→ Public Service Company of New Mexico Potential Study 2026-2045

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Abbreviations and Acronyms

Term	Definition
AEO	Annual Energy Outlook forecast developed by EIA
B/C Ratio	Benefit to Cost Ratio
BEST	ICF's Building Energy Simulation Tool
CBECS	Commercial Buildings Energy Consumption Survey
C&I	Commercial and Industrial
DEEM	Database of Energy Efficiency Measures
DEER	Database of Energy Efficiency Resources
DSM	Demand-Side Management
EE	Energy Efficiency
ECM	Energy Conservation Measure
EIA	Energy Information Administration
EPRI	Electric Power Research Institute
EUEA	New Mexico's Energy Use of Energy Act
EUL	Effective Useful Life
EUI	Energy Use Intensity
GWh	Gigawatt Hour
HVAC	Heating Ventilation and Air Conditioning
IRP	Integrated Resource Plan
LED	Light Emitting Diode lamp
VisionLoadMAP	ICF's Load Management Analysis and Planning™ tool
MECS	Manufacturing Energy Consumption Survey
MW	Megawatt
NPV	Net Present Value
O&M	Operations and Maintenance
PTAC	Packaged Terminal Air Conditioner
PTHP	Packaged Terminal Heat Pump
RECS	Residential Energy Consumption Survey
RTU	Rooftop Unit
TRC	Total Resource Cost test
UCT	Utility Cost Test
UEC	Unit Energy Consumption
UES	Unit Energy Savings

Executive Summary

In 2025, Public Service Company of New Mexico (PNM) engaged ICF International (ICF) to perform PNM's 2026 -2045 Energy Efficiency Potential Study, supporting its conservation and resource planning activities. This study continues the long working relationship between PNM and Applied Energy Group (AEG), which was acquired by ICF in 2025. This report documents the effort and provides estimates of the potential annual energy usage reductions for electric customers within PNM service territory, achieved through energy conservation measures from 2026 to 2045.

This study was designed to accomplish the following goals:

- Update the model base year consumption and characterization to 2024 using the latest available data resources and PNM's actual billed electric sales for that year
- Estimate energy conservation potential for a broad array of possible measures to assist PNM in conservation goal setting and program development

In summary, the potential study provides a solid foundation for the development of PNMs short-term energy efficiency program planning. The results were also prepared for PNM's Integrated Resource Planning (IRP) team, who use the hourly measure-level savings and measure economics estimates as inputs to their long-term planning model.

Table ES-1 summarizes the high-level results of this study. ICF analyzed potential for the residential, commercial, and industrial sectors. The ten-year potential in 2035 is 537,538 MWh. Key opportunities for savings are residential infiltration control and high efficiency windows, remaining lighting upgrades in commercial and industrial, water heating upgrades in commercial, and pumping upgrades in industrial.

Table ES-1: Achievable Potential in 2035 (10-year cumulative savings)

Sector	2035 Achievable Potential (MWh)	% of Total Potential
Residential	216,397	40%
Commercial	262,719	49%
Industrial	58,422	11%
Total	**537,538**	100%

Comparison with Prior Study

Compared to the prior potential study, this study updated several key assumptions and methodologies used. These include:

- Latest customer database and electric use per customer information from PNM
- Updated data from the 2018 Commercial Building Stock Assessment (CBECS), released late 2023
- Updated avoided costs from latest PNM projections and analysis

Compared to the previous study, 10-year achievable potential has decreased by 18%, or 118 GWh. Key contributions to changes relative to the previous study include:

- Residential potential is higher compared to the previous study, based on analysis of PNM's recent program activity and accomplishments. Opportunities in the residential sector are concentrated in building shell measures that affect cooling and space heating. Commercial and industrial sector potential have decreased compared to the previous study, mostly due to the market transformation of LED lighting in the baseline.

- Single-family, non-income qualified households make up the majority (80%) of residential load and 68% of the corresponding residential potential. This is compared to 71% of the residential load in the previous study, and 66% of the corresponding potential.
- Updates to lighting baselines show a large portion of lighting has already converted to LED in all sectors, which reduces the available opportunity compared to the prior study.

Table ES-2 compares 10-year sector-level achievable potential between the two studies.

Table ES-2: Comparison of Current and Prior Study for 10-Year Achievable Potential

Sector	Current Study: 2026-2035 Potential (MWh)	*Prior Study: 2023-2032 Potential (MWh)*	Change from Prior Study (MWh)	% Change from Prior Study
Residential	216,397	122,633	93,764	76%
Commercial	262,719	435,797	-173,078	-40%
Industrial	58,422	97,919	-39,497	-40%
Total	**537,538**	**656,349**	**-118,811**	**-18%**

Report Contents

The remainder of this report is divided into seven chapters and three appendices, summarizing the approach, assumptions, and results of PNM's 2026-2045 Potential Study. We describe each section below:

- **Introduction.** Introduction of the study objectives and summary of considerations that have come up in this study or prior studies.
- **Analysis Approach and Data Development**. Detailed description of ICF's approach to conducting PNM's 2026-2045 Potential Study and documentation of primary and secondary sources used.
- **Market Characterization and Market Profiles**. Characterization of PNM's service territory in the base year of the study, 2024. This characterization includes total consumption, number of customers and market units, and energy intensity. This also includes a breakdown of energy consumption for the residential, commercial, and industrial sectors by end use and technology.
- **Baseline Projection**. Projection of baseline energy consumption described at the end-use level. The VisionLoadMAP models were compared with PNM's official econometric forecast and then varied to include the impacts of future federal standards and customer growth assumptions.
- **Overall Conservation Potential**. Summary of conservation potential for PNM's entire service territory for selected years between 2026 and 2045, including potential estimates for each sector, including behavioral programs in residential.
- **Sector-Level Conservation Potential**. Summary of conservation potential for each market sector within PNM's service territory, including residential, commercial, and industrial. This section includes a more detailed breakdown of potential by measure type, vintage, market segment, and end use.
- **Comparison with Prior Study**. Detailed comparison of changes between the prior and current study.
- **Appendix A. Market Profiles**. Detailed market profiles for each market sector. Includes equipment saturation, unit energy consumption or energy usage index, energy intensity, and total consumption.
- **Appendix B. Customer Adoption Factors**. Documentation of the ramp rates used in this analysis.

- **Appendix C. Measure List**. List of measures, along with example baseline definitions and efficiency options by market sector analyzed.

1 Introduction

This report documents the results of the PNM's 2026-2045 Potential Study and the steps ICF followed in its completion. Throughout this study, ICF worked with PNM staff to understand the baseline characteristics of their service territory, including a detailed understanding of energy consumption, the assumptions and methodologies used in PNM's official load forecast, and recent programmatic accomplishments. Using methodologies consistent with the, ICF then developed an independent estimate of available potential within PNM's service territory between 2026 and 2045.

This Potential Study builds upon the background material established in earlier potential studies conducted by AEG (now ICF) and includes updates to the latest available customer data from PNM, most recent market data from the Residential Appliance Saturation Survey and updated technical data from the US DOE.

Objectives of the Analysis Tasks

This Potential Study was designed to identify the technical, economic, and achievable potential across the residential, commercial, and industrial sectors in PNM's territory. As part of this analysis, the ICF team:

- Characterized the current electric equipment penetration and consumption by homes, businesses, and industries for the Consumers Energy service territory.
- Estimated the energy savings, demand reductions, and costs for energy efficiency measures across different sectors, market segments, and end uses.
- Estimated the impact of building energy codes and equipment efficiency standards on future energy consumption and savings potential.

Study Considerations

This study considered several items worth summarizing here. These items are discussed throughout the rest of the report.

- **Potential Assessment vs. Program and Portfolio Design:** Potential Studies generally use the average costs and impacts of energy efficiency measures for specific customer groups to calculate the total potential for particular measures and their average cost-effectiveness. They make a binary decision on whether to include a measure in the economic potential. In comparison, energy efficiency programs operate differently by providing prescriptive incentives for measures anticipated to be cost-effective on average, along with a custom measure path for those that may only be cost-effective in certain applications. Therefore, while the potential study can offer useful insights into measures to consider for inclusion in programs, especially prescriptive ones, the identified cost-effective potential should not be viewed as exhaustive of all program opportunities.
    - **Impacts of Codes and Legislation:** ICF collaborated with PNM to evaluate the impacts of codes and standards on electric consumption and potential savings. It accounted for existing and approved changes to building codes and equipment standards,
- **Assessing Energy Efficiency Potential by Residential Customer Income Level**. This study segmented residential energy use and savings potential according by income group and housing type. Identifying differences in equipment and average consumption by income group offers insights into customer engagement with energy efficiency programs, as well as variations in cost-effectiveness and impacts among the groups.

2 Analysis Approach and Data Development

This section describes the study's analysis approach, and the data sources used to develop the potential estimates.

Overview of Analysis Approach

To perform the potential analysis, ICF used a bottom-up approach following the major steps listed below. We describe these analysis steps in more detail throughout the remainder of this chapter.

1. Performed a market characterization to describe sector-level electricity use for the residential, commercial, and industrial sectors in the study's base year (2024). This included using PNM load and survey data as well as secondary data sources such as the U.S. Energy Information Administration (EIA)'s Residential, Commercial Building, and Manufacturing Energy Consumption Surveys (RECS, CBECS, and MECS).
2. Developed a baseline projection of energy consumption by sector, segment, end use, and technology for 2025 through 2045.
3. Defined and characterized several hundred energy conservation measures (ECMs) to be applied to all sectors, segments, and end uses.
4. Estimated technical, economic, and achievable potential at the measure level for 2026-2045.
5. Used the Utility Cost test (UCT) as the cost-effectiveness metric which compares the lifetime avoided cost benefits sof each applicable measure with the combined cost of assumed customer incentives and utility-incurred costs of measure delivery and administration.

VisionLoadMAP Model

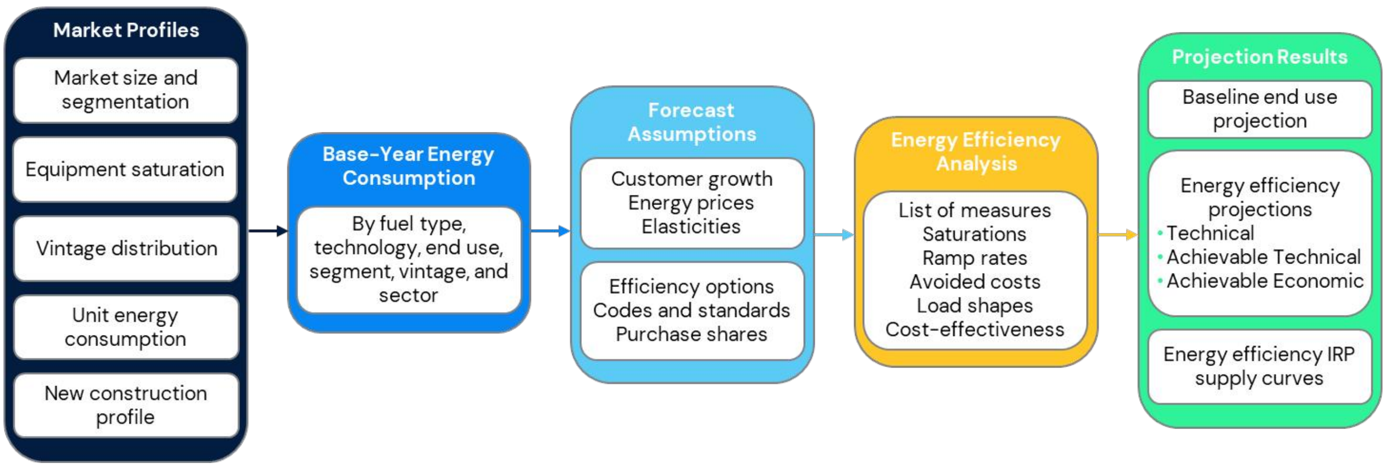
For this analysis, ICF used its Load Management Analysis and Planning tool (VisionLoadMAP™) to develop both the baseline projection and the estimates of potential. AEG (now ICF) developed LoadMAP in 2007 and has enhanced it over time. Previously built in Microsoft Excel, has been adapted to a cloud-based modeling platform now known as VisionLoadMAP (see Figure 2-1) that is both accessible and transparent and has the following key features:

- Embodies the basic principles of rigorous end-use models
- Includes stock-accounting algorithms that treat older, less efficient appliance/equipment stock separately from newer, more efficient equipment. Equipment is replaced according to the measure life and appliance vintage distributions defined by the user.
- Balances the competing needs of simplicity and robustness by incorporating important modeling details related to equipment saturations, efficiencies, vintage, and the like, where market data are available, and treats end uses separately to account for varying importance and availability of data resources.
- Isolates new construction from existing equipment and buildings and treats purchase decisions for new construction and existing buildings separately.
- Uses a simple logic for appliance and equipment decisions. The VisionLoadMAP approach allows the user to drive the appliance and equipment choices year by year directly in the model. This flexible approach enables users to import the results from diffusion models or to input individual assumptions.

- Can accommodate various levels of segmentation. Analysis can be performed at the sector level (e.g., total residential) or for customized segments within sectors (e.g., housing type, climate zone, or income level).
- Natively outputs model results in a detailed Power B.I. interactive dashboard, allowing for review of high-level summaries and granular interactivity of potential results or cost-effectiveness estimates.

Consistent with the segmentation scheme and the market profiles we describe below, the VisionLoadMAP model provides projections of baseline energy use by sector, segment, end use, and technology for existing and new buildings. It also provides forecasts of total energy use and energy-efficiency savings associated with the various types of potential.[1]

Figure 2-1: VisionLoadMAP Analysis Framework



Types of Energy Efficiency Potential

This study estimates savings for three types of potential: technical, economic, and achievable. These analyses are conducted at the measure level, and results are provided as savings impacts over the forecasting period. The various levels of potential are detailed Table 2-1.

Table 2-1: Types of Potential

Potential Type	Definition
Technical Potential	The *theoretical* upper limit of energy efficiency potential. It assumes customers adopt all feasible measures regardless of their cost. At the time of existing equipment failure, customers replace their equipment with the most efficient option available. In new construction, customers and developers also choose the most efficient equipment option.
Economic Potential	

[1] The model computes energy forecasts for each type of potential for each end use as an intermediate calculation. Annual-energy savings are calculated as the difference between

	the value in the baseline projection and the value in the potential forecast (e.g., the technical potential forecast).

	Represents the adoption of all cost-effective energy efficiency measures. In this analysis, the cost-effectiveness is measured by the utility cost test (UCT), which compares lifetime energy and capacity benefits to the costs of delivering the measure through a utility program. These costs are the incentive paid by the utility for the measure, plus any administrative costs that are incurred by the program to deliver and implement the measure. If the benefits outweigh the costs, a given measure is included in the economic potential.
Achievable Potential	Refines economic potential by applying customer participation rates that account for market barriers, customer awareness and attitudes, program maturity, and recent PNM program history

Market Characterization

To estimate the potential for savings from energy-efficient measures, it is necessary to first understand how much energy is used today and what equipment is currently in service. This market characterization begins with a segmentation of PNM's electricity footprint to quantify energy use by sector, segment, end-use application, and the current set of technologies in operation. For this we rely primarily on information from PNM, augmenting with secondary sources as necessary.

Segmentation for Modeling Purposes

This assessment first defined the market segments (building types, end uses, and other dimensions) that are relevant in the PNM service territory. The segmentation scheme for this project is presented in Table 2-2.

Table 2-2: Segmentation Overview

Segmentation Variable	Description
Sector	Residential, Commercial, Industrial
Segment	**Residential:** Single family, Single family Low Income, Multifamily, , and Manufactured Homes and Multifamily Low Income. **Commercial:** Small Office, Large Office, Restaurant, Retail, College, School, Grocery, Health, Lodging, Warehouse, and Miscellaneous **Industrial:** Industrial
Vintage	Existing and new construction
End uses	Cooling, lighting, water heating, motors, etc. (as appropriate by sector)
Appliances/end uses and technologies	Technologies such as lamp type, air conditioning equipment, motors by application, etc.
Equipment efficiency levels for new purchases	Baseline and higher-efficiency options as appropriate for each technology

With the segmentation scheme defined, we then performed a high-level market characterization of electricity sales in the base year. We used detailed PNM billing and customer data with minimal augmentation from secondary sources to allocate energy use and customers to the various sectors and segments such that the total customer count and energy consumption matched PNM's system totals for 2024. This information provided control totals at a sector level for calibrating the VisionLoadMAP model to known data for the base year.

Market Profiles

The market profile is a snapshot of an entire sector in the base year, summarizing energy use for each segment in the study and apportioning the annual energy consumption into the various end uses and technologies. The market profile serves as the foundation for the baseline projection by defining the count of stock units that are available, and what the consumption of those units looks like in each segment. Chapter 3 provides details on the key market profile elements.

Baseline Projection

The next step was to develop the baseline projection of annual electricity use for 2025 through 2045 by customer segment and end use without new utility conservation programs. The baseline projection is the foundation for the analysis of savings in future conservation cases and scenarios as well as the metric that potential is measured against. ICF developed the reference baseline in alignment with PNM's long-term demand forecast, but with some modifications to account for known future conditions.

Inputs to the baseline projection include:

- Customer growth projections
- Trends in fuel shares and equipment saturations
- Existing and approved changes to building codes and equipment standards

It should also be noted that this reference baseline does **not** include the following:

- Future DSM program impacts
- Climate change projections – to remain consistent with PNM's official load forecast, these projections assume normal weather conditions
- Does not include the explicit electrification of fossil fuels

We present the baseline projection results for the system as a whole and for each sector in Chapter 4.

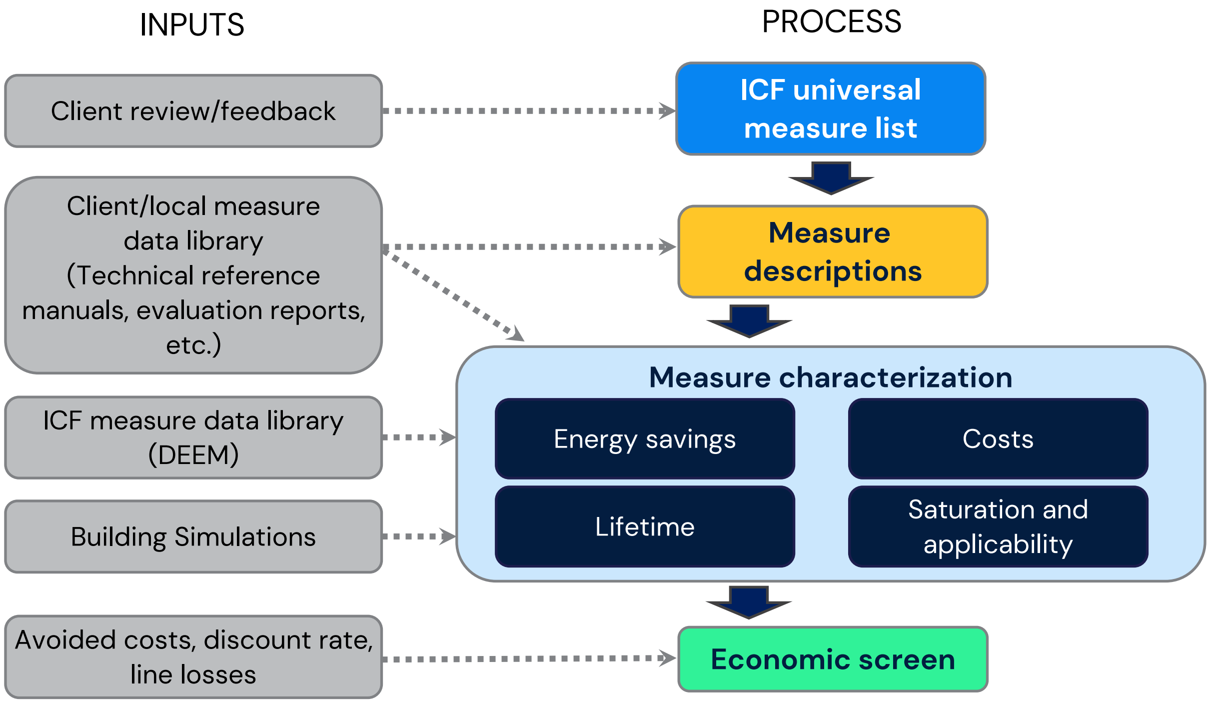
Energy Conservation Measure Development

This section describes the framework used to assess the savings, costs, and other attributes of ECMs. These characteristics form the basis for measure-level cost-effectiveness analyses as well as for determining measure-level savings. For all measures, ICF assembled information to reflect equipment performance, incremental costs, and equipment lifetimes. Combined with PNM's avoided cost data, this information informs the economic screen that determines economically feasible measures.

Figure 2-2 outlines the framework for the ECM analysis. The framework for assessing savings, costs, and other attributes of ECMs involves identifying the list of ECMs to include in the analysis, determining their applicability to each market sector and segment, fully characterizing each measure, and performing cost-effectiveness screening. PNM provided feedback during each step of the process to ensure measure assumptions and results aligned with programmatic experience.

ICF compiled a robust list of ECMs for each customer sector, primarily from relevant technical reference manuals, but also drawing upon PNM's program experience, ICF's own measure databases and building simulation models, and secondary sources. This universal list of measures covers all major types of end-use equipment, as well as devices and actions to reduce energy consumption. While this list may ultimately not be exhaustive of every possible intervention, it presents a wide array of reasonable and possible options with sufficient data for modeling and applying in PNM's territory. If considered today, some of these measures would not pass the economic screens but may pass in future years as a result of lower projected equipment costs or higher avoided cost benefits.

Figure 2-2: Approach for ECM Development



The selected measures are categorized into two types according to the VisionLoadMAP modeling taxonomy: equipment measures and non-equipment measures.

- **Equipment measures** represent efficient energy-consuming pieces of equipment that save energy by providing the same service with a lower energy requirement than a standard unit, such as, an ENERGY STAR refrigerator replacing a standard refrigerator. For equipment measures, many efficiency levels may be available for a given technology, ranging from the baseline unit (often determined by code or standard) up to the most efficient product commercially available. For instance, in the case of residential central air conditioners, this list begins with the federal minimum efficiency level unit and spans a broad spectrum up to a maximum efficiency of a SEER 24 unit. These measures are applied on a stock-turnover basis, and in general, are referred to as **"lost opportunity"** measures since once a purchase decision is made, there will not be another opportunity to improve the efficiency of that equipment item until the lifetime expires again.
- **Non-equipment measures** save energy by reducing the need for delivered energy, but do not involve the replacement or purchase of major end-use equipment (such as a refrigerator or air conditioner). Since measure installation is not tied to a piece of equipment reaching the end of its useful life, these are generally categorized as **"retrofit"** measures. An example would be a wi-fi-enabled thermostat that is pre-set to run heating and cooling systems only when people are home. Non-equipment measures can apply to more than one end use. For instance, the addition of wall insulation will affect the energy use of both space heating and cooling equipment. Non-equipment measures typically fall into one of the following categories:
- Building shell (windows, insulation, roofing material)

- Equipment controls (smart thermostats, integrated lighting fixture controls)
- Whole-building design (zero-net energy, passive solar lighting)
- Displacement measures (ceiling fan to reduce use of central air conditioners)
- Retro-commissioning
- Residential behavioral programs
- Energy management programs

ICF developed a preliminary list of efficient measures, which was distributed to the PNM project team for review. The measure list was finalized after incorporating comments and is presented in the Appendix D. Once the list of measures to assess was finalized, the project team fully characterized each measure in terms of energy savings, incremental cost, effective useful life, and other performance factors.

Calculation of Energy Conservation Potential

Three types of potential were developed as part of this study: Technical potential, economic potential, and achievable potential.

Estimating Customer Adoption

Customer adoption rates, also referred to as take rates or ramp rates, were applied to measures on a year-by-year basis. These rates represented customer adoption of measures when delivered through a portfolio of well-operated efficiency programs under a reasonable policy or regulatory framework. The approach for estimating PNM adoption rates considered several factors:

- **First-year Adoption Rates:** Customer willingness to participate data was reviewed from several surveys of comparable customer groups from ICF's work regionally and from around the nation. This provided a point estimate of short-term customer participation in measures that were relevant and cost-effective.
- **Measure Adoption Growth:** Adoption was assumed to increase over time as awareness and interest increased and programs evolved to reach more customers. To reflect this, data was used on how different factors such as personal finances, program delivery styles, and other aspects of the measure could drive increased participation and applied the total of these benefits as a lift factor to the initial adoption values. Adoption for a given measure type then progressed from the starting point to the estimated maximum adoption rate following a normal distribution curve that reflected the measure's increased maturity over time.
- **Technical Diffusion Curves for Non-Equipment Measures:** Equipment replacement measures were assumed to be installed when existing units fail. Non-equipment measures do not have this natural periodicity, so rather than installing all available non-equipment measures in the first year of the projection (instantaneous potential), they were phased in over 20 years.

All measure adoption rates used in the potential study are available in Appendix B.

Screening Measures for Cost-Effectiveness

The cost-effectiveness screening process relied on a set of economic assumptions, including:

- All cost and benefit values were analyzed in real (2024) dollars using a real discount rate of 4.89% as provided by PNM.

- While all impacts in this report were presented at the customer meter, PNM also supplied electric energy delivery loss factors to estimate generator-level impacts for economic analysis. The economic analysis included an average line-loss factor of 6.77%.
- Avoided energy and capacity cost values were provided by PNM.

To calculate the UCT benefit-cost ratio for each measure, program costs were calculated using incentive and administrative (non-incentive) costs as a percentage of each measure's incremental cost. Then, the incentive cost plus assumed program administrative costs were compared to the value of avoided supply associated with the measure. Measures with a benefit-cost ratio greater than 0.8 were considered cost-effective and were included in the economic and achievable potential. Allowing measures that are close to cost-effective into the economic potential even while not quite at a 1.0 ratio enables programs to access savings from measures which are nearly cost-effective on their own merits but could be part of a robust and well-designed portfolio that maintains an overall average benefit/cost ratio above 1.0.

Table 2-3: Components of Cost-Effectiveness

Component	UCT
Avoided Energy & Capacity	Benefit
Operations & Maintenance	--
Incremental Cost	--
Incentive Program Cost	Cost
Administrative (Non-Incentive) Program Cost	Cost

The VisionLoadMAP model performs this screening dynamically, taking into account changing savings and cost data over time. Thus, a given measure could 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:

- The economic evaluation of every measure in the screen is conducted relative to a baseline condition. For instance, in order to determine the kilowatt-hour (kWh) savings potential of a measure, kWh consumption with the measure applied must be compared to the kWh consumption of a baseline condition.
- The economic screening was conducted only for measures that are applicable to each building type and vintage; thus, if a measure is deemed to be irrelevant to a building type and vintage, it is excluded from the respective economic screen.
- Savings and cost effectiveness are considered in relation to the average customer case, characterized across the population.

This constitutes the achievable potential and includes every program-ready opportunity for conservation savings. Potential results are presented in Chapters 5 and 6.

Data Development

This section details the data sources used in this study, followed by a discussion of how these sources were applied. In general, data were adapted to local conditions, for example, by using local sources for measure data and local weather for building simulations.

Data Sources

The data sources are organized into the following categories:

- PNM data
- Regional data
- ICF's databases and analysis tools
- Other secondary data and reports

PNM Data

The highest priority data sources for this study were those specific to PNM's service territory. This is best practice when developing potential study baselines when the data is available.

Customer account database. PNM provided billing data for development of customer counts and energy use for each sector. This included a detailed database of customer building classifications which was instrumental in the development of segmentation. In addition, the account database included the following information which was instrumental to informing the potential study.

- Accomplishment data
- Equipment saturation surveys
- Residential income grouping based on census data

- **Load and customer forecasts.** PNM provided forecasts of energy consumption, customer counts by sector, and exogenous forecasting variables such as weather data.
- **Economic information.** PNM provided a discount rate as well as avoided cost forecasts and line loss factors.
- **PNM program data.** PNM provided information about past and current programs, including program descriptions, goals, and measure achievements to date.

ICF Data

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

- **Building Energy Simulation Tool (BEST).** ICF's BEST is a derivative of the DOE-2.2 building simulation model, used to estimate base-year unit energy consumptions (UECs) and energy use intensities (EUIs), as well as measure savings for the HVAC-related measures.
- **Recent studies.** ICF conducted numerous studies of energy efficiency potential in the last five years. We checked our input assumptions and analysis results against the results from these other studies, both withing the region and across the country.

Other Secondary Data and Reports

Finally, a variety of secondary data sources and reports were used for this study. The main sources are identified below.

- **Annual Energy Outlook.** The Annual Energy Outlook (AEO), conducted each year by the EIA, presents yearly projections and analysis of energy topics. For this study, we used data from the 2024 AEO.
- **Local Weather Data.** Weather from National Oceanic and Atmospheric Administration's National Climatic Data Center for Albuquerque, NM (specifically from the Albuquerque International Airport) was used where applicable.

- **Other relevant resources.** These include Technical Reference Manuals from other states, reports from the Consortium for Energy Efficiency, the Environmental Protection Agency, and the American Council for an Energy-Efficient Economy. Data from regions outside of New Mexico state are validated for reasonableness and adjusted to reflect climactic conditions where necessary and proper.

Application of Data to the Analysis

We now discuss how the data sources described above were used for each step of the study.

Data Application for Market Characterization

To construct the high-level market characterization of electricity consumption and market size units (households for residential, floor space for commercial, employees for industrial, we primarily used PNM billing data as well as secondary data from ICF's Energy Market Profiles database.

Data Application for Market Profiles

The specific data elements for the market profiles, together with the key data sources, are shown in Table 2-4. To develop the market profiles for each segment, we used the following approach:

1. Developed control totals for each segment. These include market size, segment-level annual electricity use, and annual intensity. PNM's customer account database, which includes estimates on square footage as well as consumption, was used as the primary data point for the calculation of intensities. These calculations were then compared with other regional sources and prior studies conducted by AEG (now ICF) in the region for reasonableness. Adjustments to customer segmentation and intensity were then made as necessary.
2. Used PNM's 2025 Residential Appliance Saturation Survey, EIA's RECS 2020, CBECS 2018 and MECS 2018, and ICF's Energy Market Profiles database to develop existing appliance saturations, appliance and equipment characteristics, and building characteristics.
3. Ensured calibration to control totals for annual electricity sales in each sector and segment.
4. Compared and cross-checked with other recent studies.
5. Worked with PNM staff to vet the data against their knowledge and experience.

Table 2-4: Data Applied for the Market Profiles

Model Inputs	Description	Key Sources
Market size	Base-year residential dwellings, commercial floor space, and industrial employment	• PNM account database • PNM load forecasting
Annual intensity	Residential: Annual use per household Commercial: Annual use per square foot Industrial: Annual use per employee	• PNM account database • RECS 2020, 2018 CBECS and 2018 MECS • Other recent studies
Appliance/equipment saturations	Fraction of dwellings with an appliance/technology; percentage of C&I floor space/employment with equipment/technology	• PNM RASS • RECS 2020, 2018 CBECS and MECS

UEC/EUI for each end-use technology	UEC: Annual electricity use in homes and buildings that have the technology EUI: Annual electricity use per square foot/employee in floor space that has the technology	• Building simulations using prototypes developed for PNM • Engineering analysis • AEO 2021 • RECS 2020, CBECS 2018, MECS 2018 • Recent regional ICF studies
Appliance/equipment age distribution	Age distribution for each technology	• Recent regional ICF studies • RECS 2020 equipment age data
Efficiency options for each technology	List of available efficiency options and annual energy use for each technology	• AEO 2021 • DOE Technical Support Documents • California eTRM • Recent regional ICF studies

Data Application for Baseline Projection

Table 2-5 summarizes the VisionLoadMAP model inputs required for the baseline projection. These inputs are required for each segment within each sector, as well as for new construction and existing dwellings/buildings.

Table 2-5: Data Applied for the Baseline Projection in VisionLoadMAP

Model Inputs	Description	Key Sources
Customer growth forecasts	Forecasts of new construction in residential and C&I sectors	• PNM load forecast
Equipment purchase shares for baseline projection	For each equipment/technology, purchase shares for each efficiency level; specified separately for existing equipment replacement and new construction	• Shipment data from AEO and ENERGY STAR • AEO regional forecast assumptions[2] • Appliance/efficiency standards analysis • PNM program results and evaluation reports
Electricity prices	Forecast of monthly average real retail price	• PNM load forecast
Utilization model parameters	Price elasticities, elasticities for other variables (income, weather)	• PNM econometric coefficients • Previous ICF potential studies • EPRI's REEPS and COMMEND models

In addition, assumptions were incorporated for known future equipment standards as of January 2025, as shown in Table 2-6 and Table 2-7. The assumptions in these tables extend through 2030, after which all standards are assumed to hold steady.

Table 2-6: Residential Electric Equipment Standards

End Use	Technology	2023	2024	2025	2026	2027	2028	2029	2030
Cooling	Central AC	SEER 15.0							

2 We developed baseline purchase decisions using the Energy Information Agency's *Annual Energy Outlook* report (2021), which utilizes the National Energy Modeling System (NEMS) to produce a self-consistent supply and demand economic model. We calibrated equipment purchase options to match distributions/allocations of efficiency levels to manufacturer shipment data for recent years and then held values constant for the study period.

	Room AC	CEER 10.9		CEER 16.0 (Mid-2026)
Cool/Heating	Air-Source Heat Pump	SEER 15.0 / HSPF 8.8		
Water Heating	Water Heater (≤55 gallons)	UEF 0.92		UEF 2.3/CCE 2.0 (Mid-2029)
	Water Heater (>55 gallons)	UEF 2.05/CCE 2.0		UEF 2.5/CCE 2.3 (Mid-2029)
Lighting	General Service	Federal Backstop (45 lm/W lamp)		LED (Mid-2028)
	Linear Fluorescent	T8 (80.0 lm/W lamp)		
Appliances	Refrigerator & Freezer	2014 Standard		2029 Standard
	Clothes Washer	2018 Standard		2028 Standard / Energy Star 8.1
	Clothes Dryer	CEF(D2) 3.11		CEF(D2) 3.93
	Dishwasher	2013 Standard (307 kWh/yr)		2027 Standard (223 kWh/yr)
	Stove/Oven	No standard		2028 Standard
	Microwave	2016 Standard		2026 Standard
	Air Purifier	None	Std 1.9 CADR/W	Tier 2 (2.4 CADR/W)
Miscellaneous	Pool Heater	Electric Resistance		Heat Pump (Mid-2028)

Table 2-7: Commercial and Industrial Electric Equipment Standards

End Use	Technology	2023	2024	2025	2026	2027	2028	2029	2030
Cooling	Chillers	2016/2019 ASHRAE 90.1							
	Roof Top Units	IEER 14.8						IEER 18 / IVEC 14.3	
	PTAC	EER 10.4							
Cool/Heating	Heat Pump	IEER 14.1 / COP 3.4						IEER 17.3 / COP 3.4 IVEC 13.4 / IVHE 6.2	
	PTHP	EER 10.4 / COP 3.1							
Ventilation	All	Constant Air Volume/Variable Air Volume							
Lighting	General Service	Federal Backstop (45 lm/W lamp) [100% LED in CA]						LED (Mid-2028)	
	Linear Lighting	T8 (80.0 lm/W lamp)							
	High Bay	HID (56.0 lm/W lamp)							
Refrigeration	Walk-In/Reach-in/Display	Federal Register EERE–2010–BT–STD–0003[3]							
	Icemaker	Federal Register EERE-2010-BT-STD-0037[4]							

[3] DOE Final Rule from 2014 available here: https://www.regulations.gov/document/EERE-2010-BT-STD-0003-0104. The DOE issued a new final rule on December 20, 2024, but this is still in pre-publication and has not been implemented.
[4] DOE Final Rule from 2015 available here: https://www.regulations.gov/document/EERE-2010-BT-STD-0037-0137

Miscellaneous	Pool Heater	Electric Resistance	Heat Pump (Mid-2028)
Motors	All	Expanded EISA 2007	EERE-2020-BT-STD-0007

*RTU: Rooftop Unit, PTAC: Packaged Terminal Air Conditioner, PTHP: Packaged Terminal Heat Pump

Measure Data Application

Table 2–8 details the energy efficiency data inputs to the VisionLoadMAP model. It describes each input and identifies the key sources used in the analysis.

Table 2–8: Data Inputs for the Measure Characteristics in VisionLoadMAP

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.	• ICF BEST • Annual Energy Outlook • DOE Technical Support Documents • California eTRM • Regional Technical Forum • ICF Research and Benchmarking • Regional/National TRMs • Other secondary sources
Peak Demand Impacts	Savings during the peak demand periods are specified for each electric measure. These impacts are related to energy savings and depend on the extent to which each measure is coincident with the system peak. Peak data is based on normal weather, not climate change or extreme scenarios.	• Regional/National TRMs • 8,760 hourly load shapes calibrated to PNM's load
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.	• PNM program data • ICF DEEM • Annual Energy Outlook • CA DEER • RS Means • Other secondary sources
Measure Lifetimes	Estimates derived from the technical data and secondary data sources that support the measure demand and energy savings analysis.	• ICF DEEM • CA DEER • 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.	• ICF DEEM • CA DEER • Other secondary sources
On Market and Off Market Availability	Expressed as years for equipment measures to reflect when equipment technology is available or no longer available in the market.	• ICF appliance standards and building codes analysis

Data Application for Cost-Effectiveness Screening

To perform the cost-effectiveness screening, a number of economic assumptions were needed. All cost and benefit values were analyzed in real (2024) dollars using a real discount rate of 4.89% as provided by PNM. All impacts in this report are presented at the customer meter, but electric energy delivery losses were provided by PNM to estimate impacts at the generator for economic analysis. PNM also provided annual avoided cost values.

3 Market Characterization and Market Profile

In this section, we describe how customers in the PNM service territory use electricity in the base year of the study, 2024, beginning with a high-level summary of energy use across all sectors and then examining each sector in more detail.

Each market profile includes the following elements:

- **Market size** is a representation of the number of customers in the segment. For the residential sector, the unit we use is number of households. In the commercial sector, it is floor space measured in square feet. For the industrial sector, it is number of employees.
- **Saturations** define the fraction of the market (e.g., portion of homes or portion of floor space served) where each end-use technology is installed.
- **UEC** and **EUI** describes the amount of energy consumed in the base year by a specific technology in buildings where that technology is used. UECs are expressed in kWh/household for the residential sector, and EUIs are expressed in kWh/square foot or kWh/employee for the commercial and industrial sectors, respectively.
- **Annual energy intensity** for the residential sector represents the average energy use for the technology across all homes in 2024. It is computed as the product of the saturation and the UEC and is defined as kWh/household for electricity. For the commercial and industrial sectors, intensity, computed as the product of saturation and the EUI, represents the average use for the technology across all floor space or all employees in the base year.
- **Annual usage** is the annual energy used by each end-use technology in the segment. It is the product of the market size and annual energy intensity and quantified in GWh.

Overall Energy Use Summary

Total electricity consumption for all sectors in the base year was GWh. As shown in Figure 3-1 and Table 3-1, the residential sectors account for 38% of annual energy use. The commercial sector accounts for 41% of annual energy use. The industrial sector accounts for 21%.

Figure 3-1: Sector-Level Electricity Use in Base Year (Percent)

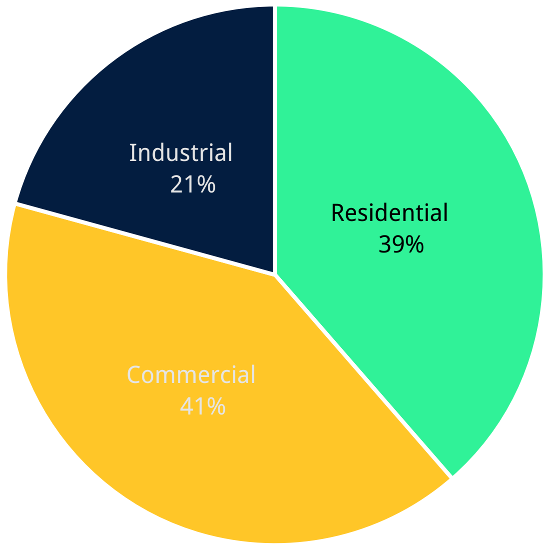


Table 3-1: PNM Sector Control Totals (2024)

Sector	Electric Use (GWh)	% of Total Usage
Residential	3,354	40%
Commercial	3,458	41%
Industrial	1,537	18%
Total	**8,349**	**100%**

Residential Sector

The total number of households and electricity sales for the service territory were obtained from PNM's customer database. In 2024, there were about 493 thousand households in PNM's service territory, using a total of 3,354 GWh of electricity, for an average of 6,804 kWh per household. Individual household consumption may vary based on house size, age, and presence of natural gas or secondary heat. We allocated these totals into four residential segments as shown in Table 3-2

Table 3-2: Residential Sector Control Totals (2024)

Segment	Electric Use (GWh)	Households	kWh/HH	% of Annual Use
Single Family	2,254	299,090	7,535	67%
Single Family Low Income	540	72,003	7,499	16%
Multifamily	98	19,385	5,057	3%
Multifamily Low Income & Manufactured Home	463	102,466	4,514	14%

Total	**3,354**	**492,945**	**6,804**	**100%**

Low-income households in this study were defined to be any household earning less than 150% of the poverty level set out by the 2024 Federal Poverty Guidelines. Manufactured Homes and low-income multifamily households were combined into a single segment.

As described in the previous chapter, the market profiles provide the foundation for development of the baseline projection and the potential estimates. The average market profile for the residential sector is presented in Table 3-3. Segment-specific market profiles are presented in Appendix B.

Figure 3-2 shows the average distribution of annual electricity use by end use across the residential sector. Three main electric end uses — space heating, water heating, and appliances — account for 56% of total use. Appliances include refrigerators, freezers, stoves/ovens, clothes washers, clothes dryers, dishwashers, microwaves, dehumidifiers, and air purifiers. The remainder of the energy falls into the electronics, lighting, cooling, and miscellaneous category – which is composed of furnace fans, pool pumps, and other “plug” loads (all other usage not covered by those listed in Table 3-3 such as hair dryers, power tools, coffee makers, etc.).

This graphic reflects average consumption describing residential consumption for the entire service territory and would look significantly different between gas and electrically heated homes. Within PNM's service area, around 56.9% of homes primarily use electricity for heating. Specifically, about 55% of single-family homes and approximately 59% of multifamily homes are electrically heated.

Figure 3-3 presents the electricity intensities by end use and housing type. As shown in this graphic, space heating end use takes up a greater share in manufactured home segment as electric heating is more common in this segment compared to single family and multifamily homes.

Figure 3-2: Residential Electricity Use by End Use (2024)

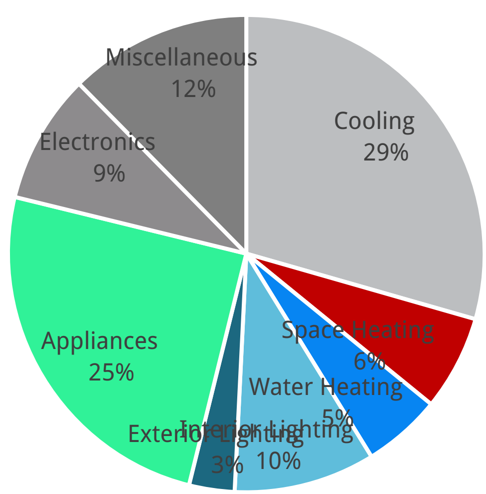


Figure 3-3: Residential Electricity Intensity by End Use and Segment (Annual kWh/household, 2024)

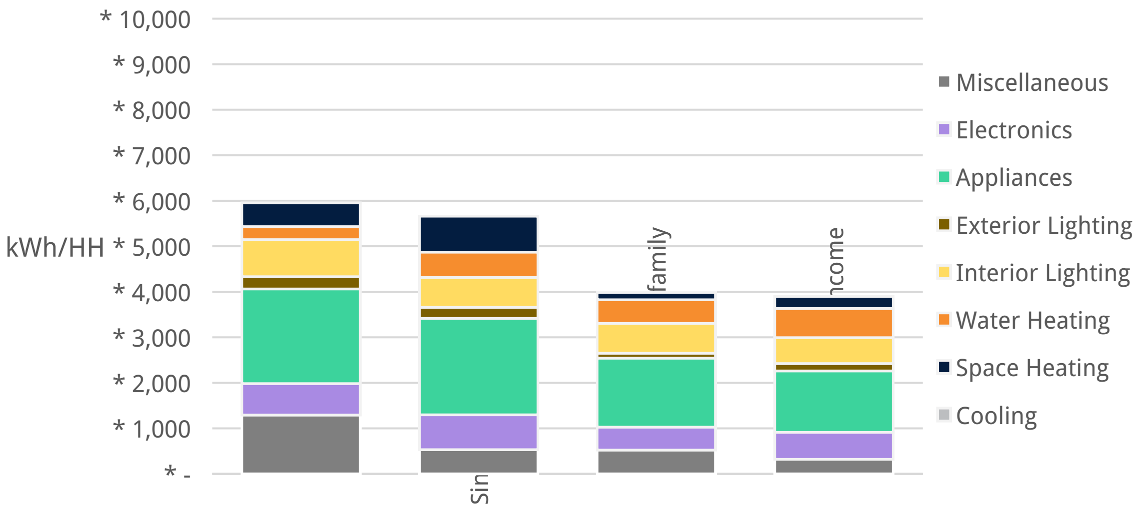


Table 3-3: Average Market Profile for the Residential Sector (2024)

End Use	Technology	Saturation	UEC (kWh/HH)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	45.0%	3,904.4	1,755.8	865.50
	Room AC	9.1%	537.3	48.8	24.05
	Evaporative Cooler	34.1%	1,000.8	341.8	168.47
	Portable AC	0.7%	758.1	5.0	2.48
	Air-Source Heat Pump	2.1%	3,982.5	82.2	40.54
	Geothermal Heat Pump	0.2%	4,194.3	7.1	3.51
	Ductless Mini Split Heat Pump	2.3%	603.6	13.9	6.83
Space Heating	Electric Furnace	8.3%	4,659.9	388.6	191.54
	Electric Room Heat	7.9%	424.8	33.4	16.44
	Air-Source Heat Pump	2.1%	2,787.3	57.6	28.37
	Geothermal Heat Pump	0.2%	3,164.1	5.4	2.65
	Ductless Mini Split Heat Pump	2.3%	366.2	8.4	4.14
Water Heating	Water Heater (<= 55 Gal)	16.4%	2,148.2	353.0	174.02
	Water Heater (> 55 Gal)	4.4%	1,267.6	55.2	27.19
Interior Lighting	General Service Lighting	100.0%	678.0	678.0	334.21
	Linear Lighting	100.0%	51.1	51.1	25.19
	Exempted Lighting	100.0%	5.0	5.0	2.47
Exterior Lighting	General Service Lighting	100.0%	236.3	236.3	116.49
Appliances	Refrigerator	100.0%	492.7	492.7	242.89
	Second Refrigerator	12.3%	559.0	68.8	33.92
	Freezer	42.8%	461.5	197.7	97.47
	Clothes Washer	94.1%	192.1	180.8	89.10
	Clothes Dryer	71.6%	681.5	488.2	240.67
	Dishwasher	85.0%	244.4	207.8	102.44
	Stove/Oven	34.7%	150.9	52.4	25.84
	Microwave	100.4%	101.2	101.6	50.08
	Dehumidifier	11.7%	626.1	73.5	36.24
	Air Purifier	48.0%	99.3	47.6	23.47
Electronics	Personal Computers	60.7%	105.8	64.2	31.67
	Monitor	85.7%	54.1	46.4	22.86
	Laptops	113.4%	26.4	29.9	14.74
	Imaging Equipment	79.9%	34.7	27.7	13.66
	TVs	224.1%	67.2	150.6	74.25
	Set-top Boxes/DVRs	272.7%	83.4	227.5	112.15
	Devices and Gadgets	100.0%	127.6	127.6	62.89
Miscellaneous	EV Supply Equipment	3.8%	2,259.1	86.4	42.60

End Use	Technology	Saturation	UEC (kWh/HH)	Intensity (kWh/HH)	Usage (GWh)
	Pool Heater	0.7%	862.3	5.8	2.87
	Pool Pump	5.2%	1,313.0	67.9	33.45
	Hot Tub/Spa	3.3%	2,043.9	68.0	33.51
	Furnace Fan	68.3%	319.9	218.4	107.67
	Bathroom Exhaust Fan	104.6%	45.7	47.8	23.58
	Well Pump	0.0%	0.0	0.0	0.00
	Miscellaneous	100.0%	454.4	454.4	224.00
Generation	Solar PV	9.1%	-9,390.2	-856.3	-422.12
	Total			**6,804.0**	**3,354.01**

Commercial Sector

The total electric energy consumed by PNM's commercial customers in 2024 was 3,458 GWh. PNM billing data, forecast results and secondary data were used to allocate this energy usage among eleven commercial segments and to develop estimates of energy intensity (annual kWh/square foot). ICF utilized PNM's detailed customer account database to classify each account into a market segment. Buildings with multiple accounts were classified based on the largest electric customer account in the building. The values are shown in Table 3-4.

Table 3-4: Commercial Sector Control Totals (2024)

Segment	Electric Use (GWh)	Floor Space (Million sqft)	kWh/sqft	% of Annual Use
Small Office	408.2	33.7	12.1	12%
Large Office	399.8	27.1	14.7	12%
Restaurant	213.8	6.4	33.6	6%
Retail	505.0	43.3	11.7	15%
Grocery	161.8	4.9	33.1	5%
College	218.4	12.5	17.4	6%
School	231.5	32.2	7.2	7%
Health	165.5	7.5	22.0	5%
Lodging	293.0	20.4	14.4	8%
Warehouse	161.3	40.5	4.0	5%
Miscellaneous	708.1	104.5	6.8	20%
Total	**3,466.5**	**333.2**	**10.4**	**100%**

Figure 3-4 shows the distribution of annual electricity consumption by end use across all commercial buildings. Most consumption is associated with lighting and HVAC end uses, which comprise 61% of annual electricity usage. The lighting end use accounts for nearly a quarter of the commercial electricity consumption (23%), followed by building ventilation (19%) and cooling (15%).

Figure 3-4: Commercial Electricity Consumption by End Use (2024)

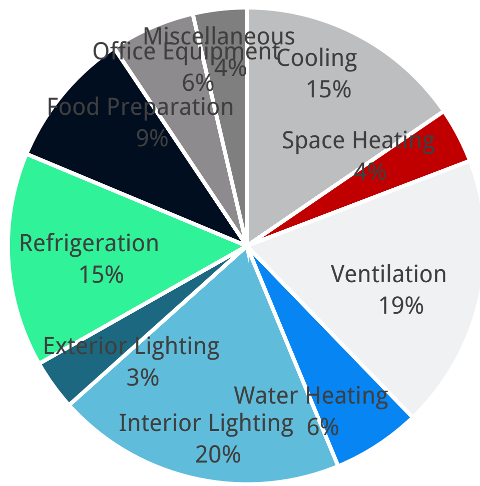


Figure 3-5 presents the electricity intensities by end use and segment. Restaurants have the highest use per square foot at 33.6 kWh/sqft. Table 3-5 shows the average market profile for the commercial sector, representing a composite of all segments and buildings. Market profiles for each segment are presented in Appendix B.

Figure 3-5: Commercial Energy Intensity by End Use and Segment (Annual kWh/sqft, 2024)

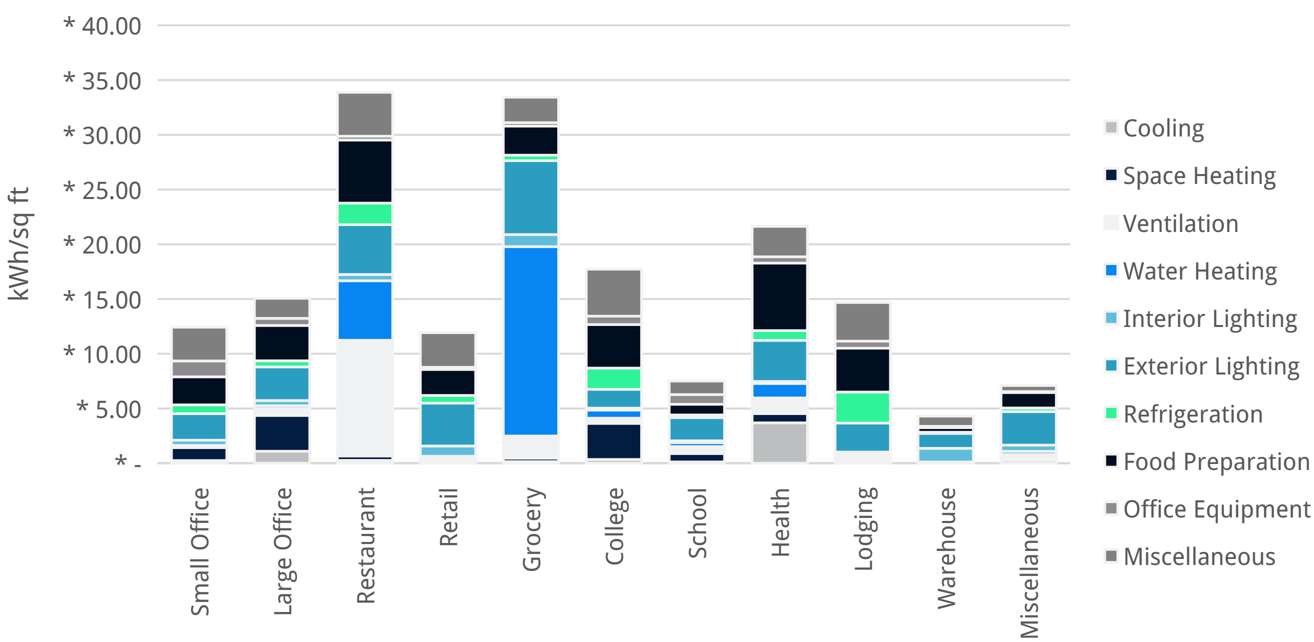


Table 3-5: Average Electric Market Profile for the Commercial Sector (2024)

End Use	Technology	Saturation	EUI (kWh/sqft)	Intensity (kWh/sqft)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.4%	4.04	0.10	31.69
	Water-Cooled Chiller	6.2%	1.95	0.12	40.09
	RTU	34.5%	2.86	0.99	329.04
	Packaged Terminal AC	9.8%	3.54	0.35	115.73
	Packaged Terminal HP	1.7%	3.93	0.07	21.92
	Air-Source Heat Pump	4.1%	3.78	0.16	51.79
	Geothermal Heat Pump	2.2%	2.74	0.06	19.88
Space Heating	Electric Furnace	13.1%	2.41	0.32	105.43
	Electric Room Heat	0.0%	2.70	-	-
	Air-Source Heat Pump	4.1%	2.34	0.10	32.11
	Packaged Terminal HP	1.7%	1.43	0.02	7.96
	Geothermal Heat Pump	2.2%	1.84	0.04	13.35
Ventilation	Ventilation	100.0%	2.10	2.10	700.75
Water Heating	Water Heater	52.0%	1.27	0.66	219.92
Interior Lighting	General Service Lighting	100.0%	0.62	0.62	207.41
	Exempted Lighting	100.0%	0.00	0.00	1.16
	Linear Lighting	100.0%	1.90	1.90	631.52
	High-Bay Lighting	100.0%	0.31	0.31	103.88
Exterior Lighting	General Service Lighting	100.0%	0.28	0.28	92.45
	Linear Lighting	100.0%	0.29	0.29	96.01
	Area Lighting	100.0%	0.04	0.04	14.62
Refrigeration	Walk-in Refrigerator/Freezer	5.5%	1.10	0.06	20.29
	Reach-in Refrigerator/Freezer	12.3%	0.60	0.07	24.67
	Glass Door Display	33.5%	0.53	0.18	58.86
	Open Display Case	11.2%	0.93	0.10	34.69
	Icemaker	35.3%	0.37	0.13	43.64
	Vending Machine	35.3%	0.18	0.06	20.93
Food Preparation	Oven	21.2%	0.42	0.09	29.47
	Fryer	24.2%	0.89	0.22	71.82
	Dishwasher	11.2%	0.65	0.07	24.41
	Hot Food Container	12.9%	0.26	0.03	11.29
	Steamer	10.8%	0.78	0.08	28.08
	Griddle	11.2%	0.77	0.09	28.63
Office Equipment	Desktop Computer	100.0%	0.27	0.27	91.34
	Laptop	99.5%	0.09	0.08	28.20
	Monitor	100.0%	0.05	0.05	16.29
	Server	84.7%	0.27	0.23	76.41
	Imaging Equipment	100.0%	0.02	0.02	7.97
	POS Terminal	50.5%	0.03	0.01	4.59
Miscellaneous	Non-HVAC Motors	55.3%	0.45	0.25	82.36

	Pool Pump	9.9%	0.11	0.01	3.65
	Pool Heater	3.4%	0.14	0.00	1.55
	EV Supply Equipment	2.4%	0.03	0.00	0.21
	Clothes Washer	13.2%	0.05	0.01	2.06
	Clothes Dryer	8.0%	0.16	0.01	4.38
	Miscellaneous	100.0%	0.06	0.06	21.38
Generation	Solar PV	1.9%	(16.92)	(0.32)	(107.41)
Total				**10.40**	**3,466.45**

Industrial Sector

The total electricity used in 2024 by PNM's industrial customers was 1,537 GWh. PNM billing data, load forecast and secondary sources were used to allocate usage among different end uses. Figure 3-6 shows the distribution of annual electricity consumption by end use for all industrial customers. Motors are the largest end use in the industrial sector, accounting for 47% of energy use and including a wide range of industrial equipment, such as air and refrigeration compressors, pumps, conveyor motors, and fans. The process end use accounts for 26% of annual energy use, which includes heating, cooling, refrigeration, and electro-chemical processes. Ventilation has the next highest energy use, followed by misc., lighting, cooling, and space heating.

Note: While the Industrial model is normalized to a unit of Employees (taken from US BLS data for the region), kWh per employee is not an intuitive metric and is not presented here to maintain clarity.

Table 3-9: Industrial Sector Control Totals (2024)

Segment	Electric Use (GWh)	% of Annual Use
Industrial	1,537	100%

Figure 3-6: Industrial Electricity Use by End Use (2024)

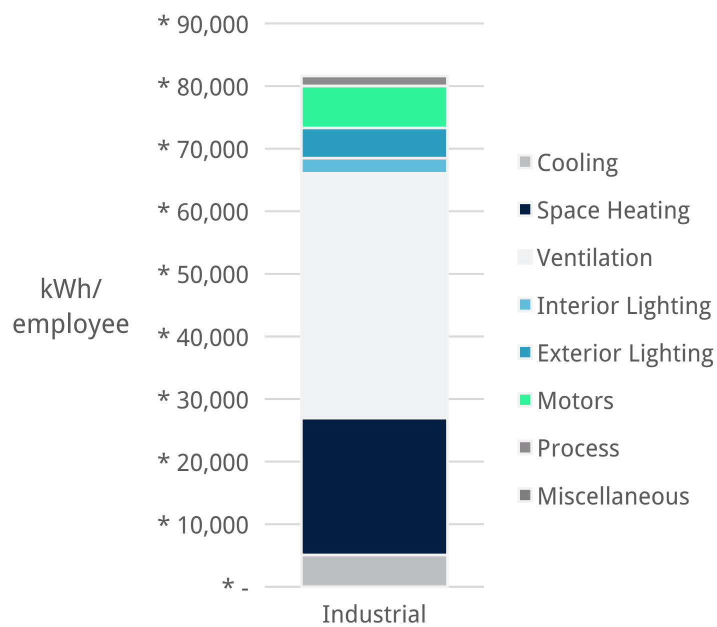


Table 3-6: Average Electric Market Profile for the Industrial Sector, 2024

End Use	Technology	Saturation	Usage (GWh)
Cooling	Air-Cooled Chiller	2.8%	11.17
	Water-Cooled Chiller	2.8%	1.28
	RTU	12.8%	37.41
	Air-Source Heat Pump	1.2%	3.06
	Geothermal Heat Pump	0.0%	0.00
Space Heating	Air-Source Heat Pump	1.2%	5.40
	Geothermal Heat Pump	0.0%	0.00
	Electric Furnace	0.6%	3.39
	Electric Room Heat	3.9%	20.09
Ventilation	Ventilation	100.0%	121.73
Interior Lighting	General Service Lighting	100.0%	8.64
	Exempted Lighting	100.0%	0.00
	Linear Lighting	100.0%	39.73
	High-Bay Lighting	100.0%	39.73
Exterior Lighting	General Service Lighting	100.0%	14.01
	Linear Lighting	100.0%	29.73
	Area Lighting	100.0%	0.38
Process	Process Cooling	100.0%	95.02
	Process Refrigeration	100.0%	102.07

	Process Heating	100.0%	130.06
	Process Electrochemical	100.0%	35.10
	Process Other	100.0%	35.54
Motors	Pumps	100.0%	132.59
	Fans & Blowers	100.0%	84.81
	Compressed Air	100.0%	123.00
	Material Handling	100.0%	334.57
Miscellaneous	Other Motors	100.0%	35.83
Total			**1,536.79**

4 Baseline Projection

Prior to developing estimates of energy-efficiency potential, ICF developed a baseline end-use projection to quantify expected consumption in the future in the absence of new conservation programs or efforts.

The first step was to align with PNM's official forecast. ICF worked with PNM's load forecasting group to incorporate assumptions and data utilized in the official utility forecast. These data points included customer growth and use-per-customer projections. These assumptions were incorporated into the VisionLoadMAP model, ensuring alignment with the official load forecast.

The end-use projection includes the relatively certain impacts of codes and standards that will unfold over the study timeframe. All such mandates that were defined as of January 2025 are included in the baseline. The baseline projection includes naturally occurring conservation that might take place in the potential forecast period (2026 and beyond). As such, the baseline projection is the foundation for the analysis of savings from future efficiency cases and scenarios as well as the metric against which potential savings are measured.

Inputs to the baseline projection include:

- Current economic growth forecasts (i.e., customer growth, income growth)
- Electricity price forecasts
- Trends in fuel shares and equipment saturations
- Existing and approved changes to building codes and equipment standards

Although it aligns closely, the baseline projection is not PNM's official load forecast. Rather it was developed as an integral component of ICF's modeling construct to serve as the metric against which conservation potentials are measured.

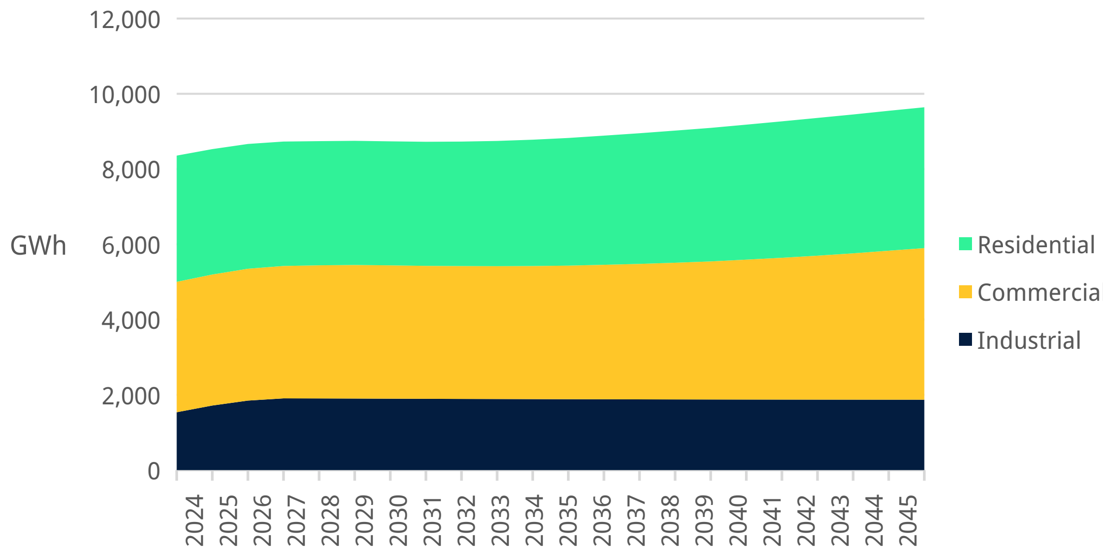
Summary of Baseline Projections Across Sectors

Table 4-1 and Figure 4-1 provide a summary of the baseline projection for annual use by sector for the entire PNM service territory. Overall, the forecast shows strong growth in electricity use, driven primarily by electric vehicle adoption along with customer growth forecasts and moderated by the effects of future codes and standards that have already been enacted.

Table 4-1: Baseline Projection Summary (GWh)

Sector	2024	2026	2028	2030	2035	2045	% Change ('26-'45)
Residential	3,354	3,316	3,300	3,296	3,392	3,743	11.6%
Commercial	3,466	3,504	3,539	3,544	3,550	4,029	16.2%
Industrial	1,537	1,847	1,903	1,897	1,883	1,870	21.7%
Total	**8,357**	**8,667**	**8,742**	**8,736**	**8,826**	**9,642**	**15.4%**

Figure 4-1: Baseline Projection Summary (GWh)



Residential Sector Baseline Projection

Table 4-2 and Figure 4-2 present ICF's independent baseline projection for electricity at the end-use level for the residential sector. Overall, residential use increases from 3,354 GWh in 2024 to 3,753 GWh in 2045, an average increase of 0.5% per year as a result of the anticipated influx of electric vehicles on the grid.

Table 4-2: Residential Baseline Projection by End Use (GWh)

End Use	2024	2026	2028	2030	2035	2045	% Change ('26-'45)
Cooling	1,111	1,127	1,148	1,174	1,253	1,498	35%
Space Heating	243	240	237	234	227	213	-12%
Water Heating	201	200	199	194	163	111	-45%
Interior Lighting	362	354	342	324	283	251	-31%
Exterior Lighting	116	113	107	100	84	74	-36%
Appliances	942	964	983	988	985	1,000	6%
Electronics	332	325	316	312	323	366	10%
Miscellaneous	425	430	437	444	464	510	20%
Electric Vehicles	43	100	188	306	701	1,426	3247%
Generation	(422)	(537)	(658)	(780)	(1,091)	(1,706)	304%
Total	**3,354**	**3,316**	**3,300**	**3,296**	**3,392**	**3,743**	**12%**

Figure 4-2: Residential Baseline Projection by End Use[5] (GWh)

[5] Generation omitted – consumption shown

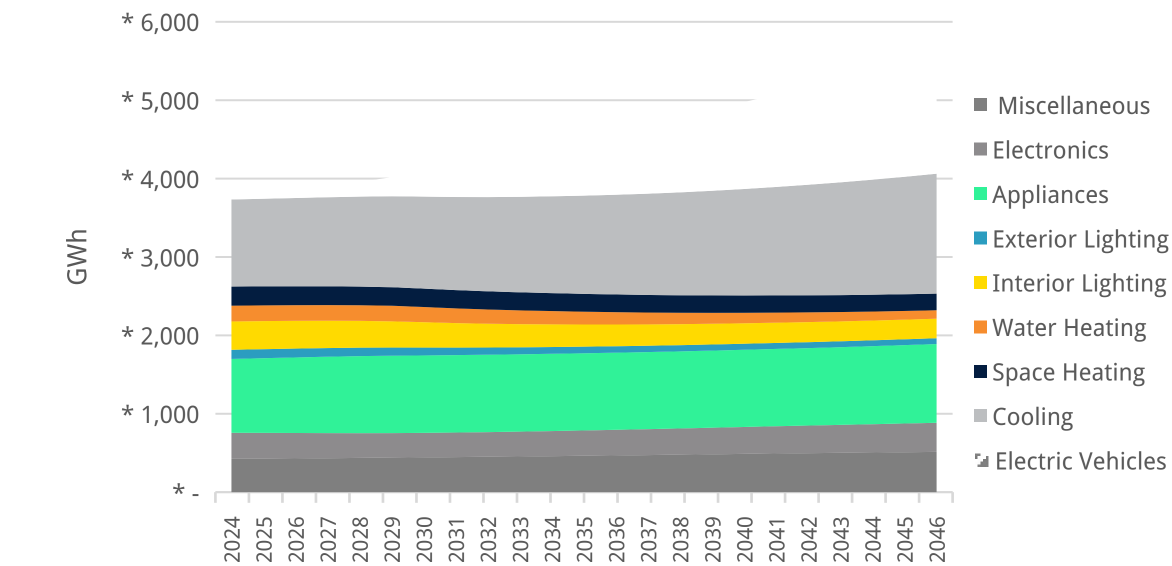
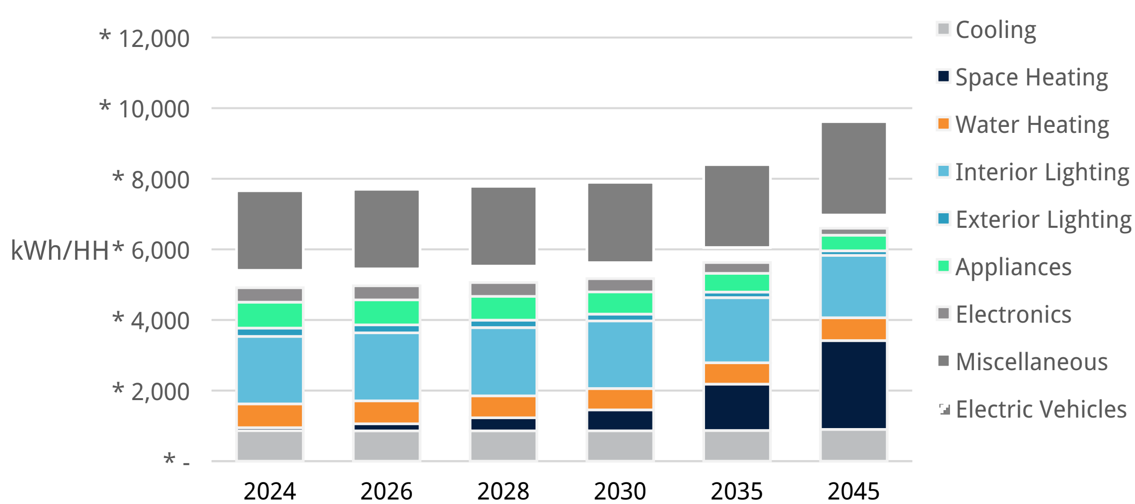


Figure 4-3: Residential Baseline Projection by End Use – Annual Use per Household



Commercial Sector Baseline Projection

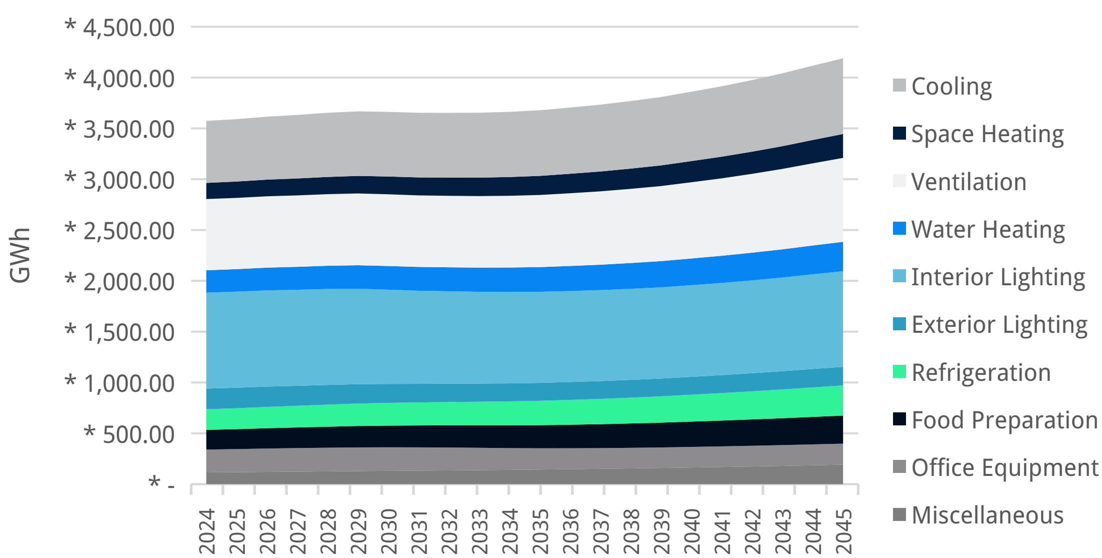
Annual electricity usage in the commercial sector increases 16.2% during the overall forecast horizon, starting at 3,466 GWh in 2024, and increasing to 4,029 GWh by 2045. Table 4-3 and Figure 4-4 present the baseline projection at the end-use level for the commercial sector. Lighting end use consumption is declining throughout the forecast, largely because of codes and standards and the market transformation of LEDs.

Table 4-3: Commercial Baseline Projection by End Use (GWh)

End Use	2024	2026	2027	2030	2035	2045	% Change ('24-'45)

Cooling	610	619	625	636	646	745	22.0%
Space Heating	159	164	166	175	188	235	48.2%
Ventilation	701	702	703	705	709	825	17.8%
Water Heating	220	224	226	233	243	289	31.3%
Interior Lighting	944	947	944	927	896	941	-0.3%
Exterior Lighting	203	200	197	186	176	183	-10.0%
Refrigeration	203	209	213	224	240	297	46.3%
Food Preparation	194	200	203	213	227	276	42.6%
Office Equipment	225	230	232	232	209	207	-8.0%
Miscellaneous	116	120	123	131	144	192	65.9%
Generation	(107)	(111)	(113)	(119)	(128)	(161)	49.7%
Total	**3,466**	**3,504**	**3,519**	**3,544**	**3,550**	**4,029**	**16.2%**

Figure 4-4: Commercial Baseline Projection by End Use



Industrial Sector Baseline Projection

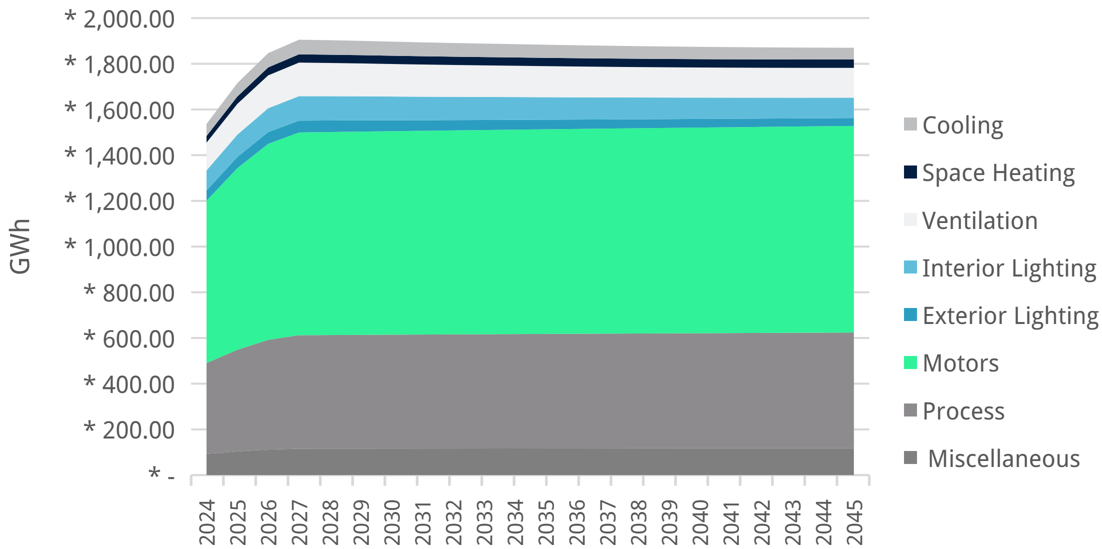
Annual industrial usage declines slightly for most of the forecast period. Table 4-4 and Figure 4-5 present the projection at the end-use level. Overall, annual industrial electricity usage increases from 1,537 GWh in 2024 to 1,870 GWh in 2045 – an increase of 21.7% over the study period.

Table 4-4: Industrial Baseline Projection by End Use (GWh)

End Use	2024	2026	2027	2030	2035	2045	% Change ('24-'45)
Cooling	53	63	64	62	57	51	-3.0%
Space Heating	29	35	36	36	36	37	26.9%
Ventilation	122	144	147	142	136	130	7.2%
Interior Lighting	88	105	107	104	98	89	1.2%

Exterior Lighting	44	51	52	48	42	34	-22.1%
Process	711	858	887	891	896	904	27.2%
Motors	398	480	497	498	501	506	27.2%
Miscellaneous	92	112	115	116	116	118	27.2%
Total	**1,537**	**1,847**	**1,905**	**1,897**	**1,883**	**1,870**	**21.7%**

Figure 4-5: Industrial Baseline Projection by End Use (GWh)



5 Potential Study Results

This chapter presents the measure-level energy conservation potential across all sectors. Year-by-year savings for annual energy usage are available in the VisionLoadMAP model, which was provided to PNM at the conclusion of the study. All savings values in this study are provided at the customer meter. This section includes potential from the residential, commercial and industrial sectors.

Summary of Overall Conservation Potential

Table 5-1 and Figure 5-1 summarize the conservation potential in terms of annual impacts of all measures for three levels of potential relative to the baseline projection.

Figure 5-2 displays the conservation forecasts. Savings are represented in cumulative terms, reflecting the effects of persistent savings in prior years in addition to new savings. This allows for the reporting of annual savings impacts as they actually affect each year of the forecast.

- **Technical Potential** reflects the adoption of all conservation measures regardless of cost-effectiveness or market barriers. In this potential case, all equipment goes to the most efficient, technically feasible option (e.g. highest-tier heat pump water heaters) even when costs may be prohibitive. All eligible retrofit measures are also installed over the 20 year study horizon. Cumulative savings in 2035 are 1,535 GWh, or 17.4% of the baseline
- **Economic Potential,** which includes only cost-effective measures based on the UCT, is estimated at 1,149 GWh in 2035, or 13% of the baseline projection.
- **Program Potential** adjusts the economic potential by reflecting PNM's increased program activity to achieve New Mexico's Efficient Use of Energy Act (EUEA) requirement of five percent savings (5%) relative to 2025 retail sales by 2030. Cumulative savings in 2035 are 691 GWh, or 10.5% of the baseline.
- **Achievable Potential,** which adjusts the economic potential by reflecting customer adoption constraints and includes every possible measure that is considered in the measure list, regardless of program implementation concerns. Potential in 2035 is estimated at 538 GWh, or 6.1% of the baseline projection.

Table 5-1: Summary of Overall Potential for Selected Years

Summary of Energy Savings	2026	2027	2030	2035	2045
Baseline Forecast (GWh)	8,667	8,731	8,736	8,826	9,642
Cumulative Savings (GWh)					
Achievable Potential	67	127	297	538	1,003
Program Potential	89	171	394	691	1,211
Economic Potential	148	290	672	1,149	1,953
Technical Potential	199	390	895	1,535	2,601
Energy Savings (% of Baseline)					
Achievable Potential	0.8%	1.5%	3.4%	6.1%	10.4%
Program Potential	1.0%	2.0%	4.5%	7.8%	12.6%
Economic Potential	1.7%	3.3%	7.7%	13.0%	20.3%
Technical Potential	2.3%	4.5%	10.2%	17.4%	27.0%

Figure 5-1: Summary of Overall Potential (% of Baseline)

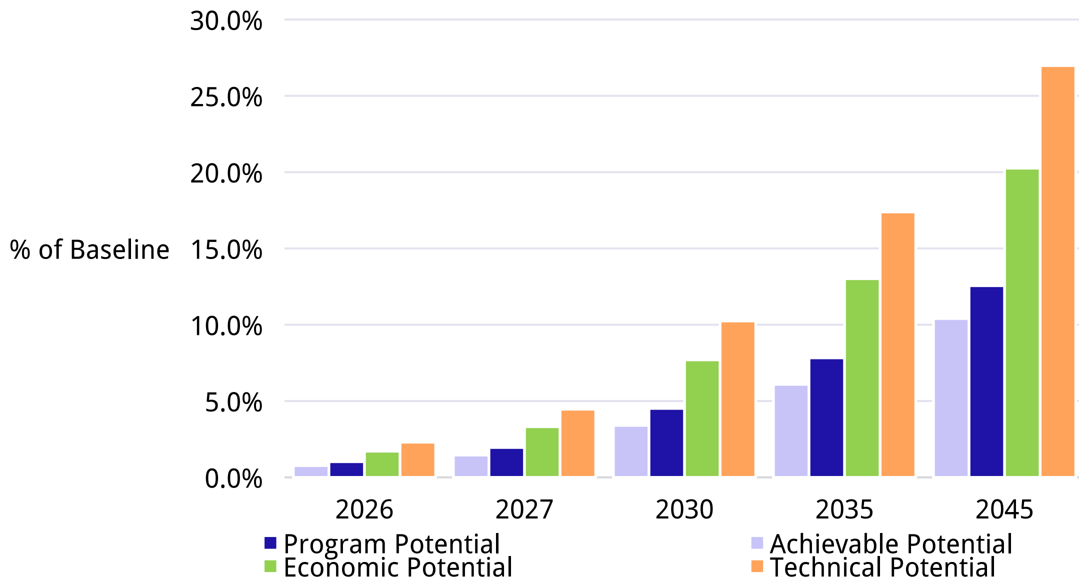
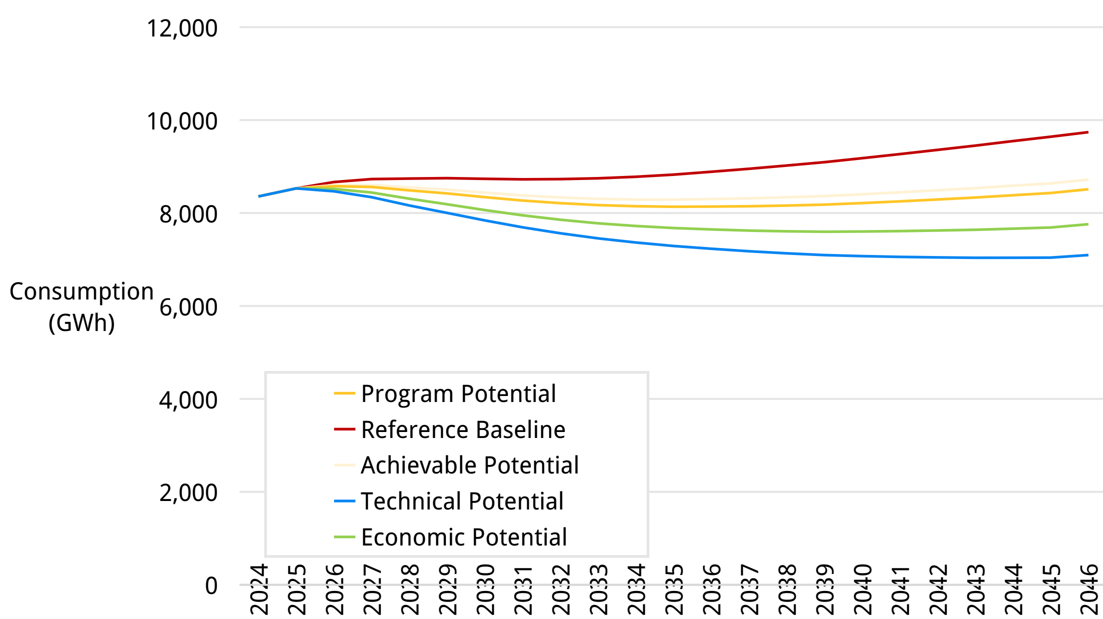


Figure 5-2: Baseline Projection and Conservation Potential Forecast Summary (Annual Energy, GWh)



Overview of Savings by Sector

Table 5-2 and Figure 5-3 summarizes achievable potential by sector for selected years. In 2035, the commercial sector represents the largest share of potential, followed by residential, then industrial.

Table 5-2: Achievable Potential by Sector for Selected Years (GWh)

Sector	2026	2027	2030	2035	2045
Residential	29.7	52.1	116.1	216.4	407.2
Commercial	30.7	62.4	150.6	262.7	489.2
Industrial	6.1	12.6	30.3	58.4	106.8
Total	**66.5**	**127.1**	**297.1**	**537.5**	**1,003.2**

Figure 5-3: Summary of Overall Savings by Sector

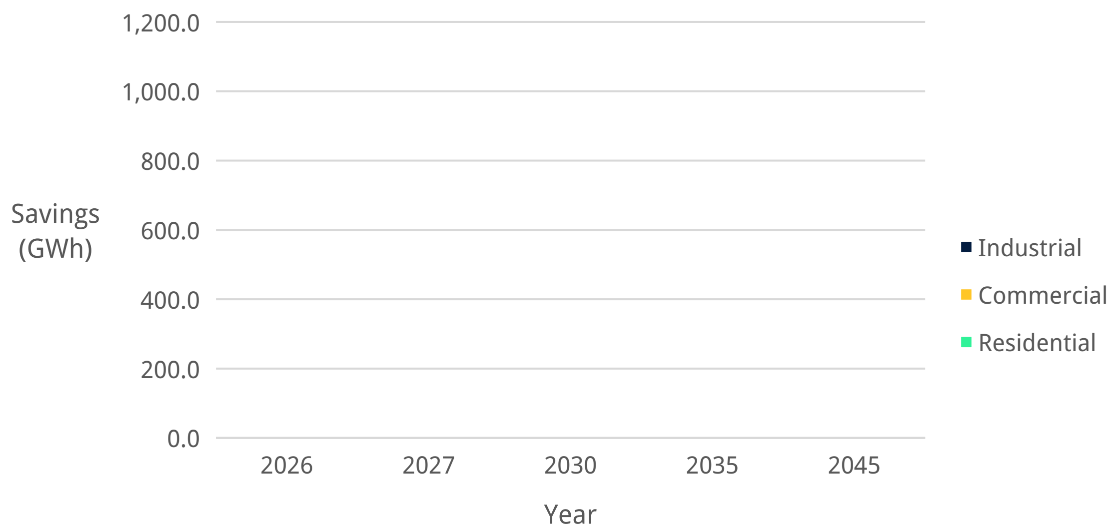
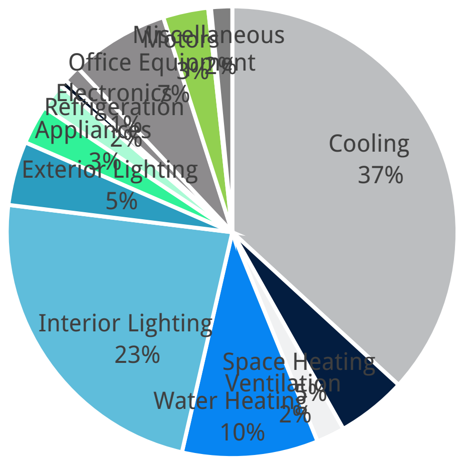


Figure 5-4 presents the cumulative savings across all sectors by end use in 2035. The Cooling end use provides the highest portion of the savings (37%), driven by building shell and infiltration control measures as well as smart thermostats in the Residential sector. Lighting measures in the C&I sectors also provide significant savings, followed by water heating savings.

Figure 5-4: Summary of Overall Savings by End Use in 2035



6 Sector-Level Savings Potential

The previous section provided a summary of potential for PNM's service territory as a whole. In this section, we provide details for each sector. For each sector, savings are shown in several tables and charts that summarize potential in different ways:

- Total potential by case (technical, economic, and achievable) and comparison to the reference baseline
- Top measures within the sector, ranked by 10-year achievable potential
- Achievable potential broken down by vintage (existing vs. new construction) by end use

Residential Potential

Table 6-1 and Figure 6-1 present estimates for measure-level conservation potential for the residential sector. In 2035, achievable potential is 6.4% of the baseline load, including savings for building shell measures such as infiltration control, high efficiency windows, and connected thermostats as the top contributors.

Table 6-1: Summary of Residential Potential for Selected Years

Summary of Energy Savings	2026	2027	2030	2035	2045
Baseline Forecast (GWh)	3,316	3,306	3,296	3,392	3,743
Cumulative Savings (GWh)					
Achievable Potential	30	52	116	216	407
Program Potential	38	69	154	281	500
Economic Potential	65	121	273	484	820
Technical Potential	93	175	390	684	1,162
Energy Savings (% of Baseline)					
Achievable Potential	0.9%	1.6%	3.5%	6.4%	10.9%
Program Potential	1.2%	2.1%	4.7%	8.3%	13.4%
Economic Potential	2.0%	3.7%	8.3%	14.3%	21.9%
Technical Potential	2.8%	5.3%	11.8%	20.2%	31.0%

Figure 6-1: Summary of Residential Potential (% of Baseline)

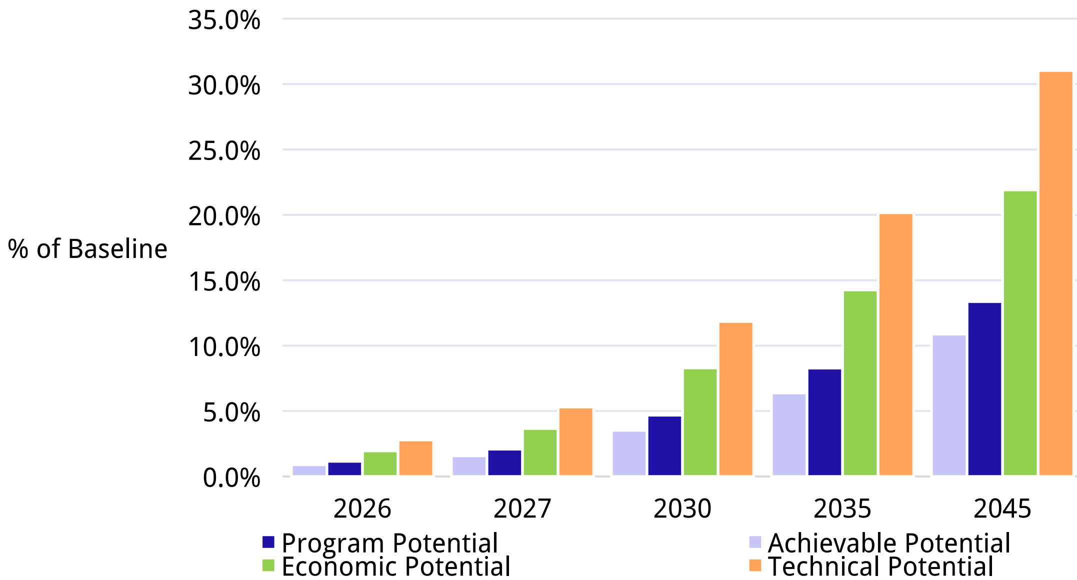


Table 6-2 identifies the top 20 residential measures ranked by cumulative achievable potential by 2035. The largest individual sources of savings in the residential sector came from Infiltration Control measures, reflecting the success of PNM's program accomplishments. Other cooling and control-related measures such as smart thermostats, and envelope insulation (e.g., high efficiency windows) also provide significant savings in the HVAC end uses. Home Energy Reports also continue to be a significant contributor to potential savings. However, there is uncertainty about the level of savings attributable to Home Energy Reports in the future, because all customers aside from a control group will begin receiving monthly emails related to PNM's Customer Energy Management Portal ("CEMP") in 2026.

Table 6-2: Residential Top Measures in 2035

Rank	Measure / Technology	2035 Achievable Potential (MWh)	% of Total
1	Building Shell - Air Sealing (Infiltration Control)	40,714	18.8%
2	Windows - High Efficiency (ENERGY STAR 7.0)	21,240	9.8%
3	Connected Thermostat - ENERGY STAR (1.0)	15,246	7.0%
4	HVAC - Maintenance and Tune-Up	14,699	6.8%
5	Building Shell - Whole-Home Aerosol Sealing	13,591	6.3%
6	Windows - Manual Shading	11,790	5.4%
7	Central AC	10,168	4.7%
8	Air Purifier	9,972	4.6%
9	Windows - High Efficiency (Triple Pane)	8,728	4.0%
10	Home Energy Reports	7,537	3.5%
11	ENERGY STAR Home Design	7,099	3.3%
12	Clothes Washer - CEE Tier 2	5,673	2.6%
13	Supplement Central System with Ductless Mini Split Heat Pump	5,371	2.5%
14	Water Heater (<= 55 Gal)	4,716	2.2%
15	Advanced Power Strips - Tier 1	4,207	1.9%
16	Refrigerator - Decommissioning and Recycling	4,100	1.9%
17	Evaporative Cooler - Whole Home	3,188	1.5%
18	Ducting - Repair and Sealing - Aerosol	2,677	1.2%
19	Windows - Low-e Storm Addition	2,576	1.2%
20	Water Heater - Low-Flow Showerheads	2,077	1.0%
	Total Savings from Top 20 Measures	**195,369**	**90.3%**
	Total Savings from All Measures	**216,397**	**100.0%**

Figure 6-2 and Figure 6-3 present forecasts of cumulative achievable potential by end use as a percentage of total annual savings and in absolute terms, respectively. Residential electric loads in PNM's territory are dominated by household cooling and appliance end uses, which together accounted for 66% of the total residential load and 80% of the cumulative potential by the end of the study. Lighting opportunities only represented 1% of the cumulative achievable potential due to the prevalence of general service lighting, the impact of lighting efficiency standards, and an already efficient market baseline.

Figure 6-2: Residential Achievable Potential – Cumulative Savings by End Use (% of Total)

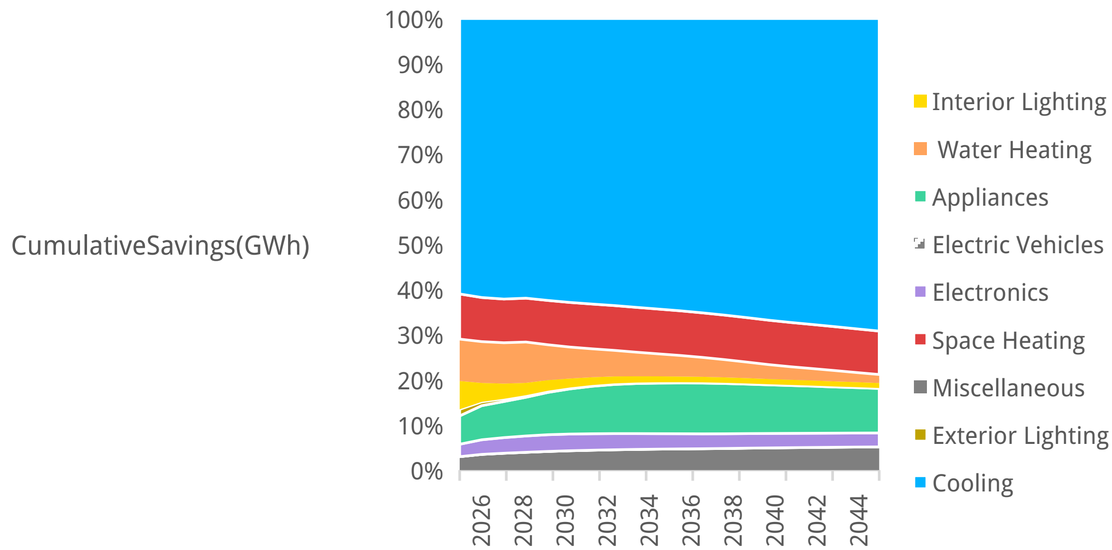


Figure 6-3: Residential Achievable Potential – Cumulative Savings by End Use (Annual MWh)

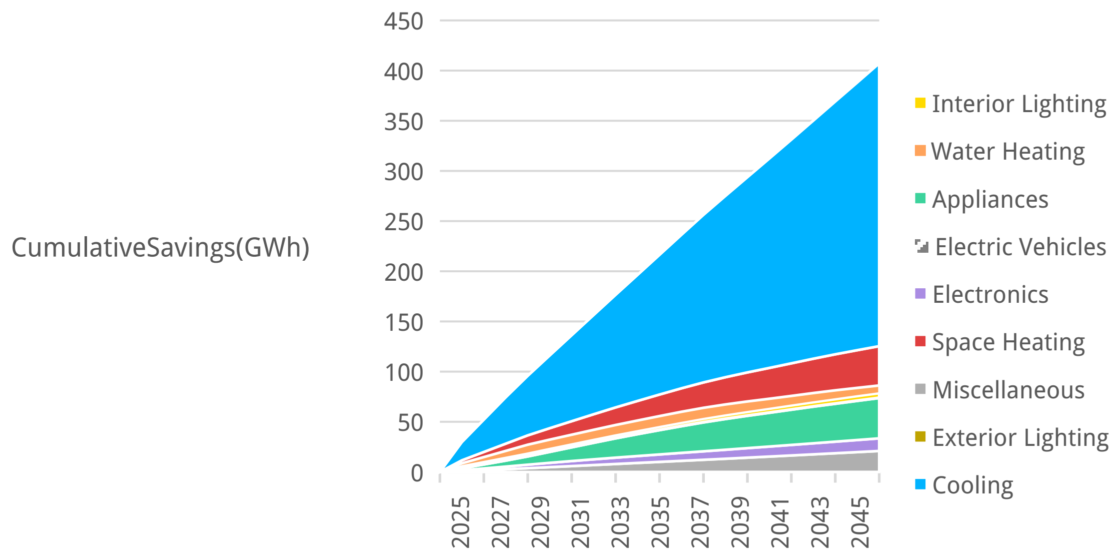


Table 6-4 summarizes residential sector cumulative achievable potential by end use. The single family segment represents the largest share of overall potential, followed by the Low-income single family segment. For all segments, the cooling end use provides the largest share of savings. Appliance end use savings are the second-highest contributor to residential savings, but is concentrated mostly in the single family segment.

Table 6-4: Residential Cumulative Achievable Potential by End Use and Segment in 2035 (MWh)

End Use	Single Family	Single Family Low Income	Multifamily	MF & MH Low Income	Total

Cooling	114,645	12,269	4,439	7,879	139,232
Space Heating	14,614	3,778	669	2,406	21,467
Water Heating	6,216	1,744	274	2,536	10,770
Interior Lighting	1,391	380	229	852	2,852
Exterior Lighting	297	56	6	47	406
Appliances	19,457	2,608	532	1,622	24,220
Electronics	5,014	775	238	1,380	7,407
Miscellaneous	8,643	1,012	137	252	10,043
Total	**170,279**	**22,623**	**6,523**	**16,973**	**216,397**

Commercial Potential

Table 6-5 and Figure 6-4 present the annual energy savings estimates for three levels of conservation potential for the commercial sector.

Lighting continues to be the main source of commercial and industrial savings, despite continuous movements in the baseline market that are shrinking the remaining opportunity, accounting for over 40% of the identified potential. Individually controlled, network-enabled fixtures enhance savings above simple LED replacement for relatively low added cost and greatly contributed to this block of savings.

Table 6-5: Summary of Commercial Conservation Potential for Selected Years

Summary of Energy Savings	2026	2027	2030	2035	2045
Baseline Forecast (GWh)	3,504	3,520	3,544	3,550	4,0297
Cumulative Savings (GWh)					
Achievable Potential	31	62	151	263	489
Program Potential	42	85	201	337	584
Economic Potential	73	148	349	572	972
Technical Potential	94	188	442	736	1,247
Energy Savings (% of Baseline)					
Achievable Potential	0.9%	1.8%	4.3%	7.4%	12.1%
Program Potential	1.2%	2.4%	5.7%	9.5%	14.5%
Economic Potential	2.1%	4.2%	9.9%	16.1%	24.1%
Technical Potential	2.7%	5.3%	12.5%	20.7%	31.0%

Figure 6-4: Summary of Commercial Potential (% of Baseline)

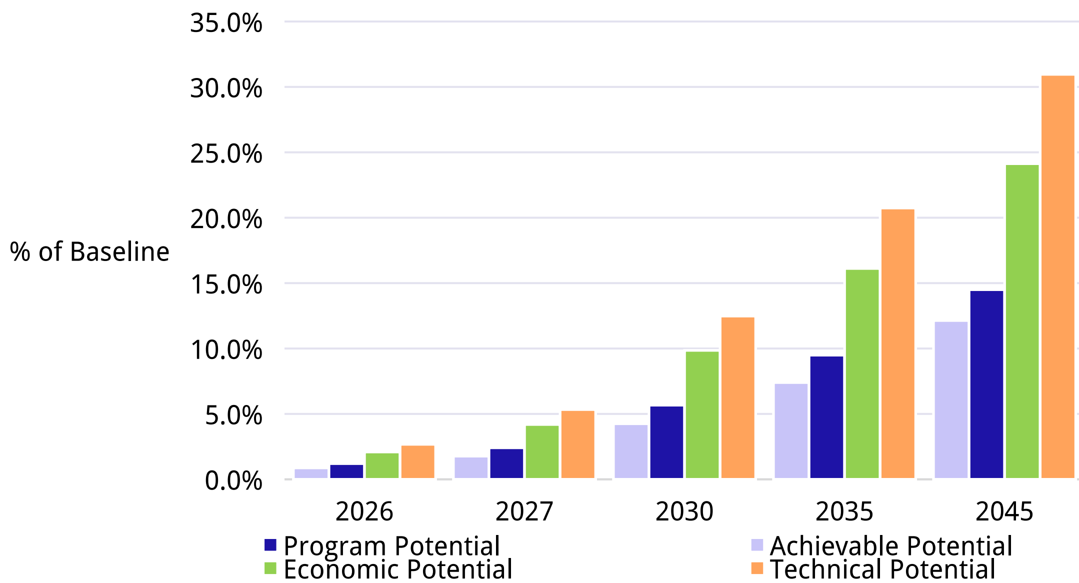


Table 6-6: Commercial Sector Top Measures in 2035

Rank	Measure / Technology	2035 Cumulative Achievable Potential (MWh)	% of Total
1	Linear Lighting	88,956	33.9%
2	Water Heater	42,385	16.1%
3	High-Bay Lighting	23,385	8.9%
4	RTU	17,845	6.8%
5	Packaged Terminal AC	11,444	4.4%
6	Windows - High Efficiency Glazing	7,098	2.7%
7	Ventilation - High Efficiency Motors	6,271	2.4%
8	Air-Source Heat Pump	4,767	1.8%
9	Water-Cooled Chiller	4,563	1.7%
10	HVAC - Economizer Repair/Addition	3,460	1.3%
11	Air-Cooled Chiller	3,440	1.3%
12	Refrigeration - High Efficiency Compressor	3,013	1.1%
13	Desktop Computer	2,854	1.1%
14	Steamer	2,769	1.1%
15	Connected Thermostat - ENERGY STAR (1.0)	2,364	0.9%
16	Reach-in Refrigerator/Freezer	2,355	0.9%
17	HVAC - Maintenance	2,144	0.8%
18	RTU - Evaporative Precooler	2,068	0.8%
19	Ventilation - Nighttime Air Purge	1,664	0.6%
20	Oven	1,584	0.6%
	Total Savings from Top 20 Measures	**234,429**	**89.2%**
	Total Savings from All Measures	**262,719**	**100.0%**

Figure 6-5 and Figure 6-6 present forecasts of energy savings by end use as a percentage of total annual savings and cumulative savings, respectively. Continued market transformation has left lighting as the dominant end use once again, though other end uses grow more as lighting becomes more and more transformed into the future.

Figure 6-5: Commercial Achievable Potential – Cumulative Savings by End Use (% of Total)

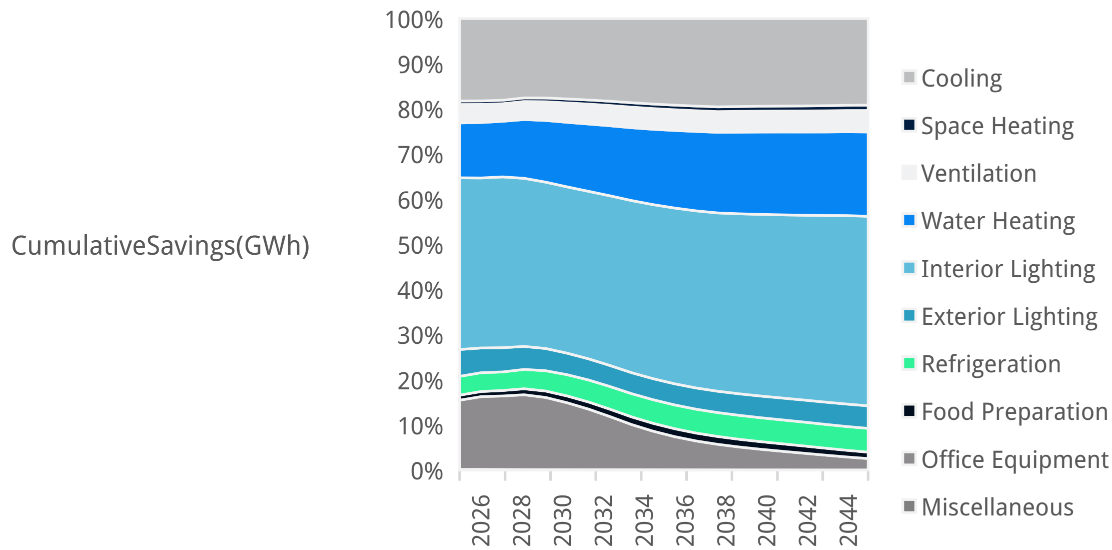


Figure 6-6: Commercial Achievable Potential – Cumulative Savings by End Use (Annual GWh)

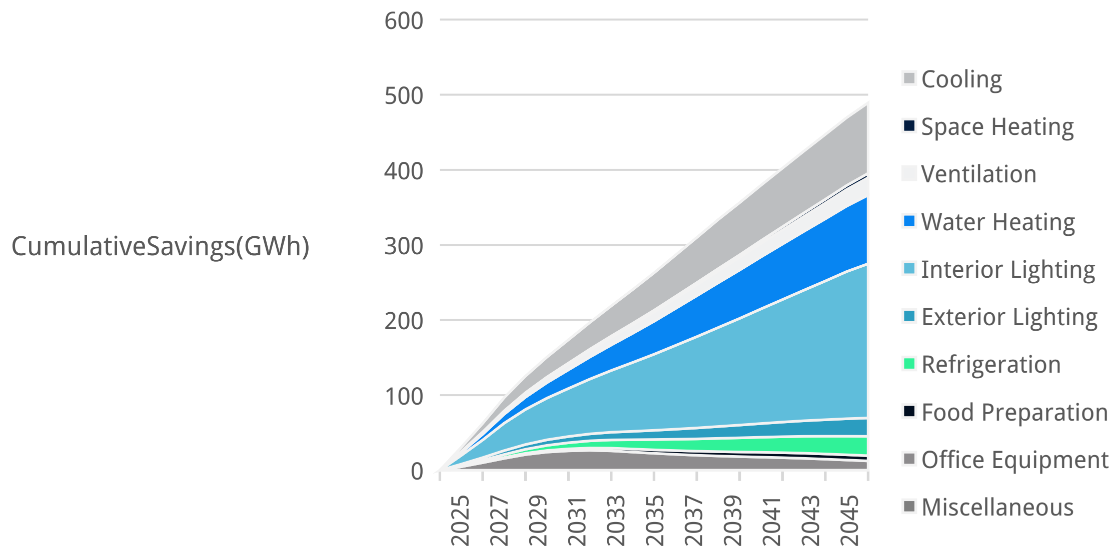


Table 6-8: Commercial Achievable Potential by End Use and Segment, 2035

End Use	Small Office	Large Office	Restaurant	Retail	Grocery	College
Cooling	8,798	2,227	1,478	15,109	1,120	5,999
Space Heating	658	300	19	258	87	346
Ventilation	1,005	1,116	582	1,858	587	1,136
Water Heating	4,717	2,636	2,446	6,914	689	6,592
Interior Lighting	6,723	6,861	1,336	32,005	5,722	3,587

Exterior Lighting	864	923	160	2,852	500	270
Refrigeration	100	219	1,845	325	9,446	639
Food Preparation	109	368	903	662	199	365
Office Equipment	3,602	7,802	181	207	107	6,286
Miscellaneous	8	1	0	0	1	77
Total	**26,583**	**22,453**	**8,949**	**60,191**	**18,457**	**25,299**

End Use	School	Health	Lodging	Warehouse	Miscellaneous
Cooling	2,367	1,550	2,713	3,520	4,882
Space Heating	240	126	295	61	224
Ventilation	61	1,405	770	377	3,152
Water Heating	1,359	1,790	9,764	719	6,221
Interior Lighting	6,811	4,645	1,147	6,270	26,164
Exterior Lighting	366	156	144	3,388	2,616
Refrigeration	326	365	62	10	403
Food Preparation	510	396	121	3	937
Office Equipment	2,060	874	106	118	1,090
Miscellaneous	7	3	48	6	38
Total	**14,107**	**11,311**	**15,171**	**14,472**	**45,726**

Industrial Potential

Table 6-9 and Figure 6-7 present potential estimates for three levels of conservation potential for the industrial sector. As a percentage of the baseline projection, industrial savings are the lowest as a result of stringent motor standards and the challenges of identifying additional opportunities to reduce process energy use. Other savings come from lighting conversions and system optimization measures.

Table 6-9: Summary of Industrial Conservation Potential for Selected Years

Summary of Energy Savings	2026	2027	2030	2035	2045
Baseline Forecast (GWh)	1,847	1,905	1,897	1,883	1,874
Cumulative Savings (GWh)					
Achievable Potential	6	13	30	58	84
Program Potential	8	17	39	73	126
Economic Potential	10	21	50	93	131
Technical Potential	13	26	62	115	158
Energy Savings (% of Baseline)					
Achievable Potential	0.3%	0.7%	1.6%	3.1%	4.5%
Program Potential	0.4%	0.9%	2.1%	3.9%	6.7%
Economic Potential	0.6%	1.1%	2.6%	4.9%	7.0%
Technical Potential	0.7%	1.4%	3.3%	6.1%	8.4%

Figure 6-7: Summary of Industrial Potential (% of Baseline)

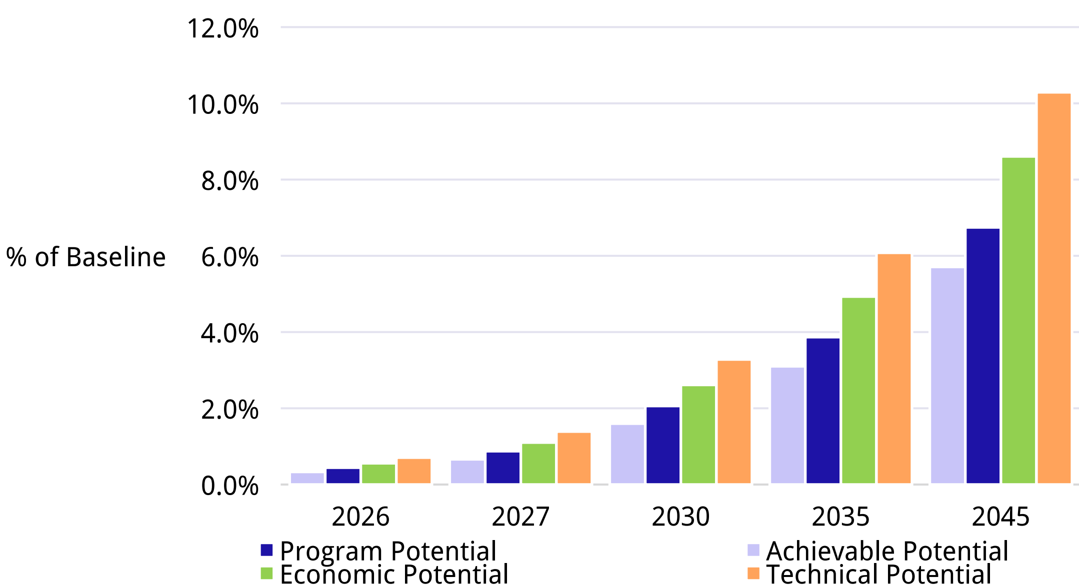


Table 6-10 identifies the top 20 industrial measures in 2035. The top savings opportunities consist of lighting upgrades and motor upgrades and optimization measures.

Table 6-10: Industrial Sector Top Measures in 2035

Rank	Measure / Technology	2035	% of Total

		Achievable Potential (MWh)	
1	Linear Lighting	13,008	22.3%
2	High-Bay Lighting	11,666	20.0%
3	Advanced Industrial Motors	5,024	8.6%
4	Pumping System - System Optimization	4,259	7.3%
5	Compressed Air - End Use Optimization	3,440	5.9%
6	RTU	3,119	5.3%
7	Insulation - Ceiling	2,866	4.9%
8	Fan System - Flow Optimization	2,169	3.7%
9	Fan System - Controls	1,818	3.1%
10	Fan System - Equipment Upgrade	1,482	2.5%
11	Building Operator Certification	1,361	2.3%
12	Air-Cooled Chiller	1,119	1.9%
13	Municipal Sewage Treatment - Optimization	924	1.6%
14	Compressed Air - Variable Speed Drive	719	1.2%
15	High Frequency Battery Chargers	653	1.1%
16	Compressed Air - Dryer Optimization and Replacement	648	1.1%
17	Motors - Green Rewind (<100 HP)	578	1.0%
18	Process Cooling - Upgrade and Optimization	529	0.9%
19	Material Handling - Upgrade and Optimization	455	0.8%
20	Pumping System - Equipment Upgrade	454	0.8%
	Total Savings from Top 20 Measures	**56,289**	**96.3%**
	Total Savings from All Measures	**58,422**	**100.0%**

Figure 6-8 presents the energy savings forecast by end use as a percent of total annual savings. Figure 6-9 presents the energy savings forecast by end use as cumulative savings. Motor-related measures and lighting account for most of the savings throughout the forecast horizon.

Figure 6-8: Industrial Achievable Potential – Cumulative Savings by End Use (% of Total)

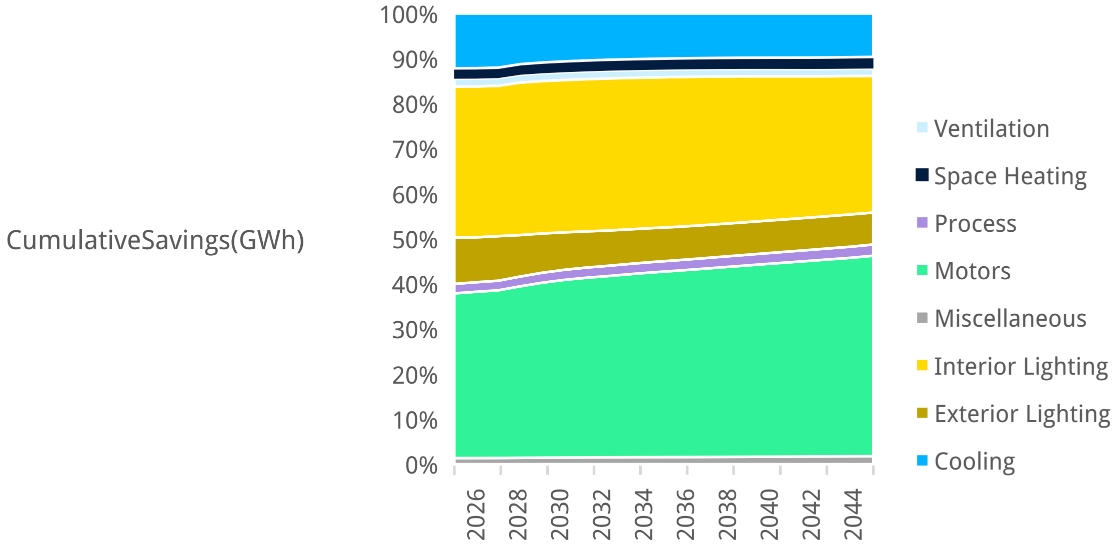


Figure 6-9: Industrial Achievable Potential – Cumulative Savings by End Use (GWh)

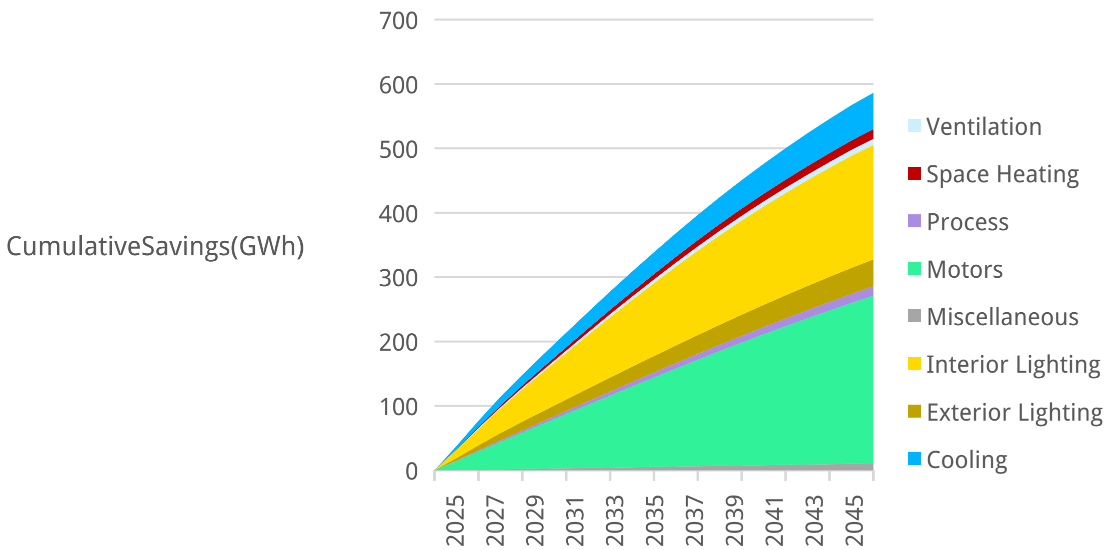


Table 6-12: Industrial Achievable Potential by End Use, MWh in 2035

End Use	Industrial
Cooling	5,912
Space Heating	1,139
Ventilation	889
Interior Lighting	19,288
Exterior Lighting	5,671

Process	23,332
Motors	1,377
Misc.	814
Total	58,422

7 Appendix A. Market Profiles

As described in Chapter 1 of this study, market profiles describe electricity use by sector, segment, end use and technology in the base year of the study (2024). The market profiles are given for average, existing buildings.

Chapter 3 includes market profiles for sectors as a whole, and this workbook contains segment-level detail within each sector. This appendix present market profiles for all modeled segments.

To Be Added

9 Appendix B. Customer Adoption Curves

This data appendix contains the measure adoption curves used in the study. It is separated into two tabs, one for residential adoption curves and the other for the commercial and industrial curves. Yearly values shown should be interpreted as the percentage of the available and applicable market that can be captured by an active program in that year. Measure adoption curves are further discussed in Chapter 2.

10 Appendix C. Measure List

Here we summarize the list of measures evaluated in the Potential Study. The data are presented in six tables, separated by sector and modeling type (equipment or non-equipment).[6]

Table 9-1 Residential EQ Measures

[6] See Chapter 2 for an explanation of equipment vs non-equipment measures in the LoadMAP framework

End Use	Technology
Cooling	Central AC
Cooling	Room AC
Cooling	Evaporative Cooler
Cooling	Portable AC
Cooling/Space Heating	Air-Source Heat Pump
Cooling/Space Heating	Geothermal Heat Pump
Cooling/Space Heating	Ductless Mini Split Heat Pump
Space Heating	Electric Furnace
Space Heating	Electric Room Heat
Water Heating	Water Heater (<= 55 Gal)
Water Heating	Water Heater (> 55 Gal)
Interior Lighting	General Service Lighting
Interior Lighting	Linear Lighting
Interior Lighting	Exempted Lighting
Exterior Lighting	General Service Lighting
Appliances	Refrigerator
Appliances	Second Refrigerator
Appliances	Freezer
Appliances	Clothes Washer
Appliances	Clothes Dryer
Appliances	Dishwasher
Appliances	Stove/Oven
Appliances	Microwave
Appliances	Dehumidifier
Appliances	Air Purifier
Electronics	Personal Computers
Electronics	Monitor
Electronics	Laptops
Electronics	Imaging Equipment
Electronics	TVs
Electronics	Set-top Boxes/DVRs
Electronics	Devices and Gadgets
Miscellaneous	EV Supply Equipment
Miscellaneous	Pool Heater
Miscellaneous	Pool Pump
Miscellaneous	Hot Tub/Spa
Miscellaneous	Furnace Fan
Miscellaneous	Bathroom Exhaust Fan
Miscellaneous	Well Pump
Miscellaneous	Miscellaneous
Generation	Solar PV

Table 9–2 Residential Non–Equipment Measures

Measure
Insulation - Ceiling Installation
Insulation - Ceiling Upgrade
Insulation - Radiant Barrier
Insulation - Wall Cavity Installation
Insulation - Wall Cavity Upgrade
Insulation - Wall Sheathing
Insulation - Floor Installation
Insulation - Floor Upgrade
Insulation - Basement Sidewall
Insulation - Foundation
Insulation - Ducting
Ducting - Repair and Sealing
Ducting - Repair and Sealing - Aerosol
Building Shell - Air Sealing (Infiltration Control)
Building Shell - Whole-Home Aerosol Sealing
Building Shell - Liquid-Applied Weather-Resistive Barrier
Building Shell - High Reflectivity Roof
Windows - High Efficiency (ENERGY STAR 7.0)
Windows - High Efficiency (Triple Pane)
Windows - Low-e Storm Addition
Windows - Install Reflective Film
Windows - Manual Shading
Ductless Mini Split Heat Pump (Zonal)
Supplement Central System with Ductless Mini Split Heat Pump
Conversion to Ductless Mini Split Heat Pump
HVAC - Conversion to Ground-Source Heat Pump
Furnace - Conversion to Air-Source Heat Pump
Conversion to Packaged Terminal Heat Pump
Conversion to Portable Heat Pump
HVAC - Efficient Blower Motor
Evaporative Cooler - Zonal
Evaporative Cooler - Whole Home
Combination Heat Pump Water Heater/Space Heating
HVAC - Maintenance and Tune-Up
HVAC - Energy Recovery Ventilator
Whole-House Fan - Installation
Room AC - Recycling
Connected Thermostat - ENERGY STAR (1.0)
Connected Thermostat - Line-Voltage
Home Energy Management System (HEMS)
Water Heater - Drainwater Heat Recovery
Water Heater - Faucet Aerators
Water Heater - Low-Flow Showerheads
Water Heater - Shower Timer
Water Heater - Pipe Insulation
Water Heater - Desuperheater
Water Heater - Thermostatic Shower Restriction Valve
Water Heater - Solar System
Circulation Pump - High Efficiency Motor
Circulation Pump - Controls
Interior Lighting - Occupancy Sensors
Interior Lighting - ENERGY STAR Skylights
Exterior Lighting - Photosensor Control
Exterior Lighting - Photovoltaic Installation
Refrigerator - Decommissioning and Recycling
Freezer - Decommissioning and Recycling
Clothes Washer - CEE Tier 2
Dishwasher - ENERGY STAR (7.0)
Water Cooler - ENERGY STAR (3.0)
Advanced Power Strips - Tier 1
Advanced Power Strips - Tier 2
Pool Heater - Solar System
Pool Covers
Pool Cleaner - Robotic
Ceiling Fan - ENERGY STAR (4.1)
ENERGY STAR Home Design
Advanced New Construction Designs
Home Energy Reports

Table 9-3 Commercial Equipment Measures

End Use	Technology
Cooling	Air-Cooled Chiller
Cooling	Water-Cooled Chiller
Cooling	RTU
Cooling	Packaged Terminal AC
Cooling/Space Heating	Packaged Terminal HP
Cooling/Space Heating	Air-Source Heat Pump
Cooling/Space Heating	Geothermal Heat Pump
Space Heating	Electric Furnace
Space Heating	Electric Room Heat
Ventilation	Ventilation
Water Heating	Water Heater
Interior Lighting	General Service Lighting
Interior Lighting	Exempted Lighting
Interior Lighting	Linear Lighting
Interior Lighting	High-Bay Lighting
Exterior Lighting	General Service Lighting
Exterior Lighting	Linear Lighting
Exterior Lighting	Area Lighting
Refrigeration	Walk-in Refrigerator/Freezer
Refrigeration	Reach-in Refrigerator/Freezer
Refrigeration	Glass Door Display
Refrigeration	Open Display Case
Refrigeration	Icemaker
Refrigeration	Vending Machine
Food Preparation	Oven
Food Preparation	Fryer
Food Preparation	Dishwasher
Food Preparation	Hot Food Container
Food Preparation	Steamer
Food Preparation	Griddle
Office Equipment	Desktop Computer
Office Equipment	Laptop
Office Equipment	Monitor
Office Equipment	Server
Office Equipment	Imaging Equipment
Office Equipment	POS Terminal
Miscellaneous	Non-HVAC Motors
Miscellaneous	Pool Pump
Miscellaneous	Pool Heater
Miscellaneous	EV Supply Equipment
Miscellaneous	Clothes Washer
Miscellaneous	Clothes Dryer
Miscellaneous	Miscellaneous
Generation	Solar PV

Table 9-4 Commercial Non-Equipment Measures

Measure
Insulation - Ceiling
Insulation - Wall Cavity
Insulation - Ducting
Building Shell - High Reflectivity Roof
Ducting - Repair and Sealing
Windows - High Efficiency Glazing
Windows - Reflective Film
Chiller - Chilled Water Reset
Chiller - Variable Flow Chilled Water Pump
Water-Cooled Chiller - Variable Flow Condenser Water Pump
Water-Cooled Chiller - Condenser Water Temperature Reset
Chiller - Variable Speed Fans
Building Shell - Air Sealing (Infiltration Control)
Ventilation - High Efficiency Motors
Ventilation - Fan Drive Improvements
Ventilation - Variable Speed Control
Ventilation - Demand Controlled
Ventilation - Parking Garages, Demand Controlled
Ventilation - Nighttime Air Purge
Destratification Fans (HVLS)
HVAC - Economizer Repair/Addition
HVAC - Economizer Controls

Measure
HVAC - Hydronic Economizer
RTU - Advanced Controls
RTU - Evaporative Precooler
RTU - Evaporative Cooler
Industrial Air Curtains
HVAC - Energy Recovery Ventilator
HVAC - Maintenance
Connected Thermostat - ENERGY STAR (1.0)
Water Heater - Thermostatic Shower Restriction Valve
Water Heater - Pre-Rinse Spray Valve
Water Heater - Faucet Aerators/Low Flow Nozzles
Water Heater - Low-Flow Showerheads
Water Heater - Drainwater Heat Recovery
Water Heater - Pipe Insulation
Water Heater - Solar System
Circulation Pump - Controls
Circulation Pump - High Efficiency Motor
Commercial Laundry - Ozone Treatment
Commercial Laundry - ENERGY STAR Washer (8.0)
Water Heater - ENERGY STAR Dishwasher (3.0)
Interior Lighting - Retrofit - Networked Lighting Controls
Interior Lighting - LED/LEC Exit Lighting
Interior Lighting - Skylights
Exterior Lighting - Photovoltaic Installation
Refrigeration - Door Gasket Replacement
Refrigeration - High Efficiency Compressor
Refrigeration - Mechanical Subcooling
Refrigeration - Defrost Controls
Refrigeration - Automatic High Speed Doors
Refrigeration - High Efficiency Condenser Coil
Refrigeration - Liquid-Suction Heat Exchange
Refrigeration - High Efficiency Evaporator Fan Motors
Refrigeration - Evaporator Fan Controls
Refrigeration - Efficient Compressor Head Fan Motor
Refrigeration - Economizer Addition
Refrigeration - Suction Line Insulation
Refrigeration - Floating Head Pressure
Refrigeration - Floating Suction Pressure
Refrigeration - Evaporative Condenser
Refrigeration - Strip Curtain
Refrigeration - Air Curtain
Grocery - Display Case - Anti-Sweat Heater Controls
Grocery - Display Case - Low-Heat/No-Heat Doors
Grocery - Display Case - Door Retrofit
Grocery - Display Case - LED Lighting
Grocery - Display Case - Motion Sensors
Grocery - Open Display Case - Night Covers
Grocery - On-Demand Overwrappers
Ultra-Low Temperature Freezer - ENERGY STAR (1.1)
Vending Machine - Occupancy Sensor
Kitchen Ventilation - Advanced Controls
Optimized Lab Hood Design
Lodging - Guest Room Controls
Office Equipment - Advanced Power Strips
Data Center - Upgrade and Optimization
High Efficiency Computer Room AC
Server Room Temperature Setback
Pool Heater - Night Covers
Water Cooler - ENERGY STAR (3.0)
Water Cooler - Timer
Efficient Hand Dryers
Engine Block Heater Controls
Circulating Engine Block Heater
Improved Vertical Lift Technology
High Frequency Battery Chargers
Advanced New Construction Designs
Retrocommissioning
Building Operator Certification

Table 9-5 Industrial Equipment Measures

End Use	Technology
Cooling	Air-Cooled Chiller
Cooling	Water-Cooled Chiller
Cooling	RTU
Cooling/Space Heating	Air-Source Heat Pump
Cooling/Space Heating	Geothermal Heat Pump
Space Heating	Electric Furnace
Space Heating	Electric Room Heat
Ventilation	Ventilation
Interior Lighting	General Service Lighting
Interior Lighting	Exempted Lighting
Interior Lighting	Linear Lighting
Interior Lighting	High-Bay Lighting
Exterior Lighting	General Service Lighting
Exterior Lighting	Linear Lighting
Exterior Lighting	Area Lighting
Process	Process Cooling
Process	Process Refrigeration
Process	Process Heating
Process	Process Electrochemical
Process	Process Other
Motors	Pumps
Motors	Fans & Blowers
Motors	Compressed Air
Motors	Material Handling
Motors	Other Motors

Table 9-6 Industrial Non-Equipment Measures

Measure
Insulation - Ceiling
Insulation - Wall Cavity
Insulation - Ducting
Ducting - Repair and Sealing
Building Shell - Air Sealing (Infiltration Control)
Chiller - Chilled Water Reset
Chiller - Variable Flow Chilled Water Pump
Chiller - Variable Speed Fans
Water-Cooled Chiller - Variable Flow Condenser Water Pump
Water-Cooled Chiller - Condenser Water Temperature Reset
HVAC - Economizer Controls
Ventilation - Demand Controlled
Destratification Fans (HVLS)
RTU - Advanced Controls
RTU - Evaporative Precooler
Industrial Air Curtains
HVAC - Maintenance
HVAC - Energy Recovery Ventilator
Connected Thermostat - ENERGY STAR (1.0)
Interior Lighting - Retrofit - Networked Lighting Controls
Interior Lighting - LED/LEC Exit Lighting
Interior Lighting - Skylights
Exterior Lighting - Photovoltaic Installation
High Frequency Battery Chargers
Refrigeration - System Optimization
Refrigeration - System Upgrade
Refrigeration - System Maintenance
Pumping System - Controls
Pumping System - Equipment Upgrade
Pumping System - System Optimization
Fan System - Controls
Fan System - Equipment Upgrade
Fan System - Flow Optimization
Compressed Air - Equipment Upgrade
Compressed Air - End Use Optimization
Compressed Air - System Controls
Compressed Air - Variable Speed Drive
Compressed Air - Dryer Optimization and Replacement
Compressed Air - Low Pressure-Drop Filters

Measure
Compressed Air - Zero-Loss Condensate Drain
Motors - Green Rewind (<100 HP)
Motors - Green Rewind (100 HP+)
Advanced Industrial Motors
Engine Block Heater Controls
Circulating Engine Block Heater
Material Handling - Upgrade and Optimization
Panel - Hydraulic Press
Pulp and Paper - Process Efficiency
Wood - Process Optimization
Metal - New Arc Furnace
Process Cooling - Upgrade and Optimization
Electrochemical Processes - Upgrade and Optimization
Injection Molding - Process Improvements
Petroleum Pump - Upgrade and Optimization
Municipal Water Treatment - UV-C LED Disinfection
Municipal Sewage Treatment - Optimization
Municipal Water Supply Treatment - Optimization
Indoor Agriculture - LED Lighting
Dairy - Milk Pre-Cooler
Dairy - Heat Recovery from Refrigeration
Dairy - Variable Speed Milk Vacuum Pump
Dairy - Compressor Upgrade
Agriculture - Efficient Stock Watering Tanks
Agriculture - Stock Tank De-Icer
Agriculture - Thermostatically Controlled Outlets
Agriculture - Efficient Circulation Fan
Transformer - High Efficiency
Commissioning
Retrocommissioning
Building Operator Certification

11 Appendix D. Demand Response Results

Introduction

This section outlines ICF's assessment of demand response potential within PNM's service territory. It summarizes the methodology, key data sources, and inputs used in the analysis, along with the resulting estimates of achievable peak demand reductions from 2026 to 2045. In contrast to energy efficiency, where customers may choose to install energy-efficient technologies without utility programs, demand response resources do not exist outside of utility offerings. Therefore, ICF relied on a programmatic view of demand response to assess the potential from this resource class instead of the technology view used to assess the potential from energy efficiency resources.

The following sections detail the key steps in the potential assessment and provide results:

- Data Collection
- Program Characterization
- Baseline Peak Demand Forecast
- Potential Estimation
- Levelized Costs

Data Collection

Table 10-1 presents the key data sources and data elements ICF used to perform the demand response potential assessment. ICF relied heavily on the Northwest Power and Conservation Council's (Council) 2021 Power Plan, which characterizes demand respond programs using regional sources. Where available, ICF incorporated data specific to PNM's service territory to develop program assumptions about participation, impacts, and costs.

Table 10-1 Data Sources

Source	Data Gathered
PNM Studies	• 2024 Evaluation of Energy Efficiency and Load Management Programs • 2024 Annual Report
Northwest Power and Conservation Council 2021 Power Plan[7]	• Demand Response program characterization (e.g. Participation impacts, costs) • Program ramp rates
Other Regional Studies	• Program Characterization

Program Characterization

The program options included in the analysis are presented in Table 10-2. The Council's 2021 Power Plan largely dictated sector eligibility for each program option.

Table 10-2 Program Options Included in the Study

Program Option	Program Description	Eligible Sector(s)

[7] In addition to the 2021 Council inputs, ICF also used several updated residential assumptions (HVAC, water heating, and EV charging programs) from the NWPCC DRAC meeting (3/26/2025) that will be included in the next version of the Power Plan.

Power Saver - Connected Thermostat Direct Load Control (DLC)	Internet-enabled control of thermostat set points. Free Copeland Sensi thermostats installed by implementer. Program supports Nest and Honeywell Home as a BYOT component.	Residential
Power Saver- HVAC DLC	Participants must have a device attached to the exterior of their air conditioning unit. This "paging" device receives a paging signal during peak events that will activate a control sequence that cycles the unit's compressor for an interval of time (usually half the time as normal) to reduce peak demand in the summer.	Residential, Small-Medium Commercial
Electric Vehicle (EV) Behavioral Charge Management	Encourage customers to reduce charging at times of high stress on the electric grid through behavioral messaging and limited incentives	Residential
EV Direct Charge Management	Optimize EV charging times to reduce their impact on system peak load through direct control of EV chargers or vehicle telematics	Residential
EV Fleet Direct Charge Management	Optimize EV fleet charging times to reduce their impact on system peak load through direct control of EV chargers or vehicle telematics	Commercial (Retail, School, and Warehouse Segments)
Battery Storage DLC	Internet-enabled control of battery charging and discharging	All Sectors
Grid Interactive Water Heater	Direct control of electric water heaters through CTA-2045 or other integrated communication port	Residential
Domestic Hot Water Heater (DHW) DLC	Direct control of electric water heaters through a traditional DLC switch installed on customer equipment	Residential
Time-of-Day (TOD)	Encourage customers to reduce their demand by setting a higher rate for a particular block of hours that occurs every day	All Sectors
Behavioral DR	Voluntary DR reductions in response to behavioral messaging. Example programs exist in CA and other states. Requires AMI technology.	Residential
Electric Vehicle TOU	Higher rate for a particular block of hours (usually in the evening) that occurs every day. Requires either on/off peak meters or AMI technology to run.	Residential
Peak Saver	The Peak Saver program is a DR program offered to non-residential customers with peak load contributions of at least 150 kW. The program compensates participants for reducing electric load upon dispatch during periods of high system load. There is no penalty for non-participation in this program.	Medium-Large Commercial and Industrial Customers

After developing the program option list, ICF worked with PNM staff to develop key assumptions used to calculate the potential and cost estimates for each program option. The following section describes these assumptions in greater detail.

Participation Rates, Impacts, and Costs

ICF began with assumptions from the Council's 2021 Power Plan, then updated these values with information from PNM's existing programs, where available. Deviations from Council assumptions included the following.

- ICF calibrated program costs for the Peak Saver and Power Saver Programs using the 2024 PNM Annual Report.
- ICF calibrated program impacts per customer using the 2024 Evaluation of Energy Efficiency and Load Management Programs Report.
- For the Power Saver Program, ICF characterized both a bring-your-own-thermostat (BYOT) and direct install (DI) version of the Connect Thermostat DLC program option. These were treated as separate channels under a single program option such that program costs and potential could be stacked across both without double counting.
- The Council's 2021 Power Plan provides cost assumptions from a total resource cost (TRC) perspective, whereby a portion of the incentive costs are used as a proxy for customer costs to participate. To support PNM's IRP, ICF calculated costs from the Utility Cost Test (UCT) perspective and counted the full incentives costs towards the programs.
- Consistent with the Council's 2021 Power Plan, ICF did not burden the rates programs with the costs of infrastructure or software upgrades that may be required for PNM to deliver demand-focused rates to its customers.

Enabling Equipment

Some of the demand response program options rely on enabling equipment and technology. ICF used equipment saturation forecasts estimated through PNM's energy efficiency potential assessment, including:

- ICF used the saturation of central cooling/heating systems developed through the energy efficiency study market characterization to inform the pool of customers eligible to participate in Connected Thermostat DLC (Residential and Small Commercial), and HVAC DLC (Residential and Small/Medium Commercial).
- The analysis assumed that all new water heater purchases would be grid-enabled water heaters (e.g., CTA-2045). The overall saturation of electric water heaters aligns with the energy efficiency market characterization, but the distribution of units assumed to be grid-enabled increases throughout the forecast period as existing water heaters turn over.
- For the Battery Storage Program, ICF assumed 20% of installed solar would include battery systems.

Program Option Hierarchy

Some of the program options target the same peak load. To avoid double counting demand response potential for these competing resources, ICF worked with PNM to develop the program hierarchy. In general, the hierarchy prioritizes customers for firm resources first followed by rate options by removing participants of programs higher in the hierarchy from the pool of customers eligible for programs lower in the hierarchy.

For this analysis, the only programs that are affected by the hierarchy (competition by end use technology) are the two rates (EV TOU and TOD). For EV TOU, customers expected to participate in the EV DLC program were removed from the eligible customer pool. For TOD, participants from the following programs were removed from the eligible customer pool: Peak Saver, Power Saver, and water heating programs. Otherwise, program potential was unchanged for the remainder of programs.

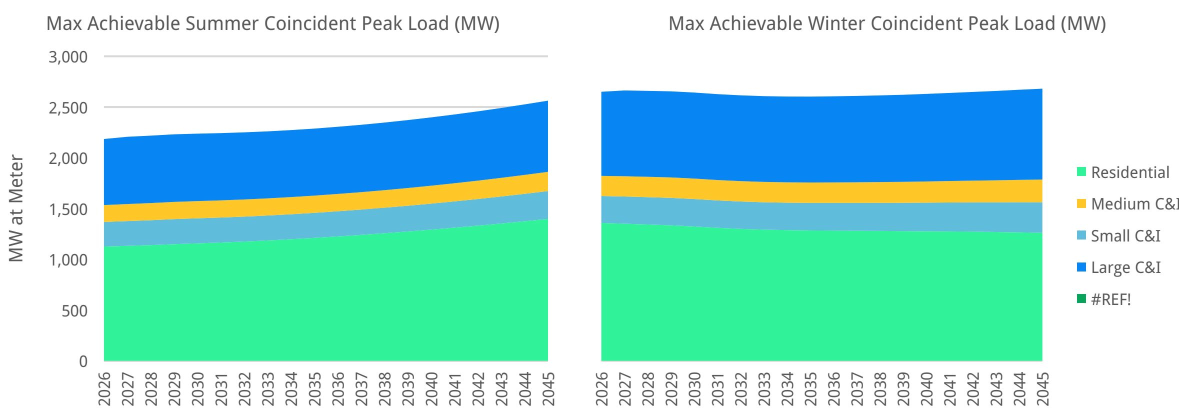
Baseline Peak Demand Forecast

ICF developed the peak demand forecast shown in Figure 10-1 by:

- Using the system-level peak demand forecast estimated for the energy efficiency potential study, and
- Segmenting the system-level peak demand forecast into sector and customer size using customer-level data provided by PNM and the market segmentation and characterization from the energy efficiency potential study, and

Demand responses potential estimates are incremental to the peak demand impacts from energy efficiency to remove double counting of EE impacts in the DR potential. ICF worked with PNM to determine the most likely EE scenario to incorporate into the DR study. Figure 10-1 shows the sector contributions to the Maximum Achievable Potential (MAP) peak demand forecast for summer and winter for each year of the study. As shown, PNM's system peak demand increases through the study period in the summer season but remains fairly constant in the winter season. The residential sector in summer is projected to increase from 1,126 MW in 2026 to 1,439 MW by 2045 reflecting projected electrification patterns and increased electric vehicle saturations by the end of the study.

Figure 10-1: Peak Demand Forecast by Season



Potential Estimation

ICF calculated the demand response potential for each program by:

1. Determining the eligible customer population using enabling equipment saturations and removing the participation from programs higher in the program hierarchy,
2. Applying participation, attrition, and event non-performance rates to estimate the number of eligible customers likely to participate in the program option, and
3. Multiplying the per-customer impacts by the number of participants to estimate the total impacts (potential) for each program option in each year of the forecast period.

Figure 10-2 shows the estimated demand response potential. The solid lines show the baseline peak demand, while the dotted lines show the estimated potential forecast after demand response programs have been implemented. The difference between these lines (shown as percentage of peak demand bars on the graph) reflects the estimated potential for each year of the study.

By the end of the forecast period, ICF estimates that demand programs could reduce the summer and winter peak demand by approximately 6%. Potential from demand response programs increases over the five to ten years as the programs enroll participants and reach full maturity. Most of the potential comes from the residential sector, where ICF estimated that residential programs have the potential to contribute 72% of the overall reduction in summer peak demand and 71% of winter peak demand by 2045.

Figure 10-2: Total Demand Response Potential Forecast

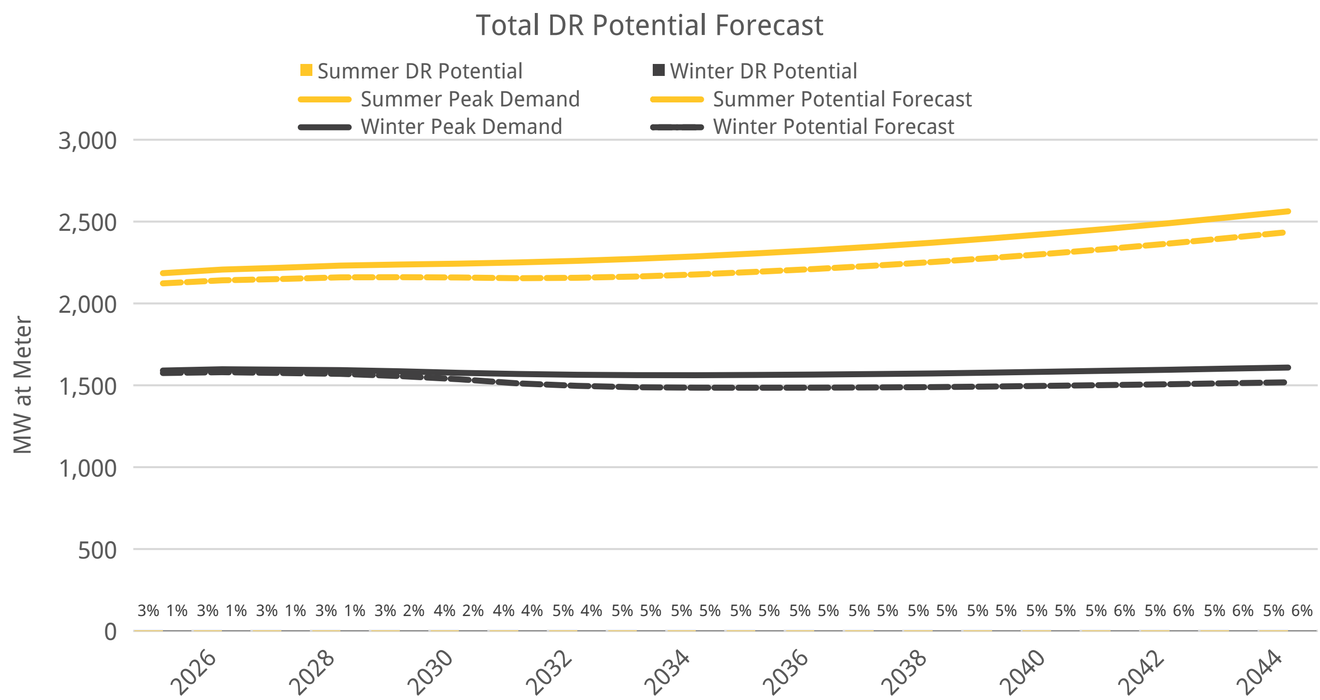


Figure 10-3 and Figure 10-4 show the potential generated by demand response programs over the select years in the forecast period for summer and winter, respectively. The early years show how the potential changes as programs mature, and the later years show what programs generate after reaching maturity. Most programs are assumed to start in 2030, a delay of four years from the start of the forecast period, to account for the time PNM would realistically need to launch programs[8].

As shown, ICF estimates that PNM could generate 127 MW of demand reduction in the summer and 90 MW in the winter through demand response programs by 2045. In summer, Power Saver (35%), Peak Saver (23%), and Electric Vehicle Direct Charge Management (23%) contribute to 81% of the total program potential. In winter, Electric Vehicle Direct Charge Management (34%), Peak Saver (25%), and Power Saver (18%)[9] make up 77% of the total program potential.

Figure 10-3: Summer Demand Response Program Potential for Select Years

[8] Discussions with PNM suggested that 2030 would likely be an aggressive start time where program planning would likely have to begin in 2026.

[9] Power Saver is currently a summer-only program. ICF expanded this program into winter for purposes of the potential study with a 2030 start date.

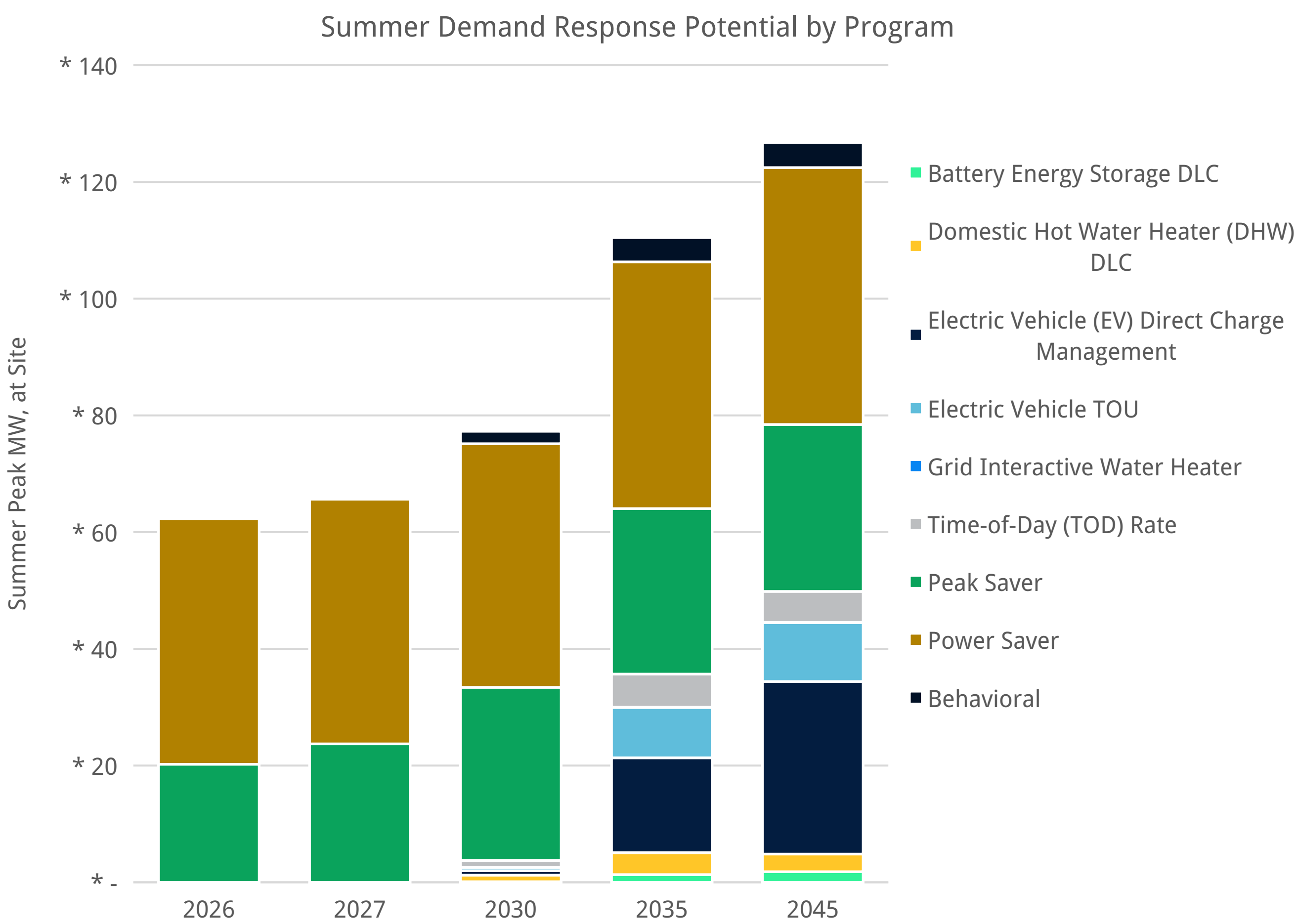
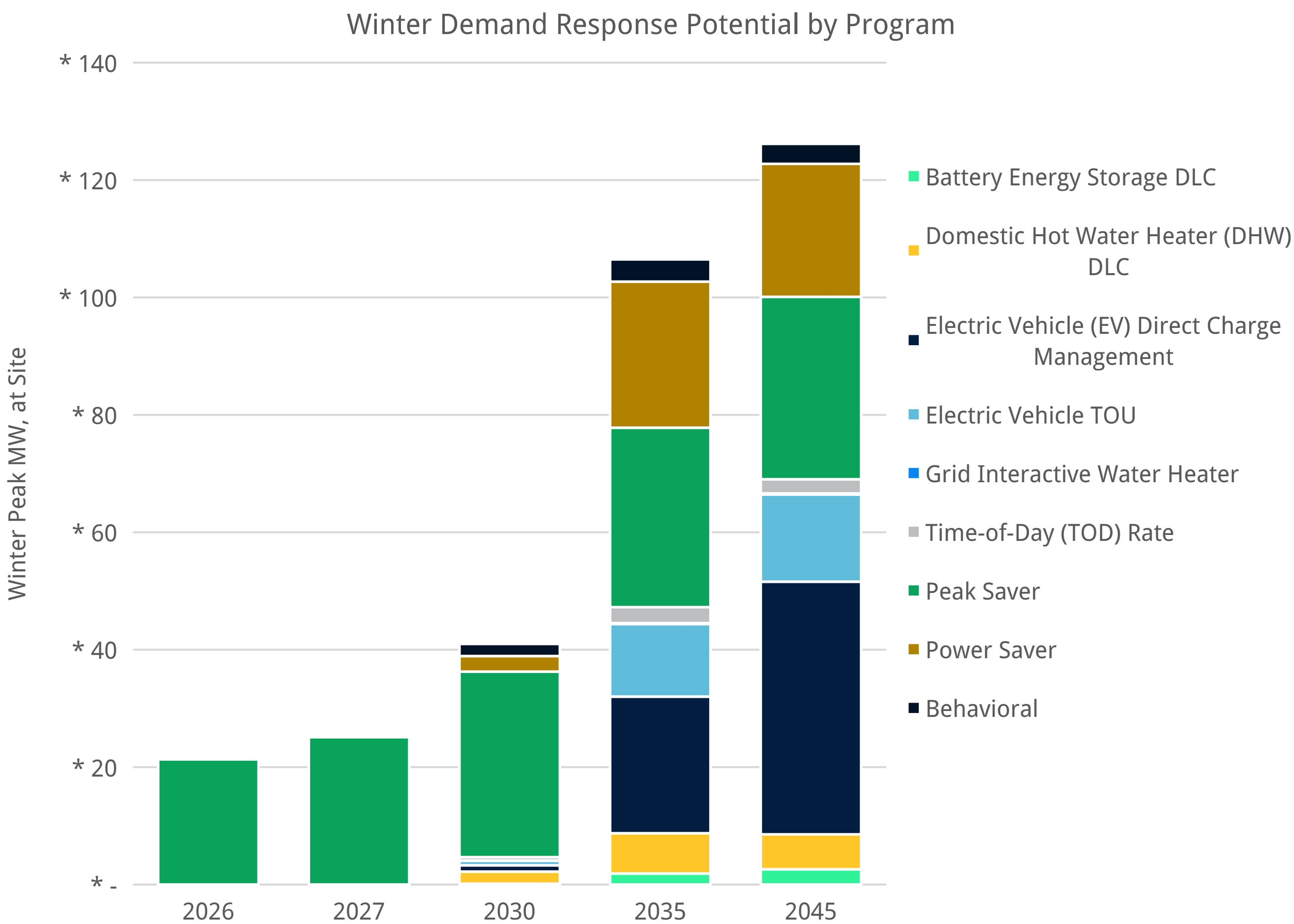

Summer Demand Response Potential by Program
Summer Peak MW, at Site
* 140
* 120
* 100
* 80
* 60
* 40
* 20
* -
2026
2027
2030
2035
2045
Battery Energy Storage DLC
Domestic Hot Water Heater (DHW) DLC
Electric Vehicle (EV) Direct Charge Management
Electric Vehicle TOU
Grid Interactive Water Heater
Time-of-Day (TOD) Rate
Peak Saver
Power Saver
Behavioral

Figure 10-4: Winter Demand Response Program Potential by Selected Years



Levelized Costs

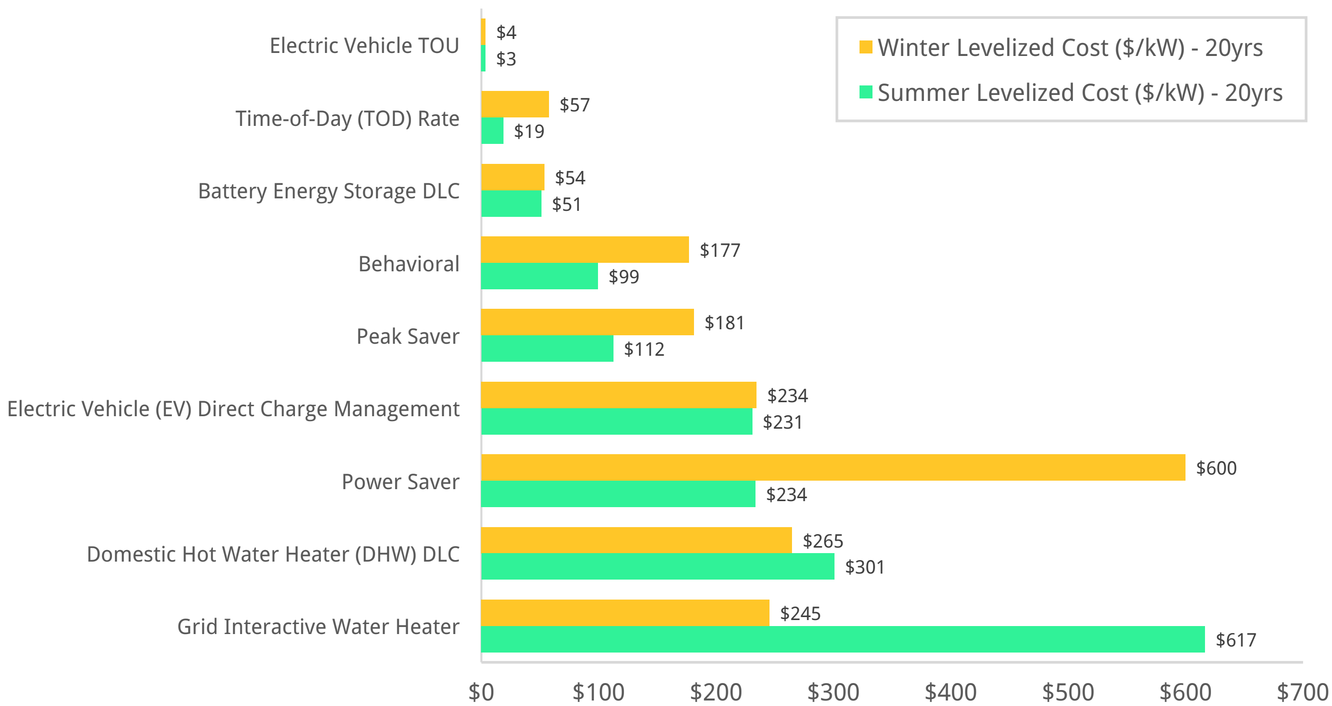
ICF calculated levelized costs for each program option, shown in Figure 11-5. Because of the staggered start times of the non-existing programs (2030) compared to the existing programs, ICF used the full forecast horizon (2026-2045) to estimate levelized costs.

All the assessed program options have the potential to generate peak demand reductions in both summer and winter, and the levelized costs shown here only apply if programs run in both seasons. Costs for single-season programs would be higher (equaling the sum of summer and winter split costs minus any season-specific incentives that are no longer applicable).

Figure 34 shows the levelized costs estimated over the first twenty years of each program's life, from a UCT perspective (i.e., including full participant incentives and additional implementation costs). If PNM requires monthly costs for the IRP model, ICF recommends replicating the costs shown here in each applicable month (i.e., summer costs in the summer months and winter costs in the winter months). Costs in the shoulder months would be $0/kW as the impacts would not be available. While this method would likely overstate the total cost if the IRP model selected demand response as a resource in all eligible months, it would avoid understating the costs if PNM only needed the capacity in one month.

As shown, Rate programs (EV TOU and TOD) provide the least expensive potential, which stems from the assumption that any billing system and infrastructure upgrades needed to offer a demand-focused rate to customers is already in place. In addition, they don't require equipment upgrades and can be run at scale. Some of the higher cost programs such as the water heater programs and EV DLC are more expensive per participant as they require equipment cost upgrades to run the program.

Figure 11-5: 20-Year Levelized Costs



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