting for resource competition:
  - Participation in C&I programs like C&I Automatic DR and Thermal Energy Storage goes down because the Firm Curtailment program option targets these same customers
  - Participation in residential programs like Domestic Hot Water Heater DLC and EV Managed Charging decreases because the Connected Thermostats program targets the same customers



Economic Screen

- Evergy's existing programs and both C&I DSR options passed the economic screen.
- The C&I ADR program was on the edge of being cost-effective, but many of these customers will be captured through the Firm Curtailment program.
- Many programs fell short of the threshold because of installation costs (e.g., switches), equipment and O&M costs (e.g., Battery and Smart Solar PV DLC), and overhead costs.
- Residential Behavioral DR was saddled with full development and administrative costs, i.e., independent of an HER program.

Program Option	UCT
Time-Related Pricing (TRP) Rate	3.17
Firm Curtailment/Tariff	3.08
Connected Thermostats DLC	2.51
Critical Peak Pricing (CPP) Rate	2.50
C&I Automatic DR (ADR)	0.92
HVAC DLC	0.59
Domestic Hot Water Heater (DHW) DLC	0.53
Residential Behavioral Demand Response	0.26
Battery Energy Storage DLC	0.13
Electric Vehicle (EV) Connected Charger Direct Load Control (DLC)	0.12
Smart Solar PV Inverter	0.07
EV Managed Charging through Vehicle Telematics	0.04
Smart Appliances DLC	0.04
Thermal Energy Storage DLC	0.00

Thank You.

Exhibit D_Evergy_Utility Program Review

Sector	Program Name	Program Description	Pros	Cons	Example Utilities	Sources
Residential	Residential New Construction	Rebates/incentives for newly constructed homes that install energy efficient equipment. Criteria for receiving incentives can vary by either a defined set of measures or certain building ratings.	- Evergy is exploring a Zero Energy Ready - New Homes pilot. - Several examples of program types from other utilities with different delivery options/incentive structures. Allows Evergy flexibility on program design to help participation. -New contruction programs avoid lost oppurtunity with installtion of many long-life measures.	- Current Evergy pilot has not launched fully. -Contractor engagement can be difficult	- Black Hills CO (Prescriptive & Performance paths) - Consumers (All-Electric New Homes) - ComEd Illinois (IE New Construction) - CenterPoint	- **Black Hills CO**: https://www.dora.state.co.us/pls/efi/efi_p2_v2_demo.show_document?p_dms_document_id=976735&p_session_id= - **Consumers**: https://insights.esource.com/documents/Consumers%20Energy%20-%208.1.2021%20-%202022-2025%20Plan%20-%20U-20875.pdf#page=173 - **ComEd**: https://www.icc.illinois.gov/docket/P2021-0155/documents/321073/files/558684.pdf - **CenterPoint**: https://visionelements.programprocessing.com/framework/CenterPointTX/382022120411.2022_CenterPoint_HEH_-_Program_Guide.pdf
Residential	Smart Home Energy Management	Residential customers control connected devices through a central system. Possibility to reduce usage during times of high usage (higher rates). The majority of similar offerings from other utilities were pilot programs that supplied kits to participants and incentivized them to participate in other programs, such as demand response events.	- Program would include new offerings that may attract more residential customers to participate in MEEIA. - Measures could be linked to other offerings (i.e. reducing usage during DR events or times of high usage). -Potential for program expansion with new technology introductions.	- No exact 1 for 1 measure comparison from Evergy TRM. Evergy TRM has “SMART Home Product" (Alexa, Google Home, etc.). - Potential Study includes a Home Energy Management System (HEMS) measure, but the measure does not have any potential in the study. - There is uncertainty on demand or interest for such offerings. May not have enough participation to be a standalone program or offering in an existing program. - There is uncertainty related to program characterization such as attribution, applicable net-to-gross factors, and savings levels.	- JCP&L - CenterPoint Texas (New Homes) - Pepco (kit = hub with sensors/plugs) - Consumers	- **JCP&L**: https://insights.esource.com/documents/Jersey%20Central%20Power%20&%20Light%20-%209.28.2020%20-%202021-2024%20Energy%20Efficiency%20Plan%20-%20EO20090620.pdf#page=133 - **Pepco**: https://homeenergysavings.pepco.com/md/residential/smart-home-pilot-program - **Consumers**: https://insights.esource.com/documents/Consumers%20Energy%20-%208.1.2021%20-%202022-2025%20Plan%20-%20U-20875.pdf#page=173
Residential	Mobile/Manufactured Home Program	Offer either free installation or rebates for energy efficiency measures (HVAC, Wx) for mobile home customers.	- Adding mobile/manufactured home offerings could expand participation Evergy sees for its MEEIA offerings. -Typically underserved market	- Uncertainty on amount of participation offerings would get. Potential study shows 1-3% of homes in Evergy service territory are mobile or manufactured homes. - May not necessarily be a full program, may have to expand eligibility to include mobile homes for other offerings instead.	- Georgia Power - Ameren Illinois	- **Georgia Power**: https://services.psc.ga.gov/api/v1/External/Public/Get/Document/DownloadFile/190693/72407 - **Ameren Illinois**: https://www.icc.illinois.gov/docket/P2021-0158/documents/322773/files/561841.pdf

Sector	Program Name	Program Description	Pros	Cons	Example Utilities	Sources
Community	School Kits	Supply free energy efficiency kits and education materials to schools.	- Evergy already offers similar product in Income Eligible kits. - Several examples of offering from other utilities.	- Uncertainty related to demand/interest for such offerings. May not have enough participation to be a standalone program or offering in existing program. - Savings claimed from this type of offering would be limited. This could mean spending in this program that does not necessarily lead to large savings for the portfolio.	- Black Hills CO - Ameren Illinois	- **Black Hills CO**: https://www.dora.state.co.us/pls/efi/efi_p2_v2_demo.show_document?p_dms_document_id=976735&p_session_id= - **Ameren Illinois**: https://www.icc.illinois.gov/docket/P2021-0158/documents/322773/files/561841.pdf
Community	UHI Mitigation	Offer rebates for UHI mitigation measures such as cool/reflective roofs. Also offer events for shade tree giveaways (either free or rebated) with education materials.	- Evergy has an existing Shade Tree pilot program. - Strong stakeholder support for this offering. - Including UHI mitigation offerings helps to address the portfolio goal of decarbonization opportunities. -Long measure life for some measures that could offer generational benefits.	- Tree measures not included in Potential Study. No estimation of potential for measures or existing characterization to go off of for design in MEEIA. - No existing policy for claiming savings on these type of projects. - Limited number of utilities have cool roof/shade trees as standalone offering. Most utilities include these measures as offerings in a larger program. - Uncertainty surrounding cost-effectiveness for program, especially for cool roof measures.	- CPS Energy Texas (Cool Roofs) - SRP Arizona (Shade Tree) - UNS Arizona (Shade Tree)	- **CPS Energy**: https://insights.esource.com/documents/CPS%20Energy%20-%205.20.2021%20-%20FY2021%20Annual%20Report.pdf#page=58 - **SRP**: https://insights.esource.com/documents/SRP%20-%208.1.2021%20-%20FY2020%20Energy%20Efficiency%20Report.pdf#page=24 - **UNS**: https://insights.esource.com/documents/UNS%20-%203.1.2022%20-%202021%20DSM%20Annual%20Report%20-%20E-00000U-18-0055.pdf#page=28
Community	Non-Profit	Rebates for purchase and installation of energy efficient measures for nonprofit organizations. Offering would include energy audits, customized reports, and concierge style assistance for each participant.	- Evergy has done a non-profit pilot that has seen moderate success. - Program addresses portfolio goal of equity and providing energy efficiency opportunities for customer types that have had limited access historically. -Hard to reach market where a dedicated program could offer needed benefits.	- Participants will need higher incentive levels and one on one assistance due to knowledge gaps and sensitive customer segments, leading to higher incentive and administrative costs. - Market participants can have competing priorities and limited capital for building improvements. This could hinder participation.	- Ameren Illinois - ComEd Illinois - Xcel MN - Xcel CO	- **Ameren Illinois**: https://www.icc.illinois.gov/docket/P2021-0158/documents/322773/files/561840.pdf - **ComEd**: https://insights.esource.com/documents/ComEd%20-%202.20.2020%20-%202019%20Q4%20Report%20-%2017-0312.pdf#page=15 - **Xcel MN**: https://insights.esource.com/documents/Xcel%20MN%20-%203.31.2022%20-%202021%20CIP%20Annual%20Report%20-%2020-473.pdf#page=70 - **Xcel CO**: https://insights.esource.com/documents/Xcel%20CO%20-%207.1.2020%20-%202021-2022%20DSM%20Plan%20-%2020A-00287EG.pdf#page=165
Community	Local Building Energy Benchmarking	Provide free energy benchmarking to local business customers to assist in tracking energy usage and year over year results.	- Program could address customer types in service territory that have not participated in MEEIA programs in the past. - Offering could encourage these types of customers to participate in other MEEIA programs. - Program could include a behavioral aspect if Evergy chooses to make results public and introduce a competitive piece to the program.	- Uncertainty on ability to claim savings from this type of program. - Uncertainty on Evergy's existing infrastructure and ability to offer benchmarking services.	- Consumers - Xcel CO - Energy Star Program	- **Consumers**: https://insights.esource.com/documents/Consumers%20Energy%20-%208.1.2021%20-%202022-2025%20Plan%20-%20U-20875.pdf#page=173 - **Xcel CO**: https://co.my.xcelenergy.com/s/business/cost-savings/energy-benchmarking - **Energy Star Program**: https://aceee2022.conferencespot.org/event-data/pdf/catalyst_activity_32410/catalyst_activity_paper_20220810190508991_a33aec2d_e47c_4c76_928d_744b0d0621e0

Sector	Program Name	Program Description	Pros	Cons	Example Utilities	Sources
Community	LED Street Lighting	Incentivize municipal customers to install LED lighting for their streetlight fixtures.	- Addressing new area that Evergy has not necessarily focused on before. - Could reach more customers that have not participated in MEEIA programs in the past. -Additional public safety benefits beyond energy efficiency.	- Uncertainty surrounding LED standards and opportunities for upcoming MEEIA. - Streetlighting measures not included in Evergy TRM or Potential Study. No estimation of potential for measures or existing characterization to go off of for design in MEEIA. -Free ridership a concern given high street lighting baseline.	- Ameren Illinois - ComEd Illinois - Otter Tail Power Co. (MN)	- **Ameren Illinois**: https://www.icc.illinois.gov/docket/P2021-0158/documents/322773/files/561840.pdf - **ComEd**: https://www.comed.com/WaysToSave/ForYourBusiness/Pages/StreetLights.aspx - **Otter Tail**: https://insights.esource.com/documents/Otter%20Tail%20Power%20-%207.1.2020%20-%202021-2023%20Plan%20-%2020-475.pdf#page=80
Business	Indoor Agriculture	Incentives for purchase and installation of specialized energy efficient equipment used by indoor agricultural facilities.	- Addressing new area that Evergy has not necessarily focused on before. - Could reach more customers that have not participated in MEEIA programs in the past.	- Uncertainty related to demand/interest for such offerings. May not have enough participation to be a standalone program or offering in existing program. -Program could take customers from Custom projects.	- Efficiency Maine - Black Hills CO	- **Efficiency Maine**: https://www.efficiencymaine.com/at-work/agricultural-solutions/ **- Black Hills CO:** https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/coe-ee-indoor-ag-program.pdf
Business	Business Marketplace	Discounts for business customers on C&I energy efficient equipment sold through an online marketplace.	- Evergy has existing infrastructure to deliver this type of program. - Measures included in this program could be used to incentivize participation in other programs.	- Further discussion on which commercial measures would be available on the marketplace. - Limited examples from other utilities of this type of offering for business customers. Most examples only include smart thermostats to be used in other offerings.	- NIPSCO - Ameren Illinois	- **NIPSCO**: https://www.nipsco.com/business-online-marketplace **- Ameren Illinois:** https://amerenillinoissavings.com/business/industry-solutions/small-business/
Business	SBDI	Small business participants receive an on-site assessment and incentives for installation of any energy efficiency equipment recommended from the assessment.	- Evergy has experience running this type of program. - Several examples of other utilities offering this type of program. - Evergy could focus program on disadvantaged business owners to further emphasize the goal of an equitable portfolio of offerings.	- Evergy discontinued historical offering due to cost concerns. -Offerings can be duplicative of other programs.	- Ameren Illinois - ComEd Illinois - Indianapolis Power & Light - Ameren MO - National Grid RI	- **Ameren Illinois**: https://www.icc.illinois.gov/docket/P2021-0158/documents/322773/files/561840.pdf - **ComEd**: https://www.icc.illinois.gov/docket/P2021-0155/documents/321073/files/558684.pdf - **Indianapolis Power & Light**: https://insights.esource.com/documents/IPL%20-%204.23.2020%20-%202021-2023%20DSM%20Plan%20-%2045370.pdf#page=66 - **Ameren MO**: https://insights.esource.com/documents/Ameren%20-%20MO%20-%202.8.2018%20-%202019-2024%20Plan%20-%20EO-2018-0211.pdf#page=144 - **National Grid RI**: https://insights.esource.com/documents/National%20Grid%20-%20RI%20-%209.30.2022%20-%202023%20DSM%20Plan%20-%2022-23-EE.pdf#page=193
Business	Virtual Energy Management	Provide free energy management platform for Small Business participants. A subscription to the energy management tool includes installation of various measures.	- Evergy has an existing pilot offering and existing infrastructure to deliver this type of program. - Evergy could focus program on disadvantaged business owners to further emphasize the goal of an equitable portfolio of offerings. -Low barrier to entry for certain	- Could overlap with advanced technology offerings on the demand response side. -Certain customer segments could be excluded based on building and technology limitations.	- ComEd Illinois	- **ComEd**: https://www.comed.com/WaysToSave/ForYourBusiness/Pages/BusinessEnergyAnalyzer.aspx

Sector	Program Name	Program Description	Pros	Cons	Example Utilities	Sources
Business	Food Service	Provide free on-site assessments and/or rebates to restaurants in the area for the purchase and installation of recommended energy efficient food service equipment.	- Assortment of food service measures had potential in the Potential Study. - Addressing new area that Evergy has not necessarily focused on before. -Long life measures where lost oppurtunity if efficient measures not installed.	- Concerns with cost-effectiveness for this offering as AEG has seen cost-effectiveness be an issue for these types of measures in other models. - Uncertainty related to demand/interest and participation for such offerings.May not warrant a stand alone offering. -Secondary market for food service equipment limits the new efficient measure market.	- Consumers - CenterPoint MN - Xcel MN - DTE Electric - Peoples/North Shore Gas	- **Consumers**: https://insights.esource.com/documents/Consumers%20Energy%20-%208.1.2021%20-%202022-2025%20Plan%20-%20U-20875.pdf#page=173 - **CenterPoint MN**: https://insights.esource.com/documents/CenterPoint%20MN%20-%207.1.2020%20-%202021-2023%20Plan%20-%2020-478.pdf#page=120 - **Xcel MN**: https://insights.esource.com/documents/Xcel%20Energy%20-%20MN%20-%207.1.2020%20-%202021-2023%20Plan%20-%2020-473.pdf#page=60 - **DTE Electric**: https://insights.esource.com/documents/DTE%20Electric%20-%206.30.2021%20-%202022-23%20Energy%20Waste%20Reduction%20Plan%20-%20U-20876.pdf#page=176 - **Peoples/NSG**: https://insights.esource.com/documents/Peoples%20Gas%20-%203.1.2021%20-%202022-2025%20EE%20Plan%20
Business	Data Center Program	Rebates for purchase and installation of energy efficient equipment related to data centers.	- Addressing new area that Evergy has not necessarily focused on before. - Assortment of data center measures from the Potential Study had potential attached to them. -Each project can offer large savings.	- There are few examples of standalone programs for this specific area from other utilities. Most utility examples include data center measures as part of a larger offering such as a standard rebate program. - Uncertainty related to demand/interest for such offerings. May not have enough participation to be a standalone program or offering in existing program.	- Xcel CO - Xcel MN	- **Xcel CO**: https://www.xcelenergy.com/staticfiles/xe-responsive/co-business-programs-summary.pdf - **Xcel MN**: https://insights.esource.com/documents/Xcel%20Energy%20-%20MN%20-%207.1.2020%20-%202021-2023%20Plan%20-%2020-473.pdf#page=54

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Evergy 2023 IRP DSM Analysis – Exhibit E_Program Descriptions

TABLE OF CONTENTS

1 | Evergy 2023 IRP Program Bundle Descriptions

This chapter details the key elements of each program in the portfolio, specifically the energy efficiency and demand response RAP scenario (demand side rates are not included). The years highlighted are the nearest program implementation cycle of 2024-2027, as well as 2036 and 2043, the final year of the study. Data for all years and scenarios are available in Exhibits E and F.

1.1 Residential

1.1.1 Energy Saving Products

Objective	The Energy Saving Products program will feature point-of-purchase rebates and online discounts for energy-efficient measures, including but not limited to: smart thermostats, appliances, advanced power strips, air purifiers, dehumidifiers and water-saving devices.
Target Market	All residential customers, manufacturers, and local retailers.
Description	Customers will receive an instant incentive for the purchase of qualified high-efficiency products – either through an online marketplace or a retail brick & mortar store. Incentives will vary depending upon the measures.
Implementation	Evergy will engage a third-party implementation contractor to: • Establish relationships with manufacturers and retailers throughout service territories. • Provide in-store promotional materials and retail sales staff training. • Maintain comprehensive online customer portal where customers will be able to browse the marketplace through the offered energy efficient equipment and appliances, and purchase qualifying measures through an online marketplace that will offer instant rebates. • Provide online support for customer website troubleshooting • Track program performance, including tracking sales data, reviewing sales data for accuracy, and payment to retailers. • Periodically report progress towards program goals and opportunities for improvement. Evergy will work with the implementation contractor to market the program to customers and educate retailer sales staff. Marketing efforts to increase customer awareness may include, but not be limited to, bill inserts, newspaper advertisements, internet placement, and Point-of-Purchase materials (hang tags, posters). Energy Saving Products will be cross-marketed with Evergy's other Residential DSM programs and be used to increase awareness of DSM rebates will reduce spillover. The program will be implemented upstream from retailers; therefore, incentives will be provided at the manufacturer- and distributor-level. Upstream options simplify the participation process, eliminating the need for customers to complete and submit a rebate application. However, upstream options typically have higher free ridership and leakage outside the service territory. Several steps will be taken to reduce free ridership and leakage while increasing spillover, including: • Evergy will work with the implementation contractor to select retailers located well within the service territory to reduce leakage. • Incentives will be modified as needed to respond to the market price of the qualifying measure, with a goal of the incentive being no higher than 50% of the incremental cost.

Eligible Measures

Residential customers will be eligible for instant, point-of-purchase rebates on products. Incentives may be modified to respond to the market.

Eligible measure include, but not limited to:

- Advanced Power Strips
- Air Purifiers
- ENERGY STAR Clothes Washers
- ENERGY STAR Connected Thermostats
- Dehumidifiers
- LED Linear Lighting Measures
- ENERGY STAR Refrigerators
- Faucet Aerators
- Low Flow Showerheads
- Pipe Insulation
- Thermostatic Shower Restriction Valves (TSRV)

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	1,543	1,689	1,730	1,779	2,039	1,248
West	2,654	2,885	2,951	3,041	3,415	2,098
Total	4,197	4,575	4,681	4,820	5,453	3,346

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	0.50	0.53	0.55	0.58	0.61	0.39
West	0.77	0.82	0.86	0.90	0.96	0.58
Total	1.26	1.35	1.41	1.47	1.56	0.97

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$540,274	$583,631	$624,331	$659,157	$763,921	$528,944
West	$820,909	$886,154	$943,824	$997,937	$1,137,182	$722,267
Total	$1,361,184	$1,469,785	$1,568,155	$1,657,095	$1,901,103	$1,251,211

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.63	1.89	1.98	2.09	2.99	2.69
West	1.78	2.09	2.19	2.32	3.36	3.24
Total	1.72	2.01	2.11	2.23	3.21	3.00

1.1.2 Heating, Cooling & Weatherization

Objective	Encourage whole-house improvements to existing homes by promoting home energy audits and comprehensive retrofit services. This includes: • Encourage energy-saving behavior and whole house improvements. • Help residential customers reduce their electricity bills. • Educate customers about the benefits of installing high-efficiency equipment. • Develop partnerships with contractors to bring efficient systems to market.
Target Market	The program targets high energy-use residential customers in single family, duplex and "4-plex or less" multi-family buildings. Other groups with high interest in achieving optimum delivery are builders, HVAC contractors, energy auditors, realtors, financing agents, etc.
Description	The program encourages home improvements that increase operational energy efficiency and home comfort. It consists of two primary components: • *Audit and Weatherization*, provides incentives for installing home envelope/weatherization measures, such as insulation and air sealing. This component also offers a free direct installed energy saving kit by energy auditor trade allies, with a requirement to have an Energy Audit performed. • *HVAC,* which incentivizes energy efficiency improvements to a homes' HVAC. It offers equipment rebates for qualifying installed HVAC equipment, duct efficiency improvements and tune-ups performed by an authorized trade ally. Customers that rent a residence must receive the written approval of the homeowner/landlord to participate in the option.
Implementation	We will continue to co-deliver this program with the local gas utility, where service jurisdictions overlap and shared cost benefits exist. Due to the unpredictable and changing nature of the marketplace, Evergy and its contractors will maintain flexibility within the program. Various market factors — including new codes and standards, energy legislation and consumer value shifts — will affect the measure mix and program delivery strategy. Evergy will engage a third-party contractor to implement the option. An implementation contractor will: • Hire staff/engage local contractors to conduct audits and direct measure installation. • Engage customers and schedule home energy audit appointments. • Provide customer service support. • Establish relationships with local HVAC contractors to work with the option installing energy efficient HVAC equipment and insulation measures. • Process rebate applications, including review and verification of applications and payment of customer rebates. • Track option performance, including customer and contractor participation as well as quality assurance/quality control (QA/QC). • Periodically report option progress. Customer marketing activities may include, but not be limited to bill inserts, newspaper advertisements, email blasts, bill messaging, and community events. It is important that the measures are properly installed and customer satisfaction is high. Evergy and/or the implementation contractor should conduct QA/QC of a random group of completed projects by project type and contractor. The QA/QC process should include verifying the installed equipment and customer satisfaction with the contractor and the option.

Eligible Measures

The measures may be modified to reflect market conditions.

Weatherization Measures
Liquid-Applied Weather-Resistive Barrier
Whole-Home Aerosol Sealing
Duct Repair and Sealing
Duct Insulation
Basement Sidewall Insulation
Floor Insulation
Radiant Barrier Insulation

Equipment Rebate Measures
Air Source Heat Pump
Central Air Conditioner
Central Heat Pump Controls
Heat Pump Ductless Mini-Split
Geothermal Heat Pump
Room Air Conditioner
Water Heater Drain Water Heat Recovery
Heat Pump Water Heater

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	2,879	3,018	3,523	3,665	4,114	3,006
West	6,984	7,209	7,468	7,670	8,597	7,155
Total	9,863	10,227	10,991	11,335	12,711	10,161

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	1.58	1.67	1.77	1.85	2.08	1.37
West	2.55	2.67	2.80	2.91	3.33	2.27
Total	4.14	4.34	4.57	4.76	5.41	3.64

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$1,920,943	$2,031,953	$2,264,194	$2,368,702	$2,989,520	$2,074,965
West	$4,290,412	$4,470,686	$4,657,843	$4,825,946	$5,929,648	$4,964,283
Total	$6,211,355	$6,502,639	$6,922,037	$7,194,648	$8,919,169	$7,039,249

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.43	1.52	1.58	1.68	2.17	2.12
West	1.25	1.33	1.42	1.50	1.94	1.74
Total	1.31	1.39	1.47	1.56	2.02	1.85

1.1.3 Research and Pilot – Appliance Recycling

Objective	Promote the removal and retirement of inefficient appliances.
Target Market	Residential customers disposing of their primary or secondary inefficient refrigerators, freezers, dehumidifier, or room air conditioners.
Description	Residential customers are encouraged to turn in their old inefficient refrigerators, freezers, and room air conditioners, removing them from the electric system and disposing of them in an environmentally safe and responsible manner. Program requirements to recycle a refrigerator or freezer include: • The unit must be between 10 and 30 cubic feet in size and in working condition. • At the time of pick-up, the unit must be empty, plugged into an electrical outlet, and there must be a clear path for removal. • Units using ammonia or SO2 refrigerant are excluded from participation. • The unit can be primary or secondary. Customers may recycle their old room air conditioners free of charge during a scheduled pick-up for a qualifying refrigerator/freezer. The recycled unit must be working at the time of pick-up. Customers are limited to two (2) refrigerator and freezer rebates and three (3) room air conditioners per household per year.
Implementation	The start year of this program will be 2028, when the program becomes cost effective. Implementation activities will include: • Schedule pick-ups from customer homes, verify customer eligibility and appliance qualification, remove appliances from customer homes, and recycle / responsibly dispose of appliances. • Rebate processing. • Program tracking. • Periodically report progress towards program goals and opportunities for improvement. • Marketing plan to achieve program goals. Marketing may include, but not be limited to, bill inserts, newspaper/community newsletter advertisements, community events, billboards, and Evergy's website. The program consists of an educational component informing customers about the benefits of recycling their inefficient appliances and environmentally responsible disposal. Actual energy and demand savings could be lowered if a customer recycles a secondary appliance and begins utilizing their former primary unit as a secondary unit. Appliance recycling programs typically have higher free ridership rates than other programs, primarily due to: • Customers planning to replace their appliance before participating in the program. • Customers that were not using their appliance prior to participating in the program. In an effort to reduce free ridership, the program should emphasize and enforce the requirement that the appliance is plugged in and in operating condition at the time of pick-up. In an effort to increase spillover, the program should be cross-marketed with other residential programs.
Eligible Measures	Incentives will be offered for refrigerators and freezers only. **Measure** Refrigerator Freezer Room Air Conditioner Dehumidifier

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	n/a	n/a	n/a	n/a	621	610
West	n/a	n/a	n/a	n/a	800	795
Total	n/a	n/a	n/a	n/a	1,421	1,405

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	n/a	n/a	n/a	n/a	0.27	0.26
West	n/a	n/a	n/a	n/a	0.21	0.20
Total	n/a	n/a	n/a	n/a	0.48	0.46

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	n/a	n/a	n/a	n/a	$157,220	$170,559
West	n/a	n/a	n/a	n/a	$299,245	$326,183
Total	n/a	n/a	n/a	n/a	$456,465	$496,743

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	n/a	n/a	n/a	n/a	2.08	2.02
West	n/a	n/a	n/a	n/a	1.15	1.12
Total	n/a	n/a	n/a	n/a	1.47	1.43

1.1.4 Residential New Construction

Objective	Encourage energy efficiency achievements in the new construction of residential homes.
Target Market	Homeowners, home builders/developers, and raters. Single-family homes and duplexes qualify for rebates.
Description	Residential customers and builders put together a customized new construction package by selecting any combination of eligible measures to receive the incentive. Customers must relect an HVAC unit and a shell measure in order to qualify for the incentive. Customers are encouraged to move forward with a suite of measurs to secure a higher incentive.
Implementation	Implementation activities will include: • Engage and establish relationships with builders, developers, and raters to participate in the program. • Provide customer service support. • Process rebate applications, including review and verification of applications and payment of rebates. • Track program performance. • Quality assurance/quality control (QA/QC) activities will include application reviews and random site visits to verify measure installation. • Periodically report program progress. Evergy will market the program to residential customers and builders/developers. Partnerships with builders, developers, and raters will be developed via education and training seminars, presentations at Home Builder Association meetings, and other informational events. Customer marketing activities may include, but not be limited to bill inserts, email blasts, bill messaging, and community events. The key barriers for many new construction offerings is the administrative burden to locate raters and receive HERs rating. This offering is designed to be a prescriptive offering to reduce barriers encountered with the location and training of HERS raters. A HERS rating will not be required for this program. Instead, the implementation contractor will work with interested customers to ensure they are selecting the right products for their new construction home. It is important that the measures are properly installed and customer satisfaction is high. Evergy and/or the implementation contractor should conduct QA/QC of a random group of completed projects by project type and contractor. The QA/QC process should include verifying the installed equipment and customer satisfaction with the contractor and the option. In an effort to increase spillover, the program should be cross-marketed with other residential programs.

Eligible Measures

Eligible measures include:

Measure
Advanced Power Strip
Air-Source Heat Pump
Liquid-Applied Weather-Resistive Barrier
Central AC
Central Heat Pump Controls and Commissioning
Connected Thermostat
Floor Insulation
Radiant Barrier Insulation
Refrigerator
Drain Water Heat Recovery
Water Heater
High-Efficiency Windows

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	741	664	602	539	363	85
West	874	863	828	777	584	199
Total	1,615	1,526	1,430	1,316	947	284

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	0.38	0.34	0.31	0.28	0.17	0.03
West	0.43	0.42	0.40	0.37	0.24	0.06
Total	0.81	0.76	0.71	0.64	0.41	0.09

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$333,229	$299,771	$272,743	$245,544	$168,012	$36,577
West	$352,642	$349,733	$337,545	$318,323	$250,708	$105,452
Total	$685,871	$649,504	$610,289	$563,866	$418,719	$142,029

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.64	1.74	1.84	1.95	2.58	2.44
West	1.79	1.89	2.00	2.10	2.58	1.90
Total	1.72	1.82	1.93	2.03	2.58	2.04

1.1.5 Income Eligible Multi-Family

Description	The program aims to provide direct install measures in housing units and common area measures in multi-family buildings. This includes the following characteristics: ***Multi-Family DI.*** Direct installation of low-cost measures for income-eligible homeowners and renters in multi-family housing, at no cost to the participant. The low-cost measures to be installed include: low-flow faucet aerator, low-flow showerhead, advanced power strip, water heater tank wrap, hot water pipe insulation and LEDs. ***Multi-Family Common Areas.*** Installation of prescriptive lighting measures in multi-family common areas, at no cost to the participating building owner, and custom measure rebates at $/kWh saved.
Objectives	Deliver long-term energy savings and bill reductions to income-eligible customers in multi-family housing and common area energy savings.
Target Market	Income-eligible residential homeowners and renters that are below 200% of the Federal poverty level and reside in multi-family housing. Multi-family buildings with income-eligible residents.
Implementation Strategy	Evergy will engage a third-party implementation contractor to: • Identify and establish relationships with multi-family building owners that have a number of income-eligible residents. • Engage customers and schedule appointments. • Track program performance. • Periodically report progress toward program goals. The implementation contractor framework could include providing owners of multi-family buildings with a single point of contact or Coordinator for in-unit and common area/building system measures. The Coordinator's duties could include: • Determining eligibility and ensuring eligible customers are aware of the available incentives from all utilities. • Assisting in the application process for the residential and business improvements. In addition, where other utilities are participating, assisting with those applications. • Providing a seamless point of contact for navigating the various incentive offers provided by the Company and other utilities. • Maintaining a relationship with the existing business trade ally network and providing information and guidance to assist them with the bid process for installation work. • Understanding and maintaining a network of assistance agencies and making referrals for financing and repairs, seeking to remove barriers to participation. • Providing case studies and education, and working with business development teams to ensure proper outreach is occurring. • Coordinating marketing materials to provide an easy to understand process for participation. • Maintaining working relationships with and providing outreach and education to stakeholders such as lenders, government agencies, and other identified parties. The program targets an underserved market that may not participate in other DSM programs due a lack of funds or awareness. The program will encourage building managers and owners to continue improving building energy efficiency via the Business DSM Programs. The program focuses on providing energy efficiency services to income-eligible residents to ensure reduced consumption. There is little risk associated with this product.
Measures	The multi-family unit kits and common area lighting measures are installed free of charge. The DI include: low-flow faucet aerator, low-flow showerhead, advanced power strip, water heater tank wrap, hot water pipe insulation and LEDs. Major measures and custom common area incentives are provided at 100% of the incremental cost.

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	211	249	282	300	350	256
West	164	169	205	212	219	167
Total	375	419	486	513	569	424

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	0.06	0.07	0.08	0.09	0.09	0.07
West	0.05	0.05	0.06	0.06	0.05	0.04
Total	0.10	0.12	0.14	0.16	0.14	0.10

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$100,844	$133,325	$149,542	$216,556	$266,730	$229,714
West	$99,332	$103,720	$122,254	$128,000	$146,286	$97,792
Total	$200,176	$237,046	$271,796	$344,556	$413,016	$327,506

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.56	1.49	1.53	1.29	1.62	1.38
West	1.21	1.30	1.33	1.42	1.79	1.87
Total	1.39	1.40	1.44	1.34	1.68	1.53

1.1.6 Income Eligible Single Family

	The program leverages the Weatherization Assistance Program to provide qualifying customers with approved energy efficiency measures and equipment.
Objectives	Deliver long-term energy savings and bill reductions to income-eligible customers.
Target Market	Income-eligible residential homeowners and renters below 200% of the Federal poverty level.
Implementation Strategy	Evergy will work with local Weatherization Assistance Program agencies to implement the program. The agencies will utilize the Evergy funding to provide weatherization to additional homes and will be responsible for the following activities: • Market the program and engage customers. • Schedule appointments. • Install measures. • Track program performance. • Periodically report progress towards program goals. The program targets an underserved market that may not participate in other DSM programs due a lack of funds. The program focuses on providing energy efficiency services to income-eligible residents to ensure reduced consumption. There is little risk associated with this product.
Eligible Measures	Measures are provided at no cost to the customer and include, but not limited to:

Eligible Measures
Advanced Power Strip
Air Purifier
Air Source Heat Pump
Liquid-Applied Weather-Resistive Barrier
Whole-Home Aerosol Sealing
Central AC
Central Heat Pump Controls and Commissioning
Connected Thermostat
Dehumidifier
Duct Insulation & Sealing
Basement Sidewall Insulation
Floor Insulation
Radiant Barrier Insulation
Refrigerator
Room AC
Faucet Aerator
Low Flow Showerhead
Pipe Insulation
Thermostatic Shower Restriction Valve
Water Heater

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	1,308	1,381	1,428	1,466	1,140	786
West	908	951	975	998	935	724
Total	2,216	2,332	2,403	2,464	2,075	1,510

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	0.64	0.67	0.70	0.73	0.43	0.32
West	0.38	0.40	0.42	0.43	0.27	0.20
Total	1.02	1.07	1.12	1.16	0.70	0.53

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$708,630	$740,499	$771,791	$796,949	$825,995	$507,293
West	$567,433	$586,448	$602,807	$617,608	$693,593	$515,873
Total	$1,276,063	$1,326,947	$1,374,598	$1,414,557	$1,519,588	$1,023,166

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.72	1.91	2.05	2.21	2.29	2.51
West	1.40	1.55	1.68	1.82	1.89	1.81
Total	1.58	1.75	1.89	2.04	2.11	2.16

1.1.7 Residential Smart Thermostat

Description	The Residential Smart Thermostat with Direct Load Control (DLC) Program pays an incentive to participants to reduce peak demand by controlling their cooling equipment during periods of system peak demand and when there may be delivery constraints within certain load zones. This is done by way of a remotely communicating, wifi thermostat. During a program event, the program operations center sends a signal to the thermostat to adjust its set-point by a few degrees such that the system will consume less energy and run less frequently throughout the max 4-hour event duration. Bring Your Own (BYO) Customers enroll in the program with a thermostat of their choosing and receive an annual incentive for their participation in demand response events.
Objectives	Primarily decrease peak demand usage to provide system and grid relief during particularly high-load, high-congestion peak hours. Also provide annual energy savings.
Target Market	Individually metered residential customers. Target primarily single family homeowners, expanding into multi-family as the single family market opportunities begin to saturate.
Implementation Strategy	Evergy will engage a third-party implementation contractor to: • Hire/sub-contract local staff to install the programmable thermostats. • Engage customers, schedule installation appointments and process customer incentives. • Provide customer service support. • Track program performance and event data. • Periodically report progress towards program goals and opportunities for improvement. Events typically occur between June 1 and September 30, Monday to Friday. Event duration is max 4 hours per day Customers may opt-out twice a year. The program will be marketed through direct contact with consumers using bill inserts, newsletters, website, broadcast and print media, and direct mail. The program will be cross marketed with Evergy's Residential DSM programs. In particular, it will be marketed and positioned to customers as a seamless bundle with other demand response programs that are similar in delivery mechanism and nature. The primary benefit of demand response programs is to mitigate the risks and costs associated with system peak loads. From a planning perspective, using demand response resources in the most valuable way would imply that system planners would include the peak impacts in the load forecast nominated to the RTO (regional transmission organization), thereby reducing the utility system peak, required capacity, and the reserve requirements. This also implies that events would primarily be called when the day-ahead forecast projects a load in excess of that nominated peak, rather than using another event trigger mechanism, such as energy market prices above a certain threshold or weather above a certain temperature. Having the thermostats available as a resource year-round is potentially of value to system operations in the event of plant maintenance or other grid events. Curtailment in participating homes with electric heat could provide additional risk management capabilities during winter months in the future. Providing the opportunity for customers to opt-out or override a limited number of events provides choice and control to the customer, minimizing the risk of attrition and lost participants.
Eligible Measures	Customers enroll their existing device or one purchase through the Evergy energy efficiency programs.

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	5,689	6,396	7,084	7,054	7,144	7,075
West	7,420	9,500	10,490	10,417	10,333	10,045
Total	13,109	15,896	17,574	17,471	17,477	17,120

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	35.51	39.88	44.11	43.87	44.07	43.39
West	46.36	59.33	65.48	65.00	64.47	62.74
Total	81.87	99.21	109.59	108.87	108.54	106.13

Note that incremental demand savings for DR programs represents the annual number of participants in the entire population that roll over from year to year. This makes the incremental savings equal to the cumulative savings.

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$1,755,687	$1,894,672	$1,988,415	$1,516,272	$1,527,312	$1,535,440
West	$2,135,480	$2,636,667	$2,341,723	$1,768,008	$1,729,510	$1,721,124
Total	$3,891,167	$4,531,339	$4,330,138	$3,284,280	$3,256,822	$3,256,564

Cost-Effectiveness

Demand Response resources were screened using the utility cost test (UCT) as the primary test for cost effectiveness.

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.76	1.85	1.91	2.07	2.97	3.20
West	1.84	1.93	2.15	2.40	3.70	4.03
Total	1.81	1.90	2.04	2.26	3.37	3.65

1.2 Non-Residential

1.2.1 Commercial Prescriptive

Description	The Business Energy Efficiency Rebate – Standard is a pre-qualified list of measures designed to help commercial and industrial customers save energy through a broad range of energy efficiency options that address all major end uses and processes. The program will offer standard rebates as well as mid-stream incentives. The measures incentivized, including lighting, HVAC equipment, and motors, are proven technologies readily available with known performance characteristics. Participants select energy efficient equipment from a pre-qualified list. Rebates are issued to participants upon completion of the project and submission of the rebate application.
Objectives	Encourage the purchase and installation of energy efficient equipment.
Target Market	All commercial and industrial customers as well as Trade Allies.
Implementation Strategy	Evergy will engage a third-party implementation contractor to: • Process customer applications, verify eligibility and process customer rebates. • Conduct QA/QC to verify equipment installation. • Provide customer service support. • Track program performance. • Periodically report progress towards program goals and opportunities for improvement. Key pillars of the marketing strategy will include Trade Allies and direct customer marketing, including direct mail, newspaper advertisements, email blasts, bill inserts, and HVAC trade publications. Additional marketing tactics will include: • **Education.** Train and educate Trade Allies on the programs and how to effectively sell the program to customers. • **Incentives.** Provide incentives to Trade Allies that successfully increase the sale of qualifying measures to customers within the Evergy service territory. • **Trade Associations.** Businesses rely on trade associations to represent the industry's best interests in lobbying, growth, and identification of business opportunities. Evergy will coordinate with specific associations to highlight suitable program offerings. • **Highlight successfully completed projects.** Evergy will select projects to display the process and benefits of the program. This type of marketing will spur the customer's competitors to improve building performance and increase business process efficiency. The program will be cross-marketed with Evergy's Business DSM programs, particularly the Business Energy Efficiency Rebate – Custom Program. The key barriers are return on investment, decision timing, customer internal funding, and approval processes. Many customers have internal return on investment hurdles that are quite aggressive, sometimes as short as a one-year payback. Another barrier is ensuring enough vendors are properly educated to actively engage customers by explaining the benefits of efficiency improvements. Measure savings are expected to be updated annually. Potential changes to measure savings, costs, and other key assumptions could affect the measure's ability to pass cost-effectiveness tests. Therefore, the mix of measures offered could change from year to year to reflect changes made to the original measure attributes. Incentives will be modified as needed to respond to market prices, with a goal of the incentive being no higher than 50% of the incremental cost. Proper incentives can reduce free ridership while still encouraging customers to participate in the program.

Measures

The consolidated measure list below is set for planning purposes and may be modified to reflect market conditions. Additional measures included in the Company TRM may also be offered.

Measure	
Air Cooled Chiller	Floating Head Pressure
Air Source Heat Pump	Linear Lighting
Area Lighting	Oven
Connected Thermostat	Packaged Terminal AC
Efficient Hand Dryer	Pool Heater
Griddle	Automatic High-Speed Doors
Display Case Anti-Sweat Heater Controls	Floating Head Pressure
Display Case Door Retrofit	Linear Lighting
Display Case LED Lighting	High-Efficiency Evaporator Fan Motors
Display Case Low-Heat/No-Heat Doors	Strip Curtain
Display Case Motion Sensors	RTU
High Bay Lighting	Steamer
Hot Food Container	Demand Controlled Ventilation
Icemaker	Variable Speed Control
Interior Fluorescent Delamping	Faucet Aerators/Low Flow Nozzles
Kitchen Ventilation Advanced Controls	Low-Flow Showerheads
Linear Lighting	Pipe Insulation
Oven	Pre-Rinse Spray Valve
Packaged Terminal AC	Water-Cooled Chiller
Pool Heater	Water Heater

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	13,146	15,313	14,797	14,478	15,817	10,918
West	10,500	11,961	11,836	11,962	14,959	9,542
Total	23,645	27,275	26,632	26,440	30,776	20,461

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	2.61	3.08	3.02	2.98	3.17	2.10
West	2.37	2.67	2.68	2.76	3.09	1.92
Total	4.98	5.75	5.70	5.74	6.26	4.01

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$4,527,627	$5,273,386	$5,641,997	$5,992,398	$7,249,523	$5,556,174
West	$3,595,094	$3,980,201	$4,271,068	$4,806,158	$5,755,431	$4,356,716
Total	$8,122,721	$9,253,587	$9,913,065	$10,798,555	$13,004,954	$9,912,890

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.14	1.39	1.40	1.41	1.86	1.73
West	1.24	1.51	1.54	1.50	2.18	1.92
Total	1.18	1.44	1.46	1.45	2.01	1.81

1.2.1 Commercial and Industrial Custom

Description	The program is designed to provide customers incentives for installing energy efficient measures not explicitly identified in the Standard program. It helps commercial and industrial customers save energy through a broad range of energy efficiency options that address all major end uses and processes. Applications must be pre-approved by Evergy before equipment is purchased and installed and must have a Total Resource Cost Test benefit-cost ratio of at least 1.0. Incentives, up to 50% of the project cost, were included as a $ per first-year-kWh saved. Participant rebates per program year are limited to the annual cap outlined in the tariff on the company website and applications. Multiple rebate applications for different measures may be submitted. Rebates will be issued upon completion of the project.
Objectives	Encourage the purchase and installation of energy efficient equipment by providing incentives to lower the cost of purchasing efficient equipment for commercial and industrial facilities.
Target Market	All commercial and industrial customers.
Implementation Strategy	Evergy will engage a third-party implementation contractor to: • Process customer applications, verify eligibility, review pre-approval applications, and process customer rebates. • Conduct QA/QC to verify equipment installation. Randomly inspect 10% of projects and all projects over a threshold determined by Evergy (e.g., $10,000). • Provide customer service support. • Track program performance. • Periodically report progress towards program goals and opportunities for improvement. Key pillars of the marketing strategy will include Trade Allies and direct customer marketing, including direct mail, newspaper advertisements, email blasts, bill inserts and HVAC trade publications. Additional marketing tactics will include: • Education. Train and educate Trade Allies on the programs and how to effectively sell the program to customers. • Trade Associations. Businesses rely on trade associations to represent industry's best interests in lobbying, growth, and identification of business opportunities. Evergy will coordinate with specific associations to highlight suitable program offerings. • Highlight successfully completed projects. Evergy will select projects to display the process and benefits of the program. This type of marketing will spur the customer's competitors to improve building performance and increase business process efficiency. The program will be cross marketed with Evergy's Business DSM programs, particularly the Business Energy Efficiency Rebate – Standard Program. The key barriers are return on investment, decision timing, and customer internal funding and approval processes. Many customers have internal return on investment hurdles that are quite aggressive, sometimes as short as a one year payback. Another barrier is ensuring that enough vendors are properly educated to allow them to actively engage customers by explaining the myriad benefits of efficiency improvements.
Eligiblity Measures	Incentives were set for planning purposes and may be modified to reflect market conditions. Incentives, up to 50% of the project cost and up to a maximum annual cap, are $0.08-0.18 per first-year kWh saved for all incentives.

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	7,883	8,370	8,364	8,485	8,958	10,101
West	6,281	6,604	6,664	6,813	7,859	8,880
Total	14,164	14,975	15,028	15,299	16,817	18,981

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	1.56	1.69	1.69	1.70	1.90	2.06
West	1.38	1.45	1.47	1.50	1.89	1.95
Total	2.94	3.14	3.16	3.20	3.79	4.01

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$2,506,082	$2,691,106	$2,708,993	$2,808,024	$3,569,488	$4,573,981
West	$1,955,542	$2,038,609	$2,079,543	$2,192,107	$2,976,702	$3,723,761
Total	$4,461,624	$4,729,715	$4,788,536	$5,000,131	$6,546,190	$8,297,741

Cost-Effectiveness

Territory	TRC Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.10	1.33	1.41	1.48	1.92	1.90
West	1.23	1.47	1.55	1.61	2.11	2.09
Total	1.16	1.39	1.47	1.54	2.01	1.99

1.2.2 Business Curtailment Agreements

Description	The Demand Response Incentive Program provides firm contractual arrangements with customers for periodic curtailments at times of system peak demand. Customers enter into a contract for a one, three, or five-year term and receive a payment/bill credit based upon the curtailable load, the contract term and number of consecutive years under contract. Participants receive notification of an event at least 4 hours prior to the start time.
Objectives	Decrease peak demand usage to provide system and grid relief during particularly high-load, high-congestion peak hours.
Target Market	Large commercial and industrial customers with load curtailment capability of at least 200 kW.
Implementation Strategy	Evergy key account executives will be vital to coordinating with the largest customers and gaining their participation and collaboration. The program will also be marketed through direct customer outreach as well as newsletters and direct mail. The program will promote Evergy's Business DSM programs to participating customers. The primary benefit of demand response programs is to mitigate the risks and costs associated with system peak loads. From a planning perspective, using demand response resources in the most valuable way would imply that system planners would include the peak impacts in the load forecast nominated to the RTO, thereby reducing the utility system peak, required capacity, and the reserve requirements. This also implies that events would primarily be called when the day-ahead forecast projects a load in excess of that nominated peak, rather than using another event trigger mechanism, such as energy market prices above a certain threshold or weather above a certain temperature. Providing the opportunity for customers to opt-out or override a limited number of events provides choice and control to the customer, minimizing the risk of attrition and lost participants.
Eligible Measures	Customers receive a fixed, capacity-reserve payment in terms of $/kW, based on the number of curtailable kW, the contract term, and number of consecutive years under contract. The fixed payment is supplemented by a performance payment on a $/kWh basis, calculated from the customer's actual load curtailment relative to their baseline load, as calculated by program management.
Estimated Savings	

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	2,826	3,570	4,069	4,064	4,048	4,093
West	4,529	5,063	5,431	5,438	5,566	5,732
Total	7,355	8,633	9,500	9,502	9,614	9,825

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	37.24	47.55	54.29	54.26	54.24	54.87
West	61.61	69.24	74.35	74.49	76.19	78.57
Total	98.85	116.79	128.64	128.75	130.43	133.44

Note that incremental demand savings for DR programs represents the annual number of participants in the entire population that roll over from year to year. This makes the incremental savings equal to the cumulative savings.

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$1,063,991	$1,352,765	$1,541,315	$1,540,560	$1,539,854	$1,557,381
West	$1,778,208	$1,991,761	$2,134,991	$2,138,790	$2,186,371	$2,252,950
Total	$2,842,199	$3,344,526	$3,676,306	$3,679,350	$3,726,225	$3,810,331

Cost-Effectiveness	Demand Response resources were screened using the utility cost test (UCT) as the primary test for cost effectiveness.

Territory	UCT Ratio					
	2024	2025	2026	2027	2036	2043
Metro	2.96	3.02	3.07	3.12	3.91	4.15
West	2.95	3.00	3.05	3.10	3.88	4.12
Total	2.95	3.01	3.06	3.11	3.89	4.14

1.2.3 Business Smart Thermostat

Description	The Business Smart Thermostat with Direct Load Control (DLC) Program pays an incentive to participants to reduce peak demand by controlling their cooling equipment during periods of system peak demand and when there may be delivery constraints within certain load zones. This is done by way of a remotely communicating, programmable thermostat. During a program event, the program operations center sends a signal to the thermostat to adjust its set-point by a few degrees such that the system will consume less energy and run less frequently throughout the max 4-hour event duration. One method of participation will be for customers to receive the thermostat and professional installation for free upon qualification and enrollment in the program. Smart thermostats also achieve energy savings by using occupancy sensors and setback schedules with learning algorithms.
Objectives	Primarily decrease peak demand usage to provide system and grid relief during particularly high-load, high-congestion peak hours. Also provide annual energy savings.
Target Market	Small & medium Commercial customers who control their heating and cooling with traditional wall-mounted thermostats.
Implementation Strategy	Evergy will engage a third-party implementation contractor to: • Hire/sub-contract local staff to install the programmable thermostats. • Engage customers, schedule installation appointments and process customer incentives. • Provide customer service support. • Track program performance and event data. • Periodically report progress towards program goals and opportunities for improvement. Events will typically occur between June 1 and September 30, Monday to Friday. Event duration is max 4 hours per day. Customers may opt-out twice a year. The program will be marketed through direct contact with consumers using newsletters, website, broadcast and print media, and direct mail. The program will be cross marketed with Evergy's Business DSM programs. The primary benefit of demand response programs is to mitigate the risks and costs associated with system peak loads. From a planning perspective, using demand response resources in the most valuable way would imply that system planners would include the peak impacts in the load forecast nominated to the RTO (regional transmission organization), thereby reducing the utility system peak, required capacity, and the reserve requirements. This also implies that events would primarily be called when the day-ahead forecast projects a load in excess of that nominated peak, rather than using another event trigger mechanism, such as energy market prices above a certain threshold or weather above a certain temperature. Having the thermostats available as a resource year-round is potentially of value to system operations in the event of plant maintenance or other grid events. Curtailment in participating homes with electric heat could provide additional risk management capabilities during winter months in the future. Providing the opportunity for customers to opt-out or override a limited number of events provides choice and control to the customer, minimizing the risk of attrition and lost participants.
Eligible Measures	Customers enroll their existing device or one purchased through the Evergy energy efficiency programs.

Estimated Savings

Territory	Net MWh Savings					
	2024	2025	2026	2027	2036	2043
Metro	233	544	699	776	758	731
West	141	423	986	1,268	1,376	1,327
Total	374	967	1,685	2,044	374	967

Territory	Net MW Savings					
	2024	2025	2026	2027	2036	2043
Metro	1.46	3.40	4.37	4.85	4.72	4.54
West	0.88	2.64	6.16	7.92	8.56	8.24
Total	2.34	6.04	10.53	12.77	2.34	6.04

Note that incremental demand savings for DR programs represents the annual number of participants in the entire population that roll over from year to year. This makes the incremental savings equal to the cumulative savings.

Estimated Budget

Territory	Annual Budget					
	2024	2025	2026	2027	2036	2043
Metro	$52,669	$117,252	$141,700	$119,528	$116,746	$115,007
West	$26,326	$75,666	$140,802	$136,377	$145,579	$143,072
Total	$78,995	$192,918	$282,502	$255,905	$78,995	$192,918

Cost-Effectiveness

Demand Response resources were screened using the utility cost test (UCT) as the primary test for cost effectiveness.

Territory	UCT Ratio					
	2024	2025	2026	2027	2036	2043
Metro	1.22	1.36	1.70	1.99	3.71	4.12
West	3.09	2.15	2.21	2.67	5.50	6.12
Total	1.58	1.61	1.92	2.32	4.66	5.19

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