City of Moreno Valley
Integrated Resource Plan
2025

Executive Summary

Moreno Valley Electric Utility's (MVU) 2025 Integrated Resource Plan (IRP) is a comprehensive, long-term strategic plan developed to ensure future energy demands can be met in a reliable, cost-effective, equitable, compliant and environmentally sustainable manner. By aligning with regulatory goals and operational realities, this IRP serves as a dynamic roadmap, guiding MVU's resource procurement and infrastructure development to support sustainable, resilient energy systems.

This IRP has a 20-year planning horizon from 2025 to 2045, exceeding the California Energy Commission's (CEC) 10-year scope to better align with the utility's long-term goals. This extended view allows MVU to anticipate technological advancements, policy evolution, and demand changes, ensuring effective resource procurement and cost-efficient service.

Regulatory Context

Senate Bill 350 (SB 350) and Senate Bill 100 (SB 100) set key mandates for public utilities like MVU, requiring integration of increasing percentages of renewable energy into their portfolios, with the ultimate goal of achieving 100% carbon-free electricity by 2045. Public Utilities Code (PUC) Section 9621 further mandates that utilities must demonstrate how they will meet resource adequacy (RA), and greenhouse gas (GHG) reduction targets[1] set by the California Air Resources Board (CARB). The regulatory framework also emphasizes stakeholder engagement, equity considerations, and the integration of disadvantaged communities (DACs) into planning, guided by tools such as the CalEnviroScreen.

IRPs[2] must demonstrate compliance with the Renewable Portfolio Standard (RPS), requiring a specific percentages of electric retail sales to come from renewable sources. MVU's IRP aims to achieve the following renewable energy targets per Senate Bill 100 (SB100):

- 44% by 2024
- 52% by 2027
- 60% by 2030
- 100% carbon-free by 2045

[1] While greenhouse gas (GHG) compliance is not currently required for publicly owned utilities (POUs) under the scope of this IRP, MVU recognizes that future IRPs will need to address GHG emission target goals as part of its ongoing commitment to sustainable energy planning.
[2] MVU is not currently required to publish an IRP under Public Utilities Code (PUC) Section 9621, but has voluntarily chosen to do so in anticipation of future compliance. PUC Section 9621 mandates that Publicly Owned Utilities (POUs) develop IRPs if their annual electric load exceeds 700 gigawatt-hours (GWh). While MVU's current load falls below this threshold, this IRP reflects MVU's proactive approach to align with 9621 requirements and to ensure readiness as regulatory obligations evolve.

Our Goals

MVU's overarching planning goals for this IRP include:

- **Cost-Effectiveness**: Employing energy efficiency and demand-side programs to manage load growth
- **Resource Diversity:** Ensuring a balanced mix of renewables, carbon-free resources, and flexible assets
- **Equity:** Prioritizing disadvantaged communities (DACs) in service and development
- **Risk Management:** Addressing uncertainties in new technologies, pricing, and customer programs
- **Reliability:** Meeting resource adequacy requirements under all conditions, including operational contingencies

Scenario Analysis and Resource Portfolio Selection

Scenarios were systematically developed in consultation with key stakeholders to explore key risks and uncertainties and to identify an optimal resource portfolio for meeting both MVU's goals and compliance with state regulations. The four scenarios evaluated during the development of the IRP were:

- **Feasible** – Utility scale solar, onshore and offshore wind, and 4 and 8-hour battery storage resources were considered to meet an expected 5.05%[3] compound annual growth rate (CAGR) in annual consumption up to 2030, geothermal was considered after 2030, due to it not being deemed a realistic resource to plan for before then.
- **Feasible w/Low Demand** – The same resource considerations were used as the Feasible scenario, but a lower, 3.06%[4] CAGR, assumed for annual consumption and slower spot load ramp time.
- **Feasible w/High Behind-the-Meter (BTM) Resources** – The same resource considerations were used as the Feasible scenario but assumed a 10% increase in BTM solar photovoltaic (PV) and storage adoption.
- **Feasible w/High Demand** – The same resource considerations were used as for the Feasible scenario but with an assumed increased in underlying and electrification demand by 10%[5] and an acceleration of the spot load ramp rate.

The Feasible w/Low Demand scenario was selected as the planning scenario for this IRP.

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[3] The 5.05% compound annual growth rate (CAGR) is derived from the annual system consumption (MWh) growth observed between 2019 and 2023.
[4] Low Demand scenario CAGR reduction based on 2022 CEC Integrated Energy Policy Report (IEPR) forecast growth rate difference between the low and medium demand scenarios for Southern California Edison (SCE)
[5] 10% was selected based on a review of other POU IRPs.

Stakeholder Engagement

Stakeholder engagement is an essential part of MVU's IRP development process. MVU's IRP stakeholder engagement includes engaging with City Council and the publicly constituted Utility Commission to ensure the IRP reflects the needs and concerns of MVU's community and stakeholders. Feedback from these groups is incorporated into the scenario development and analysis phases, helping to guide MVU towards a resource portfolio that strikes the right balance across reliability, affordability, equity, and sustainability.

Resource Procurement Plan

This IRP contains a detailed implementation timeline for the selected scenario, which outlines the key milestones and actions required to procure new resources. This roadmap will guide MVU in executing our long-term strategy and ensuring that it remains on track to meet our energy goals.

The proposed Resource Procurement Plan (the Plan) delivers the least cost portfolio of resources under the Feasible w/Low Demand scenario. Highlights include:

Procurement of ~120 MW of RPS eligible energy (preferably onshore wind) and ~35 MW of 4-hr battery from 2025-2030

Procurement of ~150 MW of RPS eligible energy (preferably geothermal) and ~10 MW of 4-hr battery from 2030-2045

The proposed resource plan assumes that resources are available at the modelled prices and availability. These factors will need to be evaluated at the time of resource procurement and assumptions will be updated, if needed, in future IRPs.

The Plan was optimized using various 3rd party forecasts, notably:

Resource costs from NREL's Annual Technology Baseline (ATB),[6] which included capital expenditure (capex), fixed and variable operating expenditure (opex)

Renewable Energy Credit (REC) prices by REC type (i.e. PCC1, PCC2, and PCC3)

Electricity wholesale market prices, at the CAISO Default Load Aggregation Point (DLAP)

Resource capacity factors by renewable resource type from the California Public Utilities Commission (CPUC) Resource Data Table (RDT)[7] tool and CPUC Monthly ELCCs[8]

Resource generation profiles for each renewable resource type from the CEC's Clean System Power Calculator (CSP) tool

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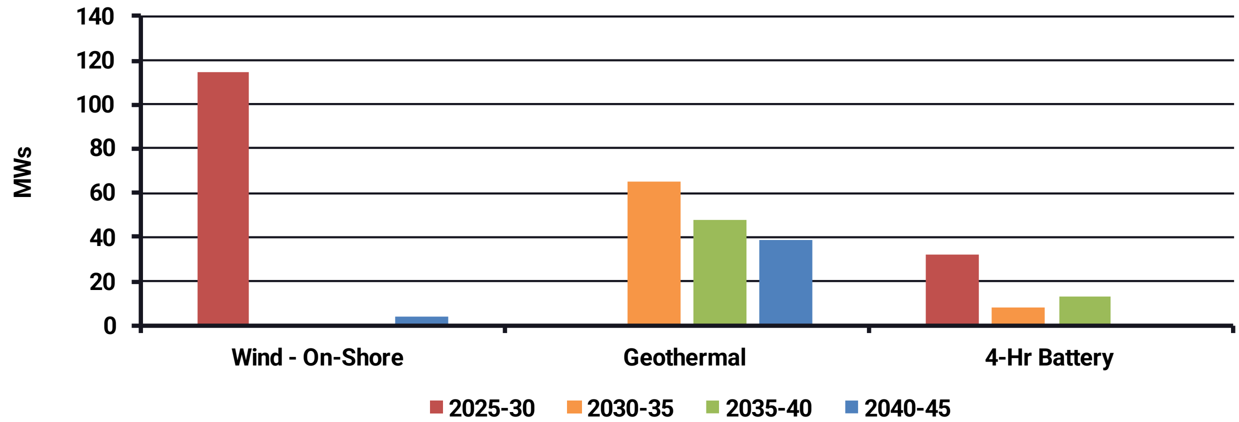
[6] National Renewable Energy Laboratory (NREL), *Annual Technology Baseline (ATB)*, which includes cost data for renewable. Available at: https://atb.nrel.gov/ (Accessed October 23, 2024)

[7] California Public Utilities Commission (CPUC), 2022 Integrated Resource Planning (IRP) Cycle Events and Materials, which includes resource data for long-term procurement planning. Available at: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials (Accessed November 27, 2024)

[8] California Public Utilities Commission (CPUC), Revised Effective Load Carrying Capability (ELCC) Proposal, which outlines updated methodologies for ELCC calculations. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/r/6442452545-revised-elcc-propsal-2-14.pdf (Accessed November 27, 2024)

MVU's plan for procuring resources is reported for each 5-year planning cycle in the figure below to 2045. Whether or not MVU will secure these resources via projects, power purchase agreements (PPAs), or RECs will depend on market pricing at the time.

Figure 1 – Resource Purchases by 5 Year Planning Phase



Source: Energeia

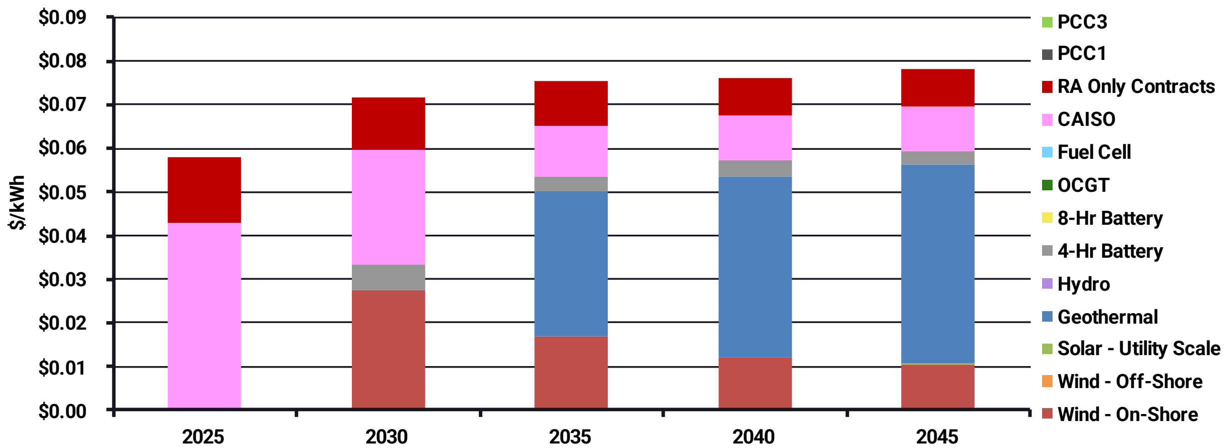
Analysis carried out for this IRP identified around 120 MWs of onshore wind will need to be procured over the 2025-2030 period. This is in addition to the roughly 44 MW of utility scale solar PPAs already procured and the 20 MW of planned front of the meter (FTM) battery storage installation. MVU is ramping up our capacity and capability over the coming years to ensure we can achieve the above targets.

Rate Impacts

In line with the obligations set out in PUC Section 9621, MVU evaluated the cost implications of the modelled scenarios to ensure minimized impacts on ratepayer bills while meeting environmental, equity, reliability, and regulatory objectives.

MVU's estimated rate impacts under the feasible scenario are reported for resources only in the figure below. The analysis shows that prices are expected to rise in nominal terms from around 6 cents per kWh today to over 7.8 cents per kWh by 2045.

Figure 2 – Forecast Resource Costs by Component ($/kWh) for Feasible Scenario



Source: Energeia

Conclusion and Future Updates

MVU's IRP and the long-term strategies outlined in this report are designed to ensure sustainable, reliable, and affordable service through 2045. The Feasible w/Low Demand scenario offers the most balanced and proactive approach to achieving our environmental and equity goals, while maintaining service reliability, and minimizing rate impacts. MVU plans to regularly review and update our IRP to reflect changes in regulations, market conditions, technology, and policy.

Future updates to the IRP are expected to consider additional scenarios, inclusion of different technologies like fuel cell and thermal energy networks, updating spot load methodology to account for load factor and coincident maximum demand, inclusion of forecasted and accurate PPA prices and CAISO prices, inclusion of improved battery optimization algorithm, and more.

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Glossary

Acronym	Definition
AAEE	Additional Achievable Energy Efficiency
AMI	Advanced Metering Infrastructure
BESS	Battery Energy Storage System
BTM	Behind the Meter
CARB	California Air Resource Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
CRAT	Capacity Requirements Assessment Tool
DAC	Disadvantaged Community
DER	Distributed Energy Resources
DSM	Demand-side Management
DR	Demand Response
EBT	Energy Balance Tool
EE	Energy Efficiency
EV	Electric Vehicle
GEAT	GHG Emissions Accounting Table
GHG	Green House Gas
IEPR	Integrated Energy Policy Report
IRP	Integrated Resource Plan
MVU	Moreno Valley Electric Utility
POU	Publicly Owned Utility
PPA	Power Purchase Agreement
PV	Photovoltaic
RA	Resource Adequacy
REC	Renewable Energy Credit
RPS	Renewable Portfolio Standard
RPT	RPS Procurement Table

About Moreno Valley Utility

The City of Moreno Valley

Incorporated on December 3, 1984, Moreno Valley is a vibrant city located in Riverside County, California. Spanning approximately 51.5 square miles, it is home to a diverse population of around 210,000 residents. Nestled in the heart of the Inland Empire, Moreno Valley is strategically positioned near major transportation corridors, including the Interstate 215 and State Route 60, providing easy access to Los Angeles, Orange County, and San Diego.

Moreno Valley boasts a rich cultural heritage and a dynamic community spirit. The city is surrounded by natural beauty, with the Box Springs Mountain Reserve to the north and Lake Perris State Recreation Area to the south. These natural landmarks offer residents and visitors ample opportunities for outdoor activities such as hiking, boating, and camping.

The city is bordered by Riverside to the west, Perris to the south, and Redlands to the east. Moreno Valley is known for its family-friendly neighborhoods, excellent schools, and a growing economy. The city has become a hub for logistics and distribution, attracting major companies like Amazon, Procter & Gamble, and Skechers, which have established large distribution centers in the area.

About Moreno Valley Utility

Moreno Valley Utility (MVU) is the city-owned electric utility, established in 2001 to provide reliable and affordable electricity to our residents and businesses. MVU has a growing customer base with currently serving over 9,100 customers, including residential, commercial, and industrial sectors delivering over 223,000 MWhs per year. The utility is committed to delivering high-quality service and maintaining a robust and resilient electrical grid.

MVU’s mission is to enhance the quality of life for Moreno Valley’s residents by ensuring a reliable power supply, promoting energy efficiency, and supporting the city’s economic development. The utility offers various programs and incentives to encourage energy conservation, including rebates for energy-efficient appliances, solar panel installations, and electric vehicle charging stations.

MVU is dedicated to sustainability and clean energy. The utility has made significant investments in renewable energy sources, like solar, to reduce our carbon footprint and support California’s ambitious climate goals. MVU also participates in regional energy initiatives and collaborates with neighboring utilities to enhance grid reliability and integrate more renewable energy into the power supply.

Community Engagement and Future Plans

MVU actively engages with the community through educational programs, public workshops, and partnerships with local organizations. The utility is focused on modernizing infrastructure, incorporating advanced technologies like smart meters and grid automation to improve service reliability and operational efficiency.

Looking ahead, Moreno Valley Utility aims to expand our renewable energy portfolio, enhance energy storage capabilities, and support the city’s growth by providing innovative energy solutions. MVU is committed to fostering a sustainable future for Moreno Valley, ensuring that the community continues to thrive with a reliable and environmentally responsible energy supply.

Outcomes from the 2018 IRP Recommendations

In the 2018 Integrated Resource Plan (IRP), MVU outlined several strategies to strengthen our resource portfolio. The IRP aimed for a total solar supply of 107,214 MWh by 2025 and wind supply of 18,983 MWh by the same year. It also included the implementation of energy storage starting in 2024, with a planned annual increase of 2 MW and an additional 8 MW scheduled for 2030. MVU also established specific solar procurement targets: 15 MW in 2020, 12 MW in 2023, and 13 MW in 2026. Recognizing the growing impact of electric vehicle (EV) adoption, MVU identified the need to develop infrastructure to support a projected 2.3 MW increase in peak demand driven by EV charging requirements.

In the last five years, MVU has initiated five power purchase agreements (PPAs) from solar facilities; Astoria 2, Whitney Point, Antelope, Gaskell, and Golden Fields. As part of these agreements, MVU will acquire a combined total of 44 MW of utility scale solar capacity in 2025 with around 15 MWs each coming from the Gaskell and Golden Fields facilities.

MVU has also installed nine utility-owned charging stations, while Tesla has deployed additional stations along Cactus Avenue. Looking ahead, MVU plans to install five charging stations at the City Yards, partially funded through a State of California grant. Over the next two years, MVU's capital improvement projects will add approximately 40 chargers at City facilities. Additionally, commercial partners have expressed strong interest in expanding charging infrastructure at their privately owned sites. To accelerate this effort, MVU offers incentive programs to support the rapid deployment of private charging stations. We anticipate that commercial entities will contribute approximately 100 new charging stations to the City each year.

Statutory Drivers and Regulatory Factors

For nearly twenty years, California's legislature has proposed and enacted numerous Assembly Bills (ABs) and Senate Bills (SBs) aimed at addressing climate change and requiring significant reductions in greenhouse gas (GHG) emissions relative to levels recorded in 1990. This collection of legislation has laid the groundwork for subsequent laws that significantly change how electric utilities operate throughout the state and has guided MVU's Integrated Resource Plan (IRP). One of the most significant measures is the Renewable Portfolio Standard (RPS), which establishes targets for increasing the share of renewable and zero-carbon energy in MVU's resource mix.

Additional laws have further supported these mandates, including:

- Providing incentives for customer-generated energy, primarily from rooftop solar panels.
- Implementing standards for cap-and-trade initiatives aimed at reducing GHG emissions.
- Enhancing energy efficiency programs and demand-side management initiatives funded by the Public Benefits surcharge.
- Developing infrastructure for electric vehicle charging stations and improving the permitting process.
- Streamlining participation in energy storage markets.

Greenhouse Gas Emission Reduction Statutes

A number of legislative measures have mandated significant reductions in greenhouse gas (GHG) emissions, with specific targets established for 2020, 2030, 2045, and 2050.

Assembly Bill 32: The California Global Warming Solutions Act of 2006 requires GHG emissions to be reduced to the levels recorded in 1990 by 2020. The California Air Resources Board (CARB) is tasked with coordinating and implementing the overall climate change strategies. Additionally, CARB is responsible for monitoring compliance and enforcing regulations through a system that allows utilities to report and self-verify their emissions reductions. CARB has also established regulations for the "Mandatory Reporting of Greenhouse Gas Emissions" and a "Cost of Implementation Fee Regulation."

Senate Bill 350: The Clean Energy and Pollution Reduction Act of 2015 introduced specific GHG emission reduction targets of 40% below 1990 levels by 2030 and 80% by 2050. The substantial impact of SB 350 meant that it did not take effect until 2020, nearly five years after its enactment.

Senate Bill 32: This legislation, which builds on the provisions of AB 32, was enacted in 2016 to codify the emission reduction levels established in SB 350, aiming for a 40% reduction in GHG emissions below 1990 levels by 2030 and an 80% reduction by 2050. CARB is responsible for ensuring that California achieves these objectives.

Assembly Bill 197: This act was passed in 2016 and mandates that CARB create regulations aimed at maximizing GHG emission reductions in a cost-effective way, prioritizing reductions from large stationary and mobile sources.

Assembly Bill 1279: Known as the California Climate Crisis Act of 2022, AB 1279 set a statewide goal for achieving carbon neutrality within twenty years. This bill advanced GHG reduction targets by requiring an 85% decrease from 1990 levels by 2045, with the expectation to sustain that reduction thereafter. It also included a provision for updating the RPS requirement (see page 3-5).

Senate Bill 12 of 2023: Introduced in late 2022 and currently under discussion, this bill proposes to enhance the existing GHG reduction goal of "40% reduction from 1990 levels by 2030" to a more ambitious target of a 55% reduction.

California RPS Statutes

Five legislative acts have established various objectives for transitioning from carbon-based energy generation to renewable and zero-carbon resources, with RPS targets beginning in 2013 and reaching key milestones in 2030 and 2045.

Senate Bill X1-2: The California Renewable Energy Resources Act of 2011 significantly reformed California's RPS by introducing three new targets applicable to all retail electric providers in the state, including publicly owned utilities (POUs), investor-owned utilities (IOUs), energy service providers (ESPs), and community choice aggregators (CCAs). This legislation defines compliant resources, sets goals and minimum increases over time for a specific percentage of retail sales, and specifies the location and delivery points for renewable resources. The established RPS targets are:

- 20% of retail sales by the end of 2013
- 25% of retail sales by the end of 2016
- 33% of retail sales by the end of 2020 and beyond

MVU's governing body, the City Council, is responsible for enforcing these requirements in collaboration with the California Energy Commission (CEC), while CARB has specific enforcement authority.

Senate Bill 350: The Clean Energy and Pollution Reduction Act of 2015 introduced new objectives to enhance air quality and public health, reduce GHG emissions to mitigate climate change, and expand clean energy initiatives. Signed into law in 2015 and effective from 2020, this bill set California's renewable energy procurement goals at 33% by 2020 and 50% by 2030, with the latter target required to be sustained in the future. It also includes interim goals of 40% RPS by 2024 and 45% RPS by 2027. Starting in 2021, at least 65% of RPS procurement must come from long-term contracts of 10 years or more.

This bill specifies renewable and zero-carbon energy sources supporting the RPS goals. Renewable energy encompasses generation from solar, wind, geothermal, small hydroelectric, municipal solid waste, biofuels (biodiesel, biomass, and biomethane), fuel cells using renewable fuel, and hydrokinetic energy (including ocean thermal energy conversion, ocean wave, and tidal current). Zero-carbon generation, which does not emit climate-altering greenhouse gases, includes large hydroelectric and nuclear technologies.

Senate Bill 100: The 100 Percent Clean Energy Act of 2018, passed in 2018, accelerated the RPS outlined in SB 350 to ensure that at least 60% of California's electricity comes from renewable sources by 2030. This percentage must be maintained at or above 60% from 2030 onward. Furthermore, SB 100 mandates that renewable energy generation and zero-carbon resources supply 100% of retail electricity sold in California by 2045. Although not explicitly mentioned in SB 100, combustion resources powered by biofuels or hydrogen derived from renewable sources are classified as zero-carbon resources.

Additionally, while all retail electricity sales must come from renewable and zero-carbon resources by 2045, power losses from transmission and distribution lines (due to heat) can still be supported by fossil fuel-generated electricity.

Lastly, SB 100 requires the CEC, the California Public Utilities Commission (CPUC), and CARB to implement programs under existing laws to achieve 100% clean electricity and to publish a joint policy report on SB 100 by 2021, with updates every four years thereafter.

Assembly Bill 1279: The California Climate Crisis Act of 2022 set a statewide goal for achieving carbon neutrality no later than 2045 and beyond.

Senate Bill 1020: The Clean Energy, Jobs, and Affordability Act of 2022, introduced in September 2022, added interim goals to the clean energy mandates established in SB 100. SB 1020 requires that eligible renewable energy and zero-carbon resources provide 90% of all retail electricity sales to California end-users by December 31, 2035, and 95% by December 31, 2040. Additionally, all electricity supplied to California state agencies must come from renewable and zero-carbon energy resources by the end of 2035.

Transportation Electrification

Senate Bill 350: The Clean Energy and Pollution Reduction Act of 2015 mandated that Publicly Owned Utilities (POUs) develop multi-year programs and make investments to promote widespread transportation electrification. This initiative aims to decrease reliance on petroleum, comply with air quality standards, meet electric vehicle (EV) charging station objectives, and lower greenhouse gas (GHG) emissions. The CPUC, in collaboration with CARB and the CEC, is responsible for approving these programs and their associated investments.

Assembly Bill 1236: This legislation was passed in 2015 and required local governments to implement ordinances that establish an expedited and streamlined permitting process for EV charging stations, following criteria outlined in the Permitting Electric Vehicle Charging Stations Scorecard.

Senate Bill 1000: The Land Use Safety and Environmental Justice Act of 2016 mandates that the CEC evaluate the distribution of EV charging infrastructure, particularly direct current fast charging (DCFC) stations, to determine if they are deployed equitably based on population density, geographic area, and income levels (low, middle, and high).

Assembly Bill 2127: This bill passed in 2018 instructed the CEC to evaluate the existing EV charging infrastructure to assess its effectiveness in supporting the state's goal of adding at least five million zero-emission vehicles (ZEVs) by 2030 and achieving a 40% reduction in GHG emissions compared to 1990 levels by the same year.

Assembly Bill 970: This legislation passed in 2021 elaborated on the provisions set forth in AB 1236 by clarifying the permitting process for EV charging stations and establishing deadlines for application acceptance.

Impact on Resource Planning

These regulatory requirements not only shape the day-to-day operations of Publicly Owned Utilities (POU) like MVU, but also influence long-term resource planning strategies. The interplay of legislative mandates creates both challenges and opportunities for MVU to meet its goals, while ensuring reliable and affordable energy service for all customers.

The regulatory framework serves as a critical foundation for MVU's Integrated Resource Plan (IRP). Adhering to these mandates will ensure compliance with state and federal regulations while advancing our commitment to sustainability, resilience, and customer service.

Planning Horizon

Study Period

The planning horizon for Moreno Valley Electric Utility (MVU)'s Integrated Resource Plan (IRP) spans 20 years from 2025 to 2045. This extended timeframe goes beyond the CEC required[9] 10-year planning scope, allowing MVU to consider longer-term trends, advancements in technology, evolving policies, and future energy needs. By adopting a more strategic approach, MVU can be proactive in our resource procurement strategies while meeting state-mandated renewable energy targets at least cost to the utility and MVU's ratepayers.

RPS Obligations

In line with the requirements of Senate Bill 100 (SB100)[10], the IRP sets forth a plan to achieve 44% renewable energy by December 31, 2024, 52% by December 31, 2027, 60% by December 31, 2030, and 100% carbon-free electricity by 2045. To meet these Renewable Portfolio Standard (RPS) mandates, the utility will establish annual renewable energy targets for the duration of the study period. These targets will be achieved using a combination of existing renewable energy resources, new power purchase agreements (PPAs), and Renewable Energy Credit (REC) purchases. The annual RPS targets serve as constraints in the utility's resource planning, ensuring compliance with renewable energy mandates while maintaining reliability in energy supply.

MVU's Goals

MVU's overarching planning goals for this IRP are maintaining reliability, cost-effectiveness, resource diversity, equity, environmental responsibility and managing key risks:

- MVU provides reliable service to customers by ensuring that energy supply can meet demand at all times, even under environmental or operational contingencies
- MVU is prioritizing energy efficiency measures, customer demand-side programs and behind-the-meter resources, including solar PV and battery storage, where cost-effective, to manage future load growth in the most economical way possible
- A diverse energy portfolio that incorporates renewable, carbon-free, and flexible generation resources is essential to ensure that the utility can meet both daily and seasonal energy demands

We have undertaken a risk assessment to identify and mitigate potential risks in our IRP, including potential over-reliance on immature technology, potential variations in spot loads, PPA and/or REC prices, and uncertain BTM program outcomes

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[9] California Energy Commission, *POU Integrated Resource Plan Guidelines*, Section 1.2.2, which sets forth that the minimum planning horizon begins no later than the year of adoption and extends through at least 2030. Available at: CEC IRP Guidelines.
[10] California Senate Bill 100 (2018). Retrieved from California Legislative Information, Chapter 312, Statutes of 2018 (Accessed October 23, 2024).

Stakeholder Engagement

Stakeholder engagement is an essential part of MVU's IRP process. MVU's IRP stakeholder engagement plan includes engaging with City Council and the local Utility Commission to ensure the IRP reflects the needs and concerns of the community and MVU stakeholders. Feedback from these groups has been incorporated into the scenario development and analysis phases, helping to guide MVU towards a resource portfolio that balances reliability, affordability, equity, and sustainability.

Scenario Analysis

Risk management plays a central role in MVU's IRP development process. To mitigate certain risks like feasibility, demand uncertainty, and technology advancement, MVU employed scenario analysis to evaluate different resource portfolios under varying risk conditions. By modeling multiple scenarios, MVU ensures that the chosen portfolio is resilient, cost-effective, and compliant with environmental regulations.

Modeled Scenarios

To evaluate MVU's future context and the associated optimal resource portfolios, four scenarios were developed (in consultation with key MVU staff and stakeholders) addressing the most significant, future uncertainties and risk factors:

- **Feasible** – Utility scale solar, onshore and offshore wind, and 4 and 8-hour battery storage resources were considered to meet an expected 5.05%[11] compound annual growth rate (CAGR) in annual consumption up to 2030, geothermal was considered after 2030, due to it not being deemed a realistic resource to plan for before then.
- **Feasible w/Low Demand** – The same resource considerations were used as the Feasible scenario, but a lower, 3.06%[12] CAGR, assumed for annual consumption and slower spot load ramp time.
- **Feasible w/High Behind-the-Meter (BTM) Resources** – The same resource considerations were used as the Feasible scenario but assumed a 10% increase in BTM solar photovoltaic (PV) and storage adoption.
- **Feasible w/High Demand** – The same resource considerations were used as for the Feasible scenario but with an assumed increased in underlying and electrification demand by 10%[13] and an acceleration of the spot load ramp rate.

After careful evaluation and analysis, MVU selected the Feasible w/Low Demand resource portfolio to take forward at the present time to meet future energy demand at the lowest possible cost while ensuring compliance with regulatory requirements and environmental goals.

This IRP contains a detailed implementation timeline for the selected scenario, which outlines the key milestones and actions required to procure new resources, retire existing assets, and upgrade infrastructure. This roadmap will guide MVU in executing our long-term strategy and ensuring that it remains on track to meet our energy goals.

[11] The 5.05% compound annual growth rate (CAGR) is derived from the annual system consumption (MWh) growth observed between 2019 and 2023.
[12] Low Demand scenario CAGR reduction based on 2022 CEC Integrated Energy Policy Report (IEPR) forecast growth rate difference between the low and medium demand scenarios for Southern California Edison (SCE)
[13] 10% was selected based on a review of other POU IRPs.

Results of Scenarios

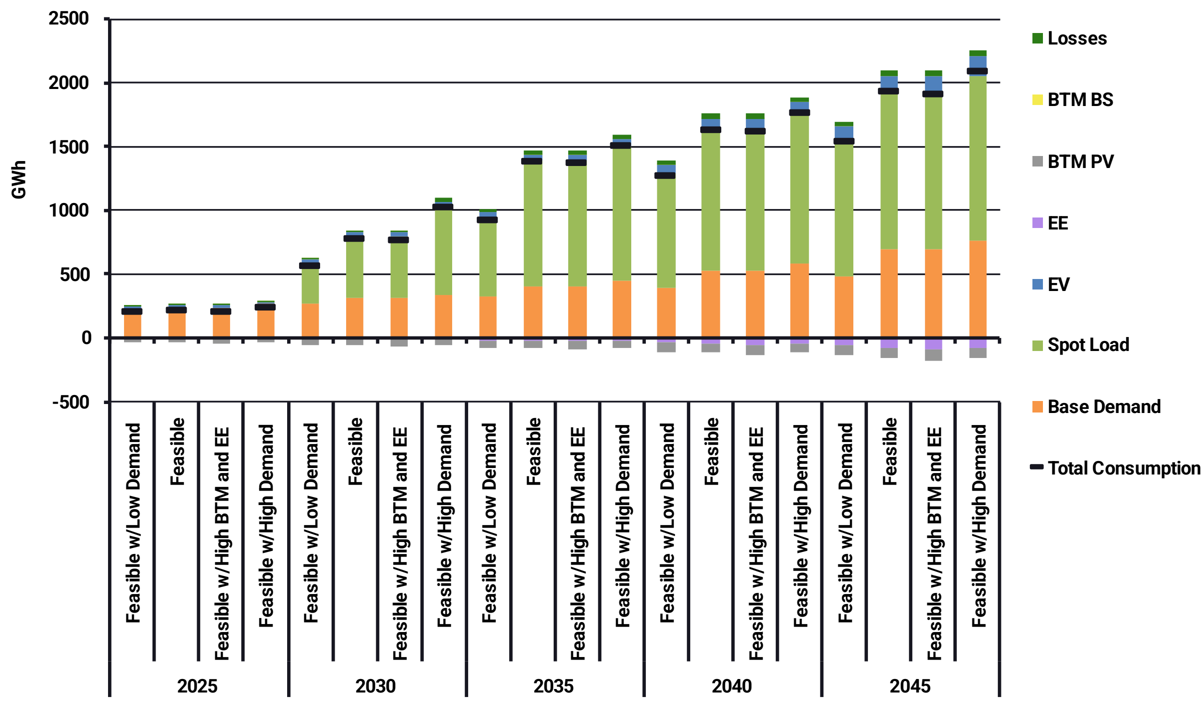
While each met state RPS and resource adequacy (RA) mandates, each scenario yielded different resource portfolio compositions over time. The variations in demand and supply scenarios, in turn, led to different rate impacts.

Consumption

The figure below reports on the forecast consumption by scenario over the planning period.

While each of the non-Feasible scenarios modifies system demand, the most impactful scenario parameters are modifications to the spot load growth assumptions. The figure below shows that after 2025, spot loads account for over 50% of the total system annual consumption (in GWh). This means the scenario parameters that shift spot load growth timing will have the greatest impact on expected future demand and by consequence the level and mix of energy resources across scenarios. Feasible w/Low Demand has the slowest spot load growth, which, coupled with a lower CAGR assumption for base demand growth, make it the lowest total annual consumption scenario year-over-year by at least 20% after 2025.

Figure 3 – Annual Consumption (MWhs) by Driver and Scenario



Source: Energeia

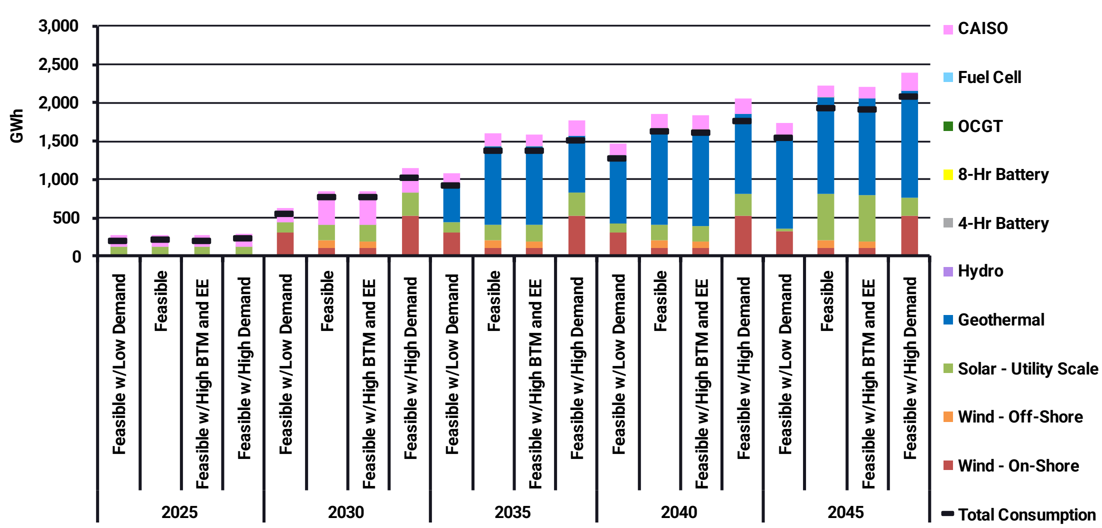
Generation

Generation every five years is shown below by resource type against the consumption in the year.

The Feasible w/Low Demand and Feasible w/High Demand scenarios show similar resource adoption through the forecast period, largely driven by differences in resource mix value stacking for different load shapes and levels of total demand. The two scenarios show high uptake of on-shore wind and 4-hr battery capacity from 2025-2030 with geothermal taking over as the primary resource adopted from 2030-2045. In this optimization model, geothermal is an ideal resource because while it has one of the highest capex and opex costs, it has a relatively high-capacity factor profile that complements MVU's system demand shape, meaning that less total nameplate capacity MWs are required compared to other resources to meet the same amount of demand. By contrast, the Feasible and Feasible w/High BTM and EE scenarios show high solar and 8-hr battery storage, and small amounts of off-shore wind adoption. The similarity in adoption strategy is again driven by similar demand and load shapes between the two scenarios. Similarities in system demand can be seen in the annual consumption graphic above, where Feasible and Feasible w/High BTM and EE scenarios have nearly identical levels of total annual consumption while the Feasible w/Low Demand and Feasible w/High Demand scenarios are a step size lower and higher respectively.

Generation after 2030 is higher relative to annual consumption largely because it is often cheaper to finance the construction and ownership of a resource vs purchasing energy through CAISO markets and meeting RPS obligations through purchases of Renewable Energy Credits (RECs). This strategy also reduces the amount of RA-only contracts needed to fulfill RA requirements. Since renewable energy source generation shapes aren't load following, purchasing enough capacity to meet demand at certain periods can result in low demand periods during which generation supply is greater than the system energy demands. While this IRP does not consider the potential benefits of selling excess renewable energy and RECs to the market, in future IRPs MVU will look to add market participation as a capacity seller to the portfolio optimization.

Figure 4 – Annual Generation (MWhs) by Resource and Scenario

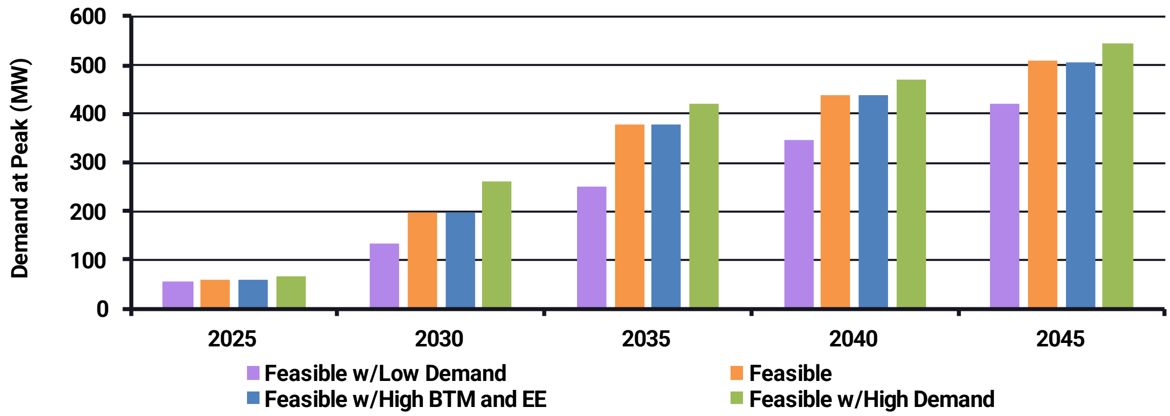


Source: Energeia

Peak Demand

Peak demand forecast by scenario is shown in the figure below. The results mirror the annual consumption results, where demand under the Feasible w/High Demand is marginally higher than the Feasible and Feasible w/High BTM and EE scenarios due to a 10% scaling of base demand and modest differences in spot load growth ramp forecasts, while the demand under the Feasible w/Low Demand scenario is notably lower, due to the smaller CAGR applied annually to the base load and notable differences in spot load growth ramp forecasts..

Figure 5 – Annual System Peak Demand (MWs) by Scenario



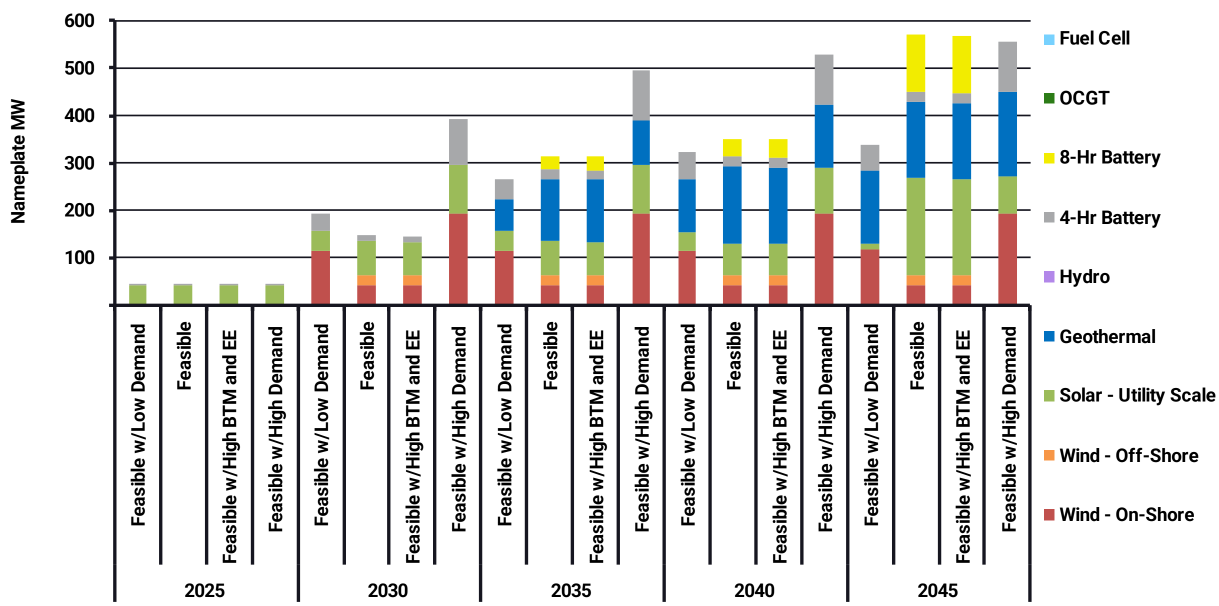
Source: Energeia

Capacity

The figure below displays the least cost resource configurations every five years over the planning horizon needed to meet RPS targets over time.

Similar relationships amongst scenarios shown in the annual consumption graphics remain true here. In particular, Feasible and Feasible w/High BTM and EE scenarios show similar resource adoption strategies, where system demand is met with a combination of on-shore wind, a small amount of utility-scale solar, 4-hr battery and geothermal adoption (after 2030). Likewise, Feasible w/Low Demand and Feasible w/High Demand show similar resource adoption strategies, where small amounts of on-shore wind, off-shore wind, more utility-scale solar, 8-hr battery and geothermal adoption (after 2030). The adoption of 8-hr batteries for these two scenarios complements in the high levels of utility-scale solar adoption, allowing energy generated during the middle of the day to be shift solar shoulder periods.

Figure 6 – Annual Nameplate Capacity (MWs) by Resource and Scenario

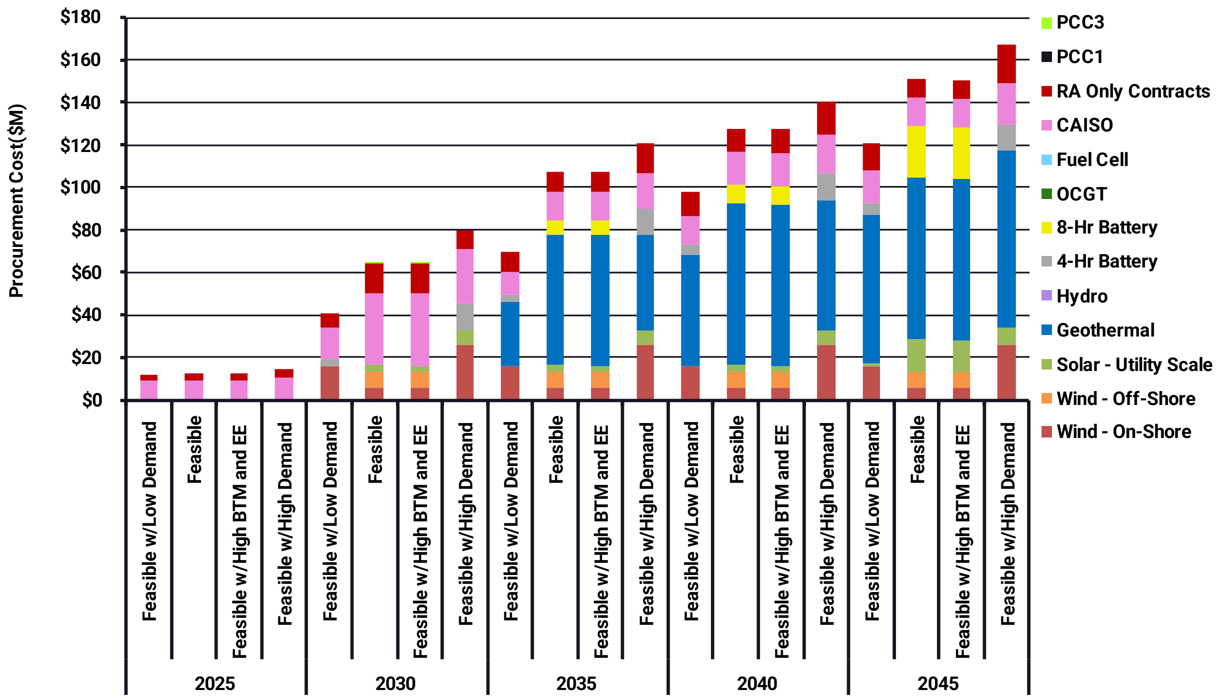


Source: Energeia

Rates

The impact of the scenario assumptions around consumption and resource options on total expenditure is shown below for the resource portion only. It includes the cost of RECs, PPAs, projects and CAISO spot market costs. The figure below shows annual costs for each year on the x-axis, not cumulative costs up to each year. There are no Portfolio Content Category 1 or 3 RECs purchased in any of the forecast years because MVU's forecasted procurement of renewable resource exceeds our RPS obligation. See the Resource Procurement Plan section of the IRP for more reporting on MVU's optimized resource portfolio compared to RPS targets.

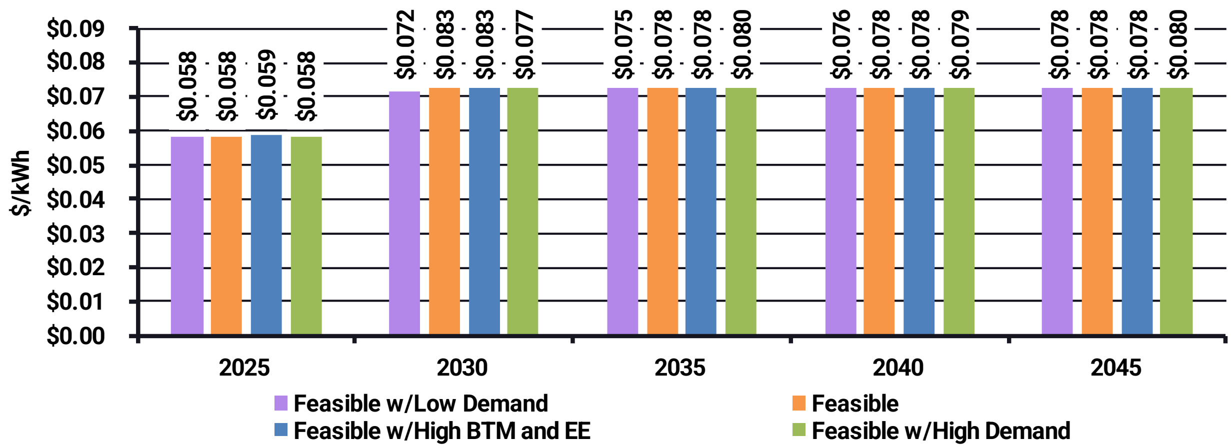
Figure 7 – Annual Expenditure on Resource Procurement by Strategy



Source: Energeia

Rate impacts, in $ per kWh of demand added, are only marginally different across scenarios each year. The Feasible w/Low Demand scenario is the cheapest option across the forecast period because the least cost solution for the higher demand scenarios results in purchasing of more resource that, while being least cost, has a load shape that isn't completely complementary to the system demand shape. This results in overgeneration, which can be seen in the annual consumption graphics above.

Figure 8 – Average Cost of Resources ($/kWh) by Scenario



Source: Energeia

Selected Scenario

While the Feasible scenario uses historical base load growth rates, MVU selected the Feasible w/Low Demand scenario because the adjusted CAGR separates out the expected spot loads from base load growth and utilizes a more realistic spot load growth progression than the other scenarios.

Demand Forecast

MVU's demand forecast aligns with the requirements set forth in Public Utilities Code (PUC) Section 9621. This forecast is informed by the California Energy Demand Forecast prepared annually as part of the Integrated Energy Policy Report (IEPR) and MVU's internal analysis performed by Energeia, reflecting MVU's unique operational landscape.

While MVU's demand forecast considers statewide trends outlined by the IEPR, including load modifying resources, Energeia performed an independent analysis to tailor the underlying demand projections more closely to MVU's specific context.

MVU has utilized the California Public Utility Commissions Clean System Power Calculator (CSP) to estimate the hourly load shapes by demand modifying resources and leverage the IEPR forecasted demand modifier market share as a percent of total managed sales. The two are combined with the forecasted base demand to estimate what the hourly demand needs will look like given a diverse mix of demand modifiers.

In addition to the forecasts provided in the following sections, MVU's peak demand forecast is also inserted into the Capacity Requirements Assessment Tool (CRAT) to comply with the CEC's peak demand reporting requirements.

Methodology, Inputs and Assumptions

MVU's key peak demand, coincident peak demand and energy demand methodologies, inputs and assumptions are detailed in the following sections.

Energy Demand Forecast

The Energy Demand Forecast reflects total consumer electricity consumption in a given year including electrical losses, measured in megawatt-hours (MWh).

MVU's Energy Demand Forecast trends historical underlying, weather adjusted consumption, net of load modifiers, and adds spot loads to it, which are also trended at the underlying, weather adjusted consumption trend rate. For this IRP, the underlying, weather adjusted consumption growth rate was estimated to be 5.05% per annum, based on the last 10 years of actual consumption.

Annual spot load consumption was estimated by sizing a representative load profile to the load's given contribution to MVU's system peak demand in a given year. This resulted in an hourly load profile over the year, which was summed to obtain the annual energy demand.

Load modifiers were forecast based on the percentage ratios to the underlying baseline demand in the CEC's CSP tool, including energy efficiency, BTM storage and other demand-side management (DSM) resources.

BTM PV generation was derived from an internal MVU forecast based on historical BTM BV generation growth and expected future penetration potential.

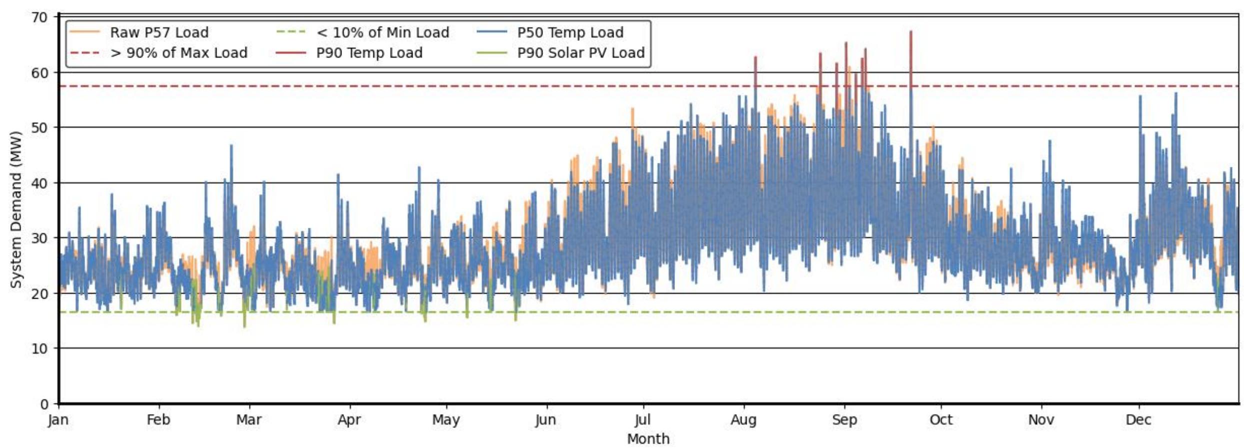
The underlying baseline consumption level, plus spot loads, plus load modifiers are added together to get the final annual Energy Demand Forecast.

Demand Profile Forecast

MVU's annual hourly load profile (8760 profile) was estimated each year by taking the latest 8,760 profile from 2023, weather normalizing it to reflect P50 weather, except for load above 95% of peak demand or below 10% of peak demand, which was normalized to P90 weather and P90 solar PV levels, respectively.

The resulting 8760 profile is depicted in the graphic below, highlighting the underlying raw demand, the P50 adjusted demand, as well as the P90 adjusted demand in the peak period, and the P90 solar adjusted demand in the minimum demand period.

Figure 9 – Annual Hourly Weather Corrected System Load (Illustration)



Source: Energeia

The weather normalized 2023 load was then grown each year based on the compound annual growth rate (CAGR) based on 2019-2023 system growth. For the Low Demand scenario, a CAGR of 3.6% was used instead, in line with the CEC's 2021 IEPR demand forecast for Southern California Edison under the medium vs low demand scenarios.

The above approach is used to provide a weather normalized load across the 8760 profiles, which is essential for accurately modeling resource requirements in 2045, when all loads must be served by zero carbon resources. It is also used to estimate system peak demand, as well as demand during California's annual and monthly peak times, which drive MVU's resource adequacy (RA) obligation.

The CEC's CSP tool was used to obtain 8760 estimates of load modifiers in terms of ratio percentages to underlying demand by year, as well as the 8760 shapes of them by year. These were then scaled to MVU's baseline demand, to estimate the underlying or gross demand for each year of the forecast.

Resource Procurement Plan

MVU has developed the following Resource Procurement Plan (the Plan) to deliver the resources identified as optimal under the Feasible scenario. The Plan addresses procurement of a diversified portfolio consisting of both short-term and long-term electricity, electricity-related, and demand response products. By doing so, it aligns with the CEC guidelines[14], ensuring that MVU can sustainably provide reliable power while adhering to state regulations.

Regulations and Requirements

SB 350[4], SB 100[15], and the California Public Utilities Code (PUC) Section 1297 set out the resource mix requirements over the period to 2045.

Table 1 – RPS Targets

Year	Requirement/Target	Associated Policies
2024	40% Renewable Retail Sales	SB 350
2025	65% of Renewable Retail Sales to come from PPAs	SB 350
2027	45% Renewable Retail Sales	SB 350
2030	50% RPS	SB 350
2030	60% RPS	SB 100
2045	100% renewable and zero carbon	SB 100

Source: CEC

SB 350 allows POUs to meet up to 10% of their RPS obligation using PCC3 RECs.

In 2025, MVU's existing solar Power Purchase Agreements (PPAs) cover our RPS obligation.

From 2026 – 2030, MVU plans to strategically invest in RPS eligible PPAs such that the RPS obligation is met through PPAs.

From 2030 – 2045, MVU plans to consider least cost options between PPA purchases and resource construction to meet the RPS requirements.

MVU's policy is to purchase 105% of our RPS obligation, to ensure it is always in compliance, and to meet up to 10% of our RPS obligation using REC3s.

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[14] California Senate Bill 350 (2015). Retrieved from California Legislative Information, Chapter 547, Statutes of 2015 (Accessed October 23, 2024) https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

[15] California Senate Bill 100 (2018). Retrieved from California Legislative Information, Chapter 312, Statutes of 2018 (Accessed October 23, 2024) https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

Resource Procurement Plan

MVU's Resource Procurement Plan reflects the least cost portfolio of resources under the Feasible w/Low Demand scenario.

The Plan was optimized using various forecast, notably:

Resource costs from NREL's Annual Technology Baseline (ATB),16 which included capital expenditure (capex), fixed and variable operating expenditure (opex)

Renewable Energy Credit (REC) prices by REC type (i.e. PCC1, PCC2, and PCC3)

Electricity wholesale market prices, at the SP15 CAISO Default Load Aggregation Point (DLAP)

Resource capacity factors by renewable resource type from the CPUC Resource Data Table (RDT)[17] tool and CPUC Monthly ELCCs[18]

Resource generation profiles for each renewable resource type from the CEC's Clean System Power Calculator (CSP) tool

MVU excluded nuclear from the portfolio of considered zero carbon resources. It did include Renewable Natural Gas (RNG) and Green Hydrogen fueled Combined Cycle Gas Turbines and Fuel Cells as part of the portfolio, along with 4 and 8 hour batteries.

MVU's plan for procuring resources is reported for each 5-year planning cycle in the figure below to 2045. Whether or not MVU will secure these resources via projects, PPAs or RECs will depend on market pricing at the time.

Analysis carried out for this IRP identified roughly 250 MWs of onshore wind resources will need to be procured over the 2025-2030 period. MVU is ramping up our capacity and capability over the coming years to ensure they will be achieved.

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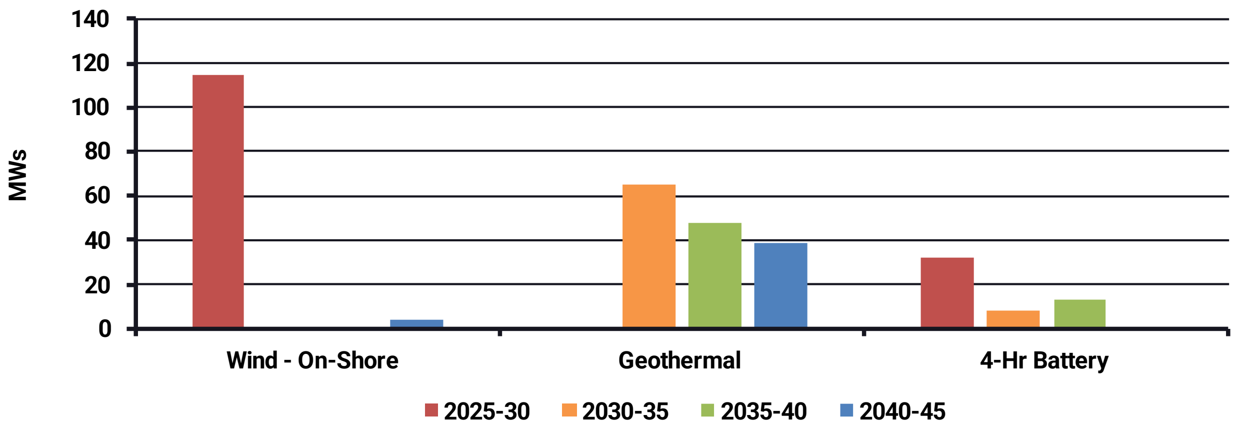
[16] National Renewable Energy Laboratory (NREL), *Annual Technology Baseline (ATB)*, which includes cost data for renewable. Available at: https://atb.nrel.gov/ (Accessed October 23, 2024)
[17] California Public Utilities Commission (CPUC), 2022 Integrated Resource Planning (IRP) Cycle Events and Materials, which includes resource data for long-term procurement planning. Available at: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials (Accessed November 27, 2024)
[18] California Public Utilities Commission (CPUC), Revised Effective Load Carrying Capability (ELCC) Proposal, which outlines updated methodologies for ELCC calculations. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/r/6442452545-revised-elcc-propsal-2-14.pdf (Accessed November 27, 2024)

Figure 10 – Resource Purchases by 5 Year Planning Phase

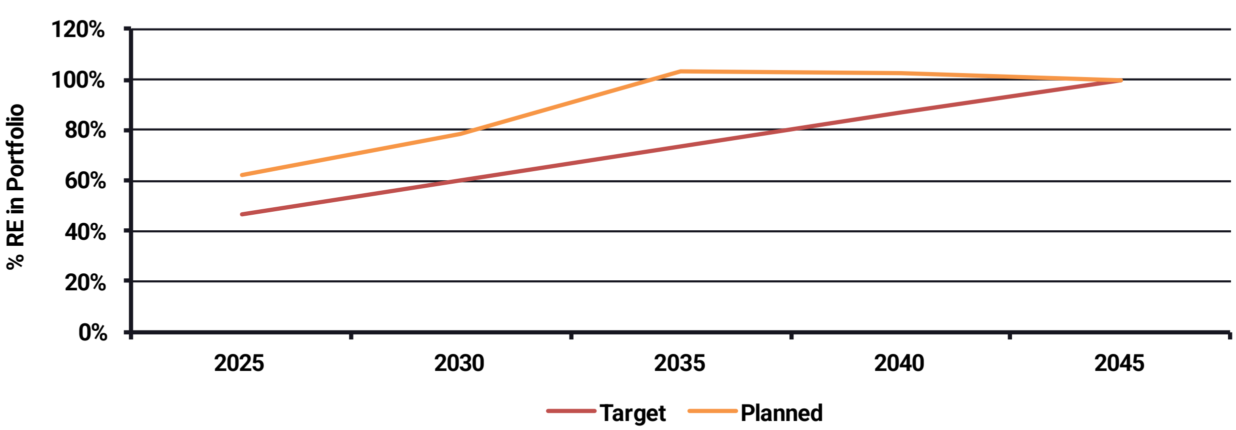


Source: Energeia

As demonstrated by our analysis and reporting in this IRP, MVU's Resource Procurement Plan ensures a diversified, affordable, equitable and reliable energy supply, compliant with the RPS and internal requirements, that also minimizes risks to ratepayers.

The figure below reports on the estimated RE generation as a percentage of our target over time using the above Resource Procurement Plan. We are over generating renewable energy throughout the forecast period because of the cost effectiveness of financing the construction and ownership of renewable energy as opposed to purchasing energy from CAISO and meeting RPS targets using REC purchases and the reduced reliance on RA-only contracts. Our energy needs are thus met through the ownership of renewable energy, as opposed to reliance on RECs to meet RPS requirements.

Figure 11 – Renewable Energy Generation vs. Targets for the Feasible w/Low Demand Scenario



Source: Energeia

MVU plans to update the RPS procurement plan at regular intervals, although the frequency and substance of these updates remain at the sole discretion of MVU. These updates will reflect adjustments based on market conditions, policy changes, technological advancements, and the evolving needs of the utility and the customers.

Energy Efficiency and Demand Response

In alignment with the requirements of PUC Section 9621, MVU's IRP includes procurement targets for Additional Achievable Energy Efficiency (AAEE) and demand response (DR) resources in accordance with PUC Section 9615.

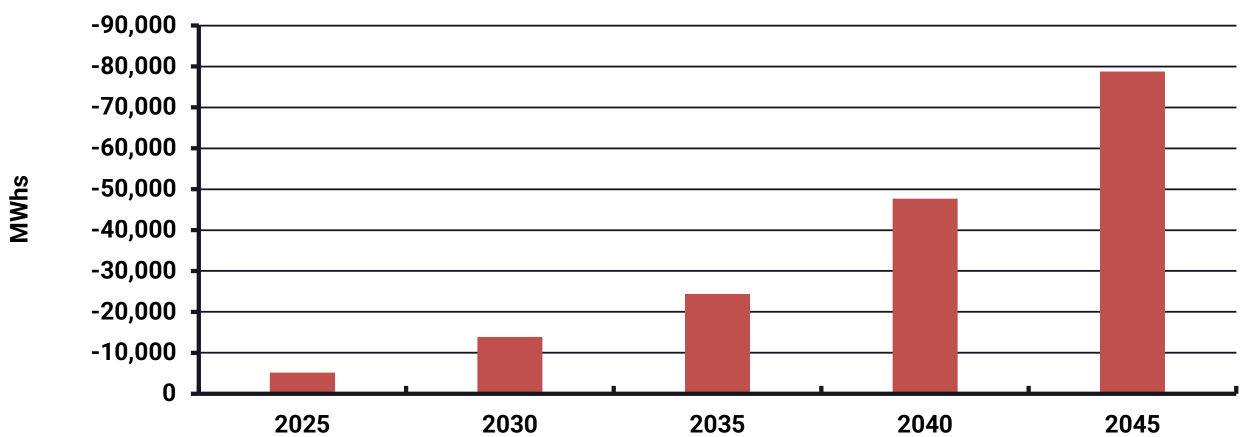
MVU utilized the CPUC's CSP tool to identify the level of AAEE and DR by year, as well as their expected impact on MVU's 8760 profile, and therefore its system peak and coincident peak demand to 2045.

In accordance with SB 350, which mandates a cumulative doubling of statewide energy efficiency savings by January 1, 2030, MVU integrates the California Energy Demand Updated IEPR Forecast, 2030-2040, into our energy planning.

AAEE Targets

The figures below report on the targeted levels of EE by year under the feasible scenario for each 5-year planning period. As we are relying on the IEPR ratios to underlying demand, the targets largely follow changes in our underlying consumption forecast.

Figure 12 – Energy Efficiency Targets (MWhs)



Source: Energeia

AAEE Delivery Plan

MVU currently offers a range of EE programs tailored to our residential customers:

- Our *Getting Really Energy Efficient Now* (GREEN) program provides financial support for energy-saving upgrades. Under this initiative, each eligible household can receive up to $4,000 to cover the costs of installing energy-efficient equipment such as whole-house fans, smart thermostats, solar screens, and high-efficiency HVAC systems.
- Our Residential Energy Efficiency Program includes energy audits, appliance rebates, and incentives for heat pump tune-ups and replacements. These efforts aim to help households reduce energy consumption, lower utility bills, and contribute to the broader community goals of sustainability and environmental stewardship.

MVU also offers a variety of commercial energy efficiency programs aimed at businesses:

- Our Commercial Energy Efficiency Program includes rebates for retrofitting HVAC systems, lighting upgrades, and motor replacements. MVU incentivizes businesses to install energy-efficient equipment that meets or exceeds California's Title 24 standards.
- Our Direct Install Program provides small to medium-sized businesses with energy audits and free energy-saving equipment, covering costs up to $3,000 per site. Businesses can also access rebates for LED lighting retrofits, HVAC tune-ups, and other energy-efficient improvements.
- For more advanced projects, such as chiller and motor replacements, we offer specific rebates based on annual energy savings, encouraging businesses to upgrade to more efficient systems. These initiatives not only help local businesses save on their energy bills but also support the community's broader sustainability goals by reducing overall demand on the grid.

Achieving our targeted growth in AAEE over the forecast period will require a significant increase of our program breadth and width. We are in the process of reviewing what a best practice program of EE is given our demand outlook, which will form the basis of our resourcing and procurement plan over the coming years.

While MVU currently does not offer a similar suite of DR programs, we are in the process of developing them. We will be reviewing best practice DR programs in California and developing a strategy and plan over the coming years, which will enable us to meet our target DR resources in this IRP.

Calculating and Reporting on Impacts

Our analysis shows EE programs reduce retail energy sales by approximately 677 GWhs over the period, save our consumers $289,971 per annum in resource costs over the period.

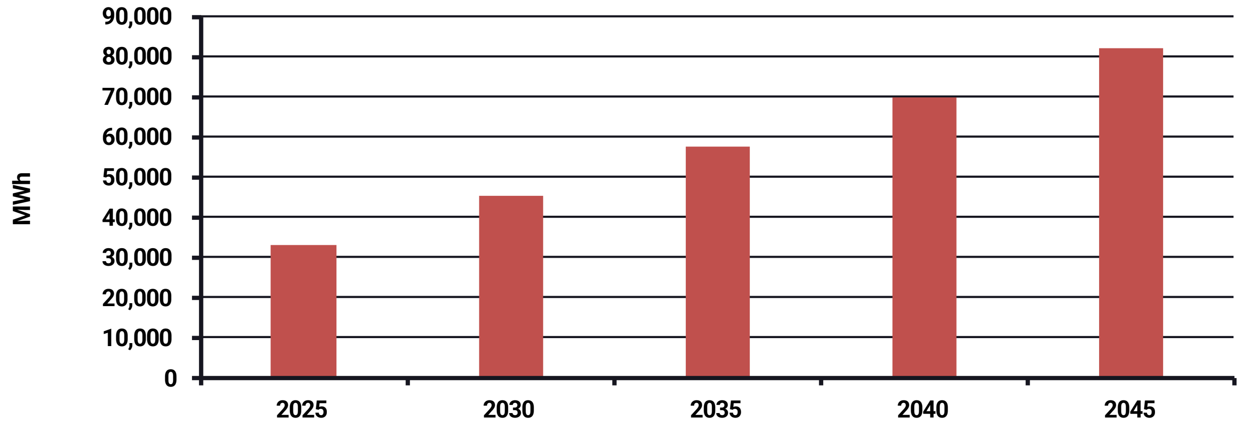
Customer Solar

MVU currently has roughly 17 MW of behind the meter (BTM) installed solar capacity and we expect this number to continue to rise over the next 10-20 years.

MVU plans to enable additional BTM solar adoption through technology rebates for both commercial and residential customers in the near future. By reducing upfront cost barriers and ensuring equitable rate structures are available to customers, MVU expects solar uptake to continue to climb through 2045.

In future IRPs, MVU will update forecast BTM solar capacity and demand impacts based on updated historical and forecast data, including a summary of how MVU-led programs have impacted uptake rates.

Figure 13 – Behind the Meter (BTM) Solar Targets (MWhs)



Source: Energeia

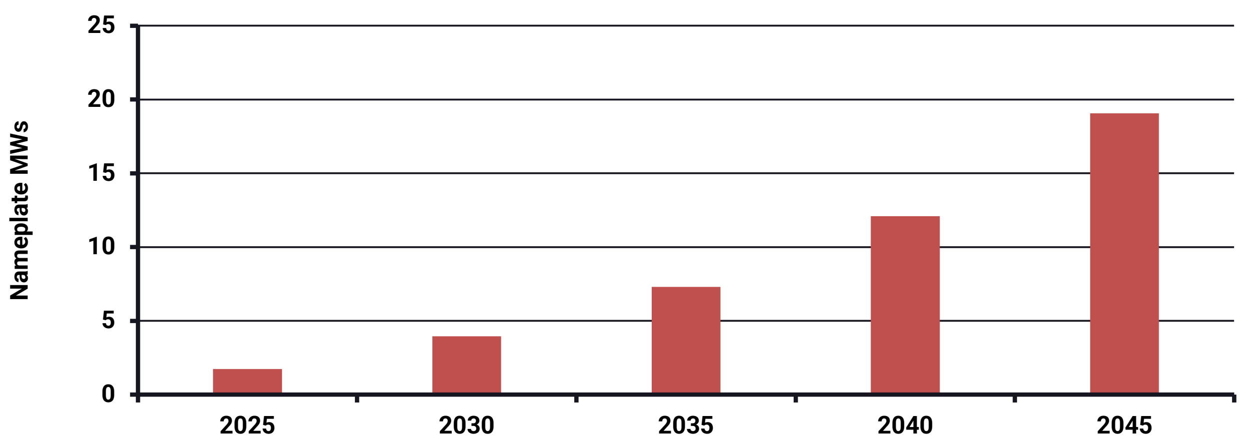
Energy Storage

Energy storage from both BTM and front of the meter (FTM) resources is an important element in MVU's long-term plan to address future energy needs and support grid reliability. While not required by external mandates, MVU is evaluating FTM energy storage options to ensure it can meet demand fluctuations, integrate renewable energy resources, and enhance system flexibility. Energy storage helps balance supply and demand, particularly with the increasing deployment of intermittent renewable energy sources such as wind and solar.

Storage Targets

MVU has included 4 and 8-hour FTM battery storage as options in our analysis of least cost resource portfolio given scenario settings. Additionally, MVU has forecast BTM battery storage impacts using a BTM storage growth assumption, as a function of manage electricity sales (MWh), from the CPUC’s Clean System Power (CSP) Calculator. The figure below shows that by 2045, close to 20 MWs of nameplate BTM battery storage capacity is forecasted to be connected within MVU’s territory resulting in roughly 4.5 GWh of discharge.

Figure 14 – Storage Targets (MWs)



Source: Energeia Analysis

Storage Delivery Plan

MVU is in the process of procuring our first Battery Energy Storage System (BESS). We will be developing a battery storage strategy and plan, and ramping up our battery capabilities and capacities in the coming years.

Storage Impacts

Our modeling shows that the target level of battery storage will optimally reduce solar exports and expected curtailment while also providing RA, maximizing the overall efficiency and affordability of our renewable energy portfolio.

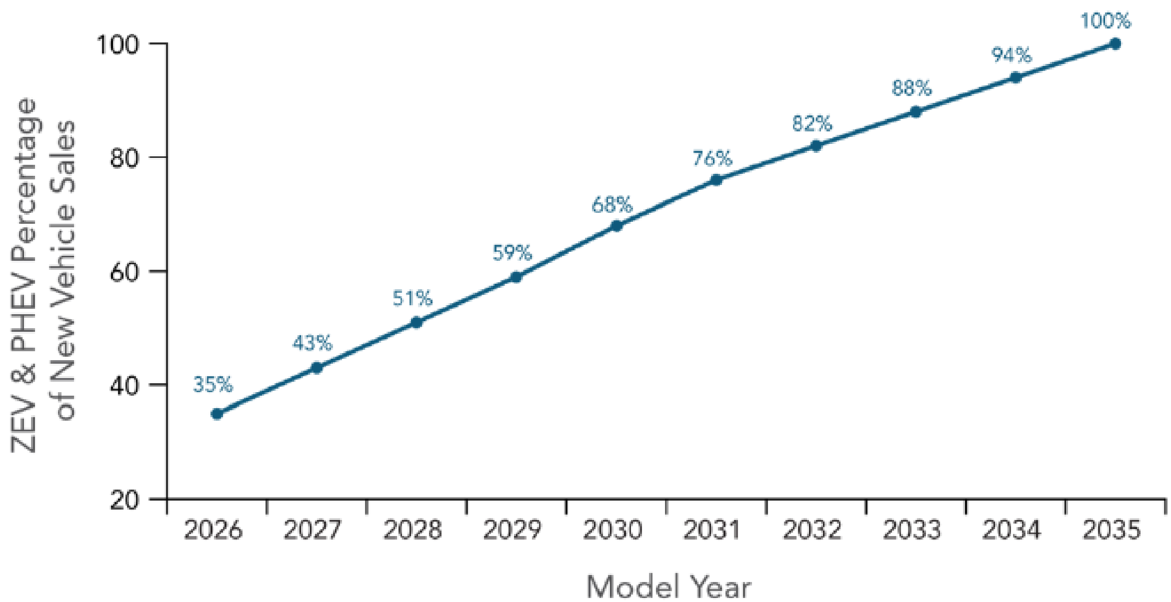
Transportation Electrification

PUC Section 9621 requires IRPs to address procurement for transportation.

Transportation Electrification Targets

Fleet electrification is a key component of Moreno Valley's transportation strategy. Currently, 60% of the city's fleet consists of electric, plug-in hybrid, or hybrid vehicles, with propane-powered forklifts replaced by electric models. The city is committed to further expanding our electric vehicle fleet to comply with California targets listed below and continues investing in zero-emission vehicles, reinforcing our sustainability objectives.

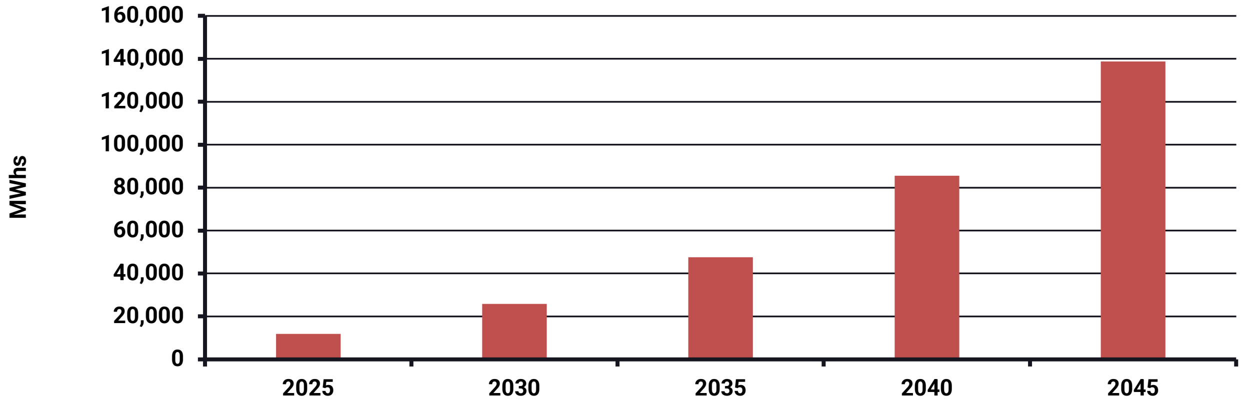
Figure 15 - California Vehicle Mandate per ACC II



Source: California Air Resources Board (CARB)

In addition to the fleet electrification targets, MVU is targeting to achieve electrification rates consistent with California's mandates, which are estimated for MVU on a pro-rata basis using data from the IEPR and reported in the figure below.

Figure 16 – Transport Electrification Targets (Annual MWhs)



Source: Energeia

Transportation Electrification Delivery Plan

To achieve the target rate of EV adoption, Moreno Valley is investing in public charging infrastructure, developing attractive EV charging rates and managing charging programs suitable for DR activities, including:

- By 2030, the City of Moreno Valley is projected to host over 18,000 EVs, necessitating the installation of more than 400 public and shared private charging ports. This requirement is expected to grow significantly, exceeding 2,100 ports by 2050. Moreno Valley is exploring partnerships with local businesses and property owners to facilitate the deployment of workplace and fleet charging solutions. This initiative aims to provide technical assistance and support for businesses integrating EV infrastructure, enhancing the availability of charging options throughout the city.
- The city has conducted an in-depth siting analysis to identify optimal locations for EV chargers, using regional trip data and travel demand scores to determine the most suitable types of chargers for each site, whether Level 2 or direct current fast charging (DCFC). To enhance community engagement, the city has sought public input through stakeholder meetings and a public survey, which revealed a strong demand for more accessible charging locations, real-time charger availability information, and prioritization of sites near shopping areas and workplaces. Achieving the significant increase in transport electrification implied by the targets set out above will require an uplift in Moreno's transport electrification capabilities and capacity.

We are in the process of developing a transport electrification strategy and plan for the next five years.

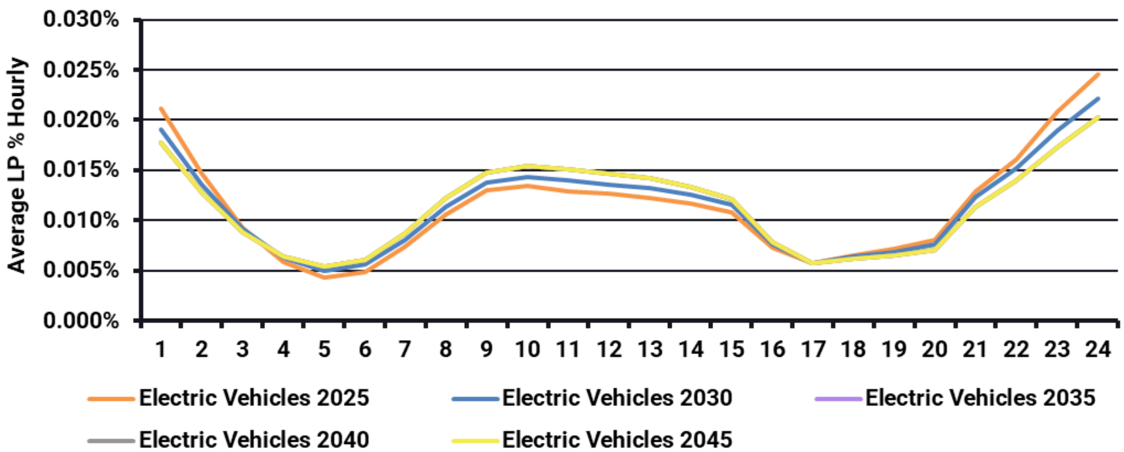
In compliance with state legislation, Moreno Valley will continue to refine our strategies to ensure effective grid integration and support for transportation electrification within our jurisdiction.

Transportation Electrification Impacts

In line with state requirements[19], Moreno Valley submits regular reports on our transportation electrification progress, detailing infrastructure expansion, program participation, and overall impacts on the grid. By tracking metrics such as EV adoption rates, rebate usage, and charging behavior, the city can assess the effectiveness of our strategies and make data-driven decisions for future enhancements. This continuous analysis is crucial for ensuring that transportation electrification delivers both environmental and grid benefits.

The figure below reports on our estimate of transportation charging profiles over the study period. It is based on the transportation electrification 8760 load profiles in the IEPR.

Figure 17 – Transport Electrification Charging Shape Overtime



Source: Energeia

MVU is planning on updating our uptake and impact estimates via a future transportation electrification study. This study will also inform our strategies with respect to program design, including areas of focus, incentive levels and incentive structures

[19] California Air Resources Board (CARB), *Advanced Clean Cars II*, accessed October 2023, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii.

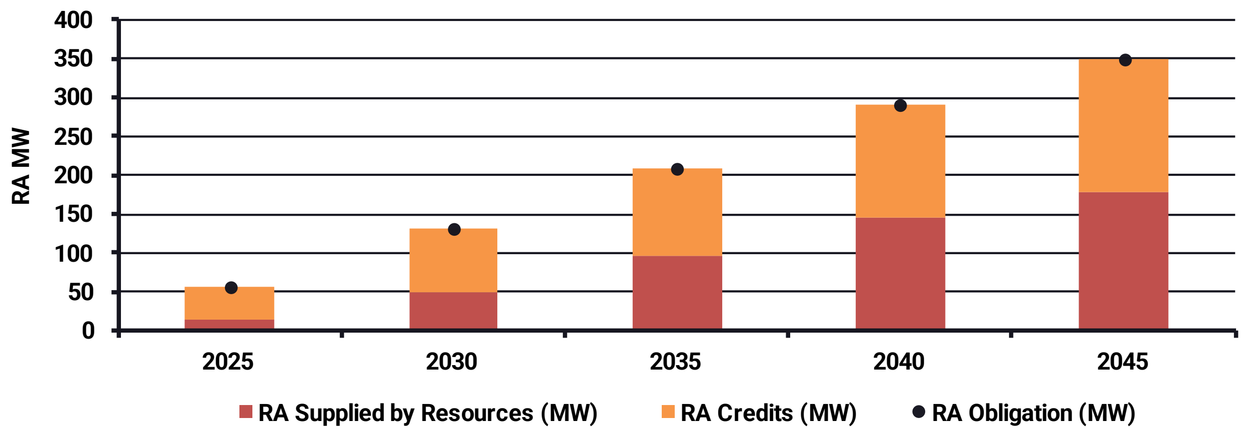
System and Local Resource Adequacy

MVU employs a multi-faceted strategy to comply with RA requirements under PUC Section 9621. This strategy integrates demand-side and supply-side resources, ensuring RA compliance at least cost. MVU monitors and forecasts RA requirements on an annual basis, utilizing demand response programs, interruptible load mechanisms, renewable energy generation and RA certificates to meet these demands most effectively.

System Resource Adequacy

The figure below shows MVU's planned RA strategy over the forecast period for the selected scenario.

Figure 18 – MVU's RA Strategy Under the Feasible w/Low Demand Scenario



Source: Energeia

On the supply side, MVU plans to utilize a diverse mix of resources, including utility-owned renewable generation and energy storage. On the demand side, AAEE and DR will be used to minimize Moreno's RA obligations. RA certificates will be purchased to meet any shortfalls where it is the most cost-effective option.

MVU uses a comprehensive approach to meet reliability requirements, aligned with PUC Section 9621 mandates. To ensure that the grid operates efficiently and dependably, MVU forecasts annual peak demand and employs both demand-side and supply-side measures to manage system load. Demand response programs, interruptible load options, and the deployment of renewable resources are key components in balancing capacity with consumption.

Local Resource Adequacy

No local resource adequacy requirements have been identified.

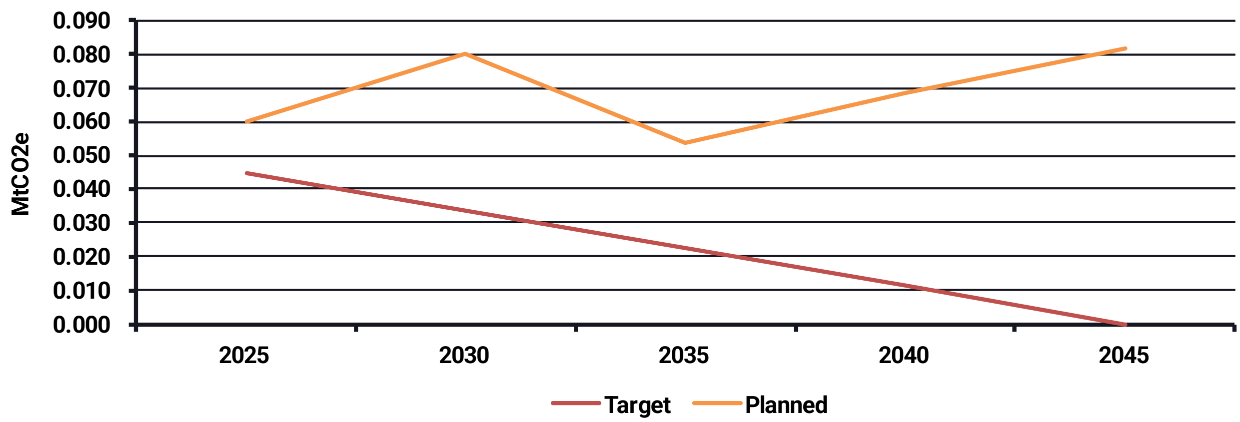
Greenhouse Gas Emissions

PUC Section 9621 requires POUs to meet the GHG emissions reduction targets established by CARB, which occurred at its July 26, 2018, board meeting.

Although MVU is not yet required to meet these obligations, this section outlines MVU's expected future pro-rata GHG reduction targets, delivery plan and supporting information.

The figure below shows MVU's GHG targets over time, and the level of emissions that our Resource Plan will generate. We assume a constant CAISO market purchase emissions factor of 0.428 Mt CO_2e/MWh through the forecast period, consistent with the value used by CARB for unspecified power[20]. The emissions factor associated with market purchases may decrease over time due to renewable energy adoption and should be reevaluated during the next iteration of the IRP.

Figure 19 – Forecast GHG Emissions vs Expected Future Targets (MtCO2e)



Source: Energeia

MVU continues to work on our GHG emission strategy and plan, including consideration of resource portfolios that would meet our expected GHG obligations. We plan to update our IRP to achieve our expected future GHG targets in future IRPs.

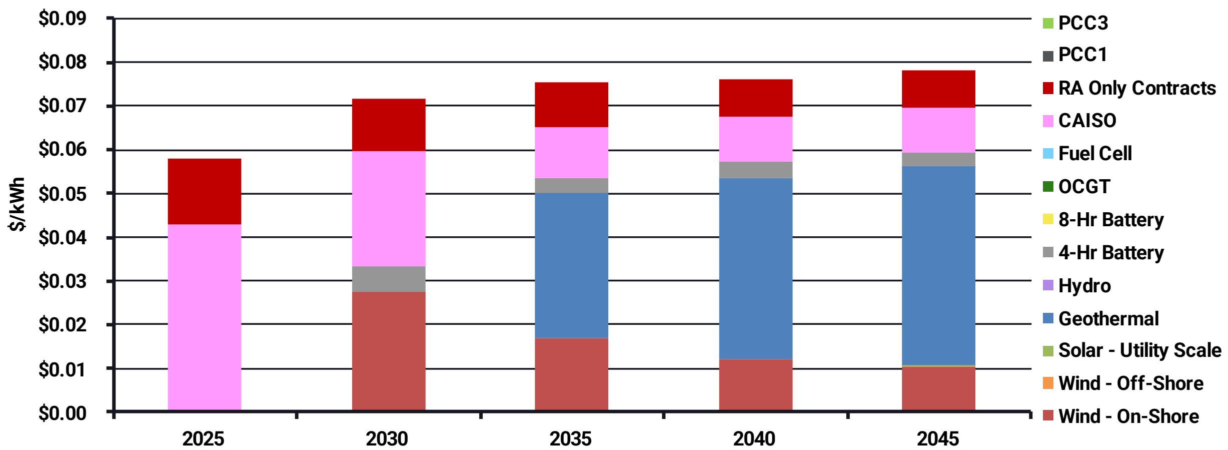
[20] California Energy Commission (CEC), Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines, which specifies "All energy procured that cannot be tracked back to a specific generation source will be assigned an emission intensity of 0.428 Mt CO2e/MWh, consistent with the value used by CARB for unspecified power imported from out of state" on page B-11. Available at: https://www.energy.ca.gov/rules-and-regulations/energy-suppliers-reporting/clean-energy-and-pollution-reduction-act-sb-350-0

Retail Rates

In line with the obligations set out in PUC Section 9621, MVU evaluates the cost implications of our IRP to ensure they minimize impacts on ratepayer bills while meeting environmental, equity, reliability and regulatory objectives.

MVU's estimated rate impacts for this IRP are reported for resources only in the figure below. The analysis shows, for the selected scenario, that prices are expected to rise in nominal terms from around 6 cents per kWh today to roughly 7.8 cents per kWh by 2045.

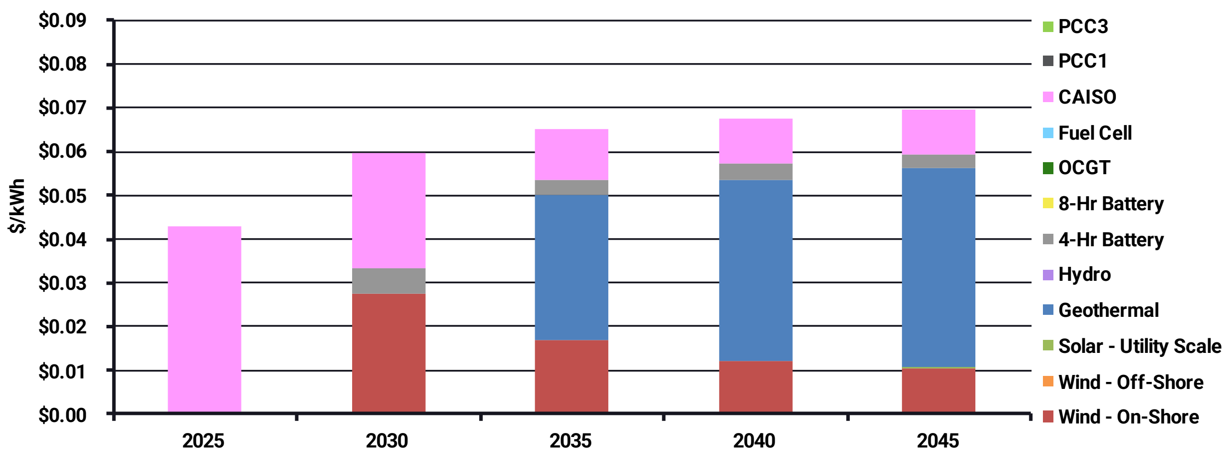
Figure 20 – Forecast Resource Costs by Component ($/kWh) for Selected Scenario



Source: Energeia

As California rolls out the RA slice-of-the-day framework, the above RA cost calculation may change in the future. To account for this risk, the figure below illustrates forecast resource costs if the RA obligation is removed from the $/kWh calculation. By 2045, the value per kWh is roughly 7 cents per kWh, or 0.8 cents per kWh cheaper.

Figure 21 – Forecast Resource Costs by Component ($/kWh) for Selected Scenario w/o RA



Source: Energeia

Bulk Transmission System

Under PUC Section 9621, utilities must prioritize a reliable bulk transmission system that facilitates both load-serving and the integration of renewable resources to meet state policy goals. FERC's Order No. 1000 also guides our transmission planning process, mandating that POUs engage in regional transmission planning to address reliability concerns and promote efficient and cost-effective upgrades to transmission infrastructure.

MVU follows California Independent System Operator (CAISO) guidelines for grid reliability standards and planning requirements. For instance, CAISO's Transmission Planning Process (TPP) requires regular assessments of potential reliability risks and identifies necessary upgrades for incorporating renewable generation into the grid. Through CAISO's annual TPP, MVU is committed to tracking and implementing transmission upgrades where necessary to align with on-line dates for new renewable generation resources, as mandated under SB 100.

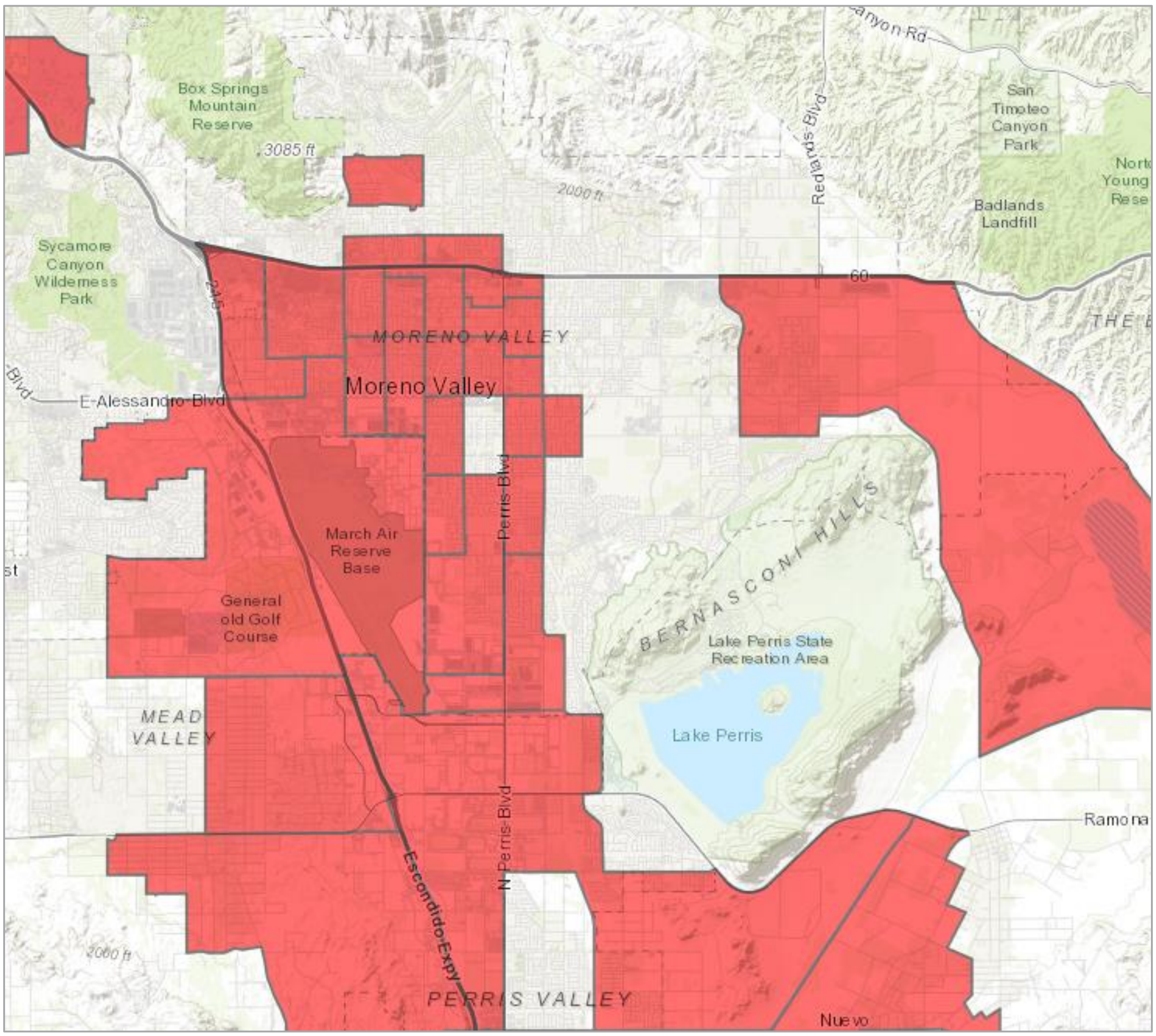
Although it is early days with respect to our resource development process, MVU is not aware of any bulk transmission system upgrades needed to support the achievement of our IRP.

We will continue to monitor our bulk transmission system impacts and needs over successive IRPs, ensuring adherence to these regulatory requirements and proactive compliance with any necessary upgrades in coordination with CAISO and regulatory agencies.

Localized Air Pollutants and Disadvantaged Communities

MVU is committed to addressing the impacts of localized air pollution in areas where Disadvantaged Communities (DACs) and Low-Income Communities (LICs) reside. These communities have been identified using the California Communities Environmental Health Screening Tool (CalEnviroScreen), developed by CalEPA. This tool evaluates census tracts based on geographic, socioeconomic, public health, and environmental hazard criteria to identify areas most impacted by pollution and environmental burdens. MVU uses the CalEnviroScreen to determine which areas in our service territory qualify as DACs. As shown in the figure below, several census tracts designated as DACs in Moreno Valley are affected by their proximity to highways, industrial operations, and the nearby Air Force base, which contribute significantly to air pollution.

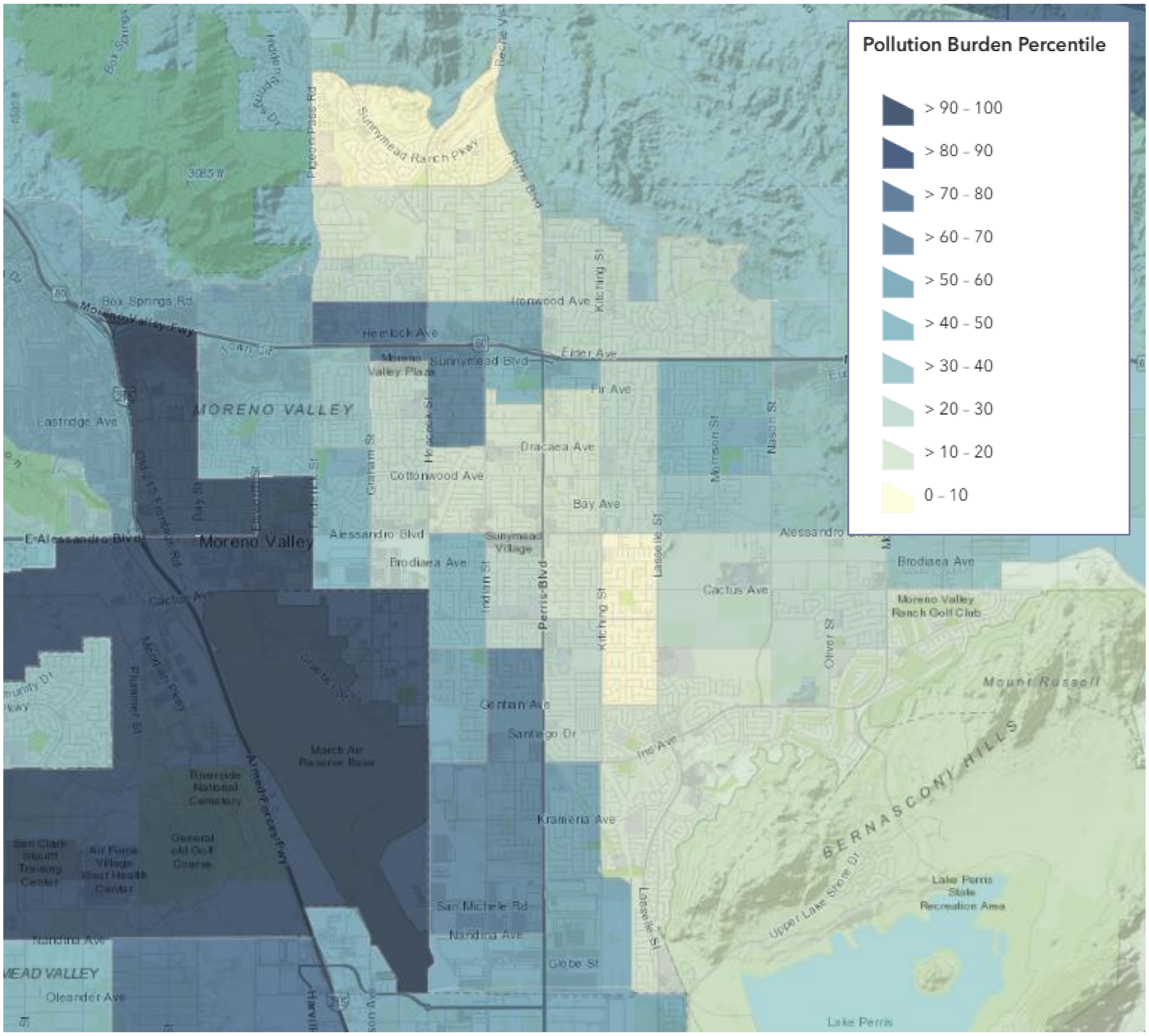
Figure 22 – SB 535 Disadvantaged Communities Map



Source: CalEnviroScreen 4.0, SB 535

As shown in the figure below, transportation corridors, particularly major highways, are primary sources of pollutants like nitrogen oxides (NOx) and particulate matter (PM), which disproportionately impact nearby DACs. Additionally, emissions from military operations at the Air Force base contribute to elevated pollution levels in adjacent communities.

Figure 23 – Pollution Burden by Census Block in Moreno Valley



Source: CalEnviroScreen 4.0

Key Strategies

As part of California's CALeVIP 2.0 program, certain rebates for EV charger installations are specifically targeted at sites located within DACs or LICs. A DAC in this program is defined as an area scoring in the top 50% of the CalEnviroScreen 4.0 tool, while LICs include census tracts where the income is below 80% of the statewide median, or areas classified as low-income by the Department of Housing and Community Development (HCD). Higher rebates are available for charger installations in these communities, further incentivizing infrastructure development in areas where they can make the greatest environmental and economic impact.

MVU is actively working to reduce the impact of emissions on our DAC and LIC customers through initiatives that promote the adoption of electric vehicles (EVs) and the development of charging infrastructure. By expanding EV infrastructure, especially near DACs and LICs, MVU aims to reduce emissions from gasoline and diesel vehicles, directly benefiting communities impacted by transportation-related pollution.

In future IRPs, MVU will evaluate how different IRPs tangibly impact the identified DACs above in terms of pollution reductions but also bill impacts.

Impact on Disadvantaged Communities

By focusing on emissions reductions from transportation and energy production, MVU's initiatives are designed to deliver significant improvements in air quality for DACs and LICs. Expanding EV infrastructure in these areas, particularly around high-traffic transit hubs like the Moreno Valley Mall and Riverside University Health System Medical Center, will reduce NOx, sulfur oxides (SOx), and PM, leading to better health outcomes for residents. Although parking at the Medical Center is restricted and the area already has more than 30 charging ports, additional installations are prioritized in other transit hubs to support park-and-ride facilities.

Moreover, the shift toward cleaner energy sources such as solar and battery storage will reduce reliance on fossil fuels, further lowering emissions of NOx and other harmful pollutants. These efforts will particularly benefit DACs, which historically bear a disproportionate burden of pollution. CalEnviroScreen 4.0 data highlights specific areas within MVU's service territory that are highly impacted, such as census tracts 6065046700 and 6065042505, both of which rank in the 98th percentile for pollution burden due to factors like traffic, hazardous waste, and socioeconomic vulnerability.

In addition to environmental improvements, the expansion of EV infrastructure and clean energy resources is expected to create local job opportunities in charger installation and maintenance, further benefiting disadvantaged communities by fostering economic development.

By targeting both transportation and energy sectors, MVU's programs aim to enhance public health, promote economic growth, and ensure equitable access to clean energy solutions for DACs and LICs within the service territory.

Appendix A – Weather Normalization

The primary objective of weather normalization is to account for the influence of weather variability on load demand. Abnormal weather conditions, such as extreme temperatures, can cause significant fluctuations in load profiles. To manage this, weather normalization produces an 8760-hour load profile that reflects both typical demand throughout the year and extreme demands during peak and minimum demand hours. This allows us to analyze load behavior under standard weather conditions, providing a clearer picture of demand trends at the system or asset level.

Background

Load demand is inherently sensitive to weather. In this normalization process, we categorize the load profile into specific segments, focusing on the top 10% of peak hours and the bottom 10% of minimum demand hours. These segments are crucial for utility capacity planning, helping utilities balance cost savings with the need to meet both maximum and minimum system demands. By planning for these extreme conditions, utilities can ensure grid stability while optimizing cost efficiency during non-peak periods.

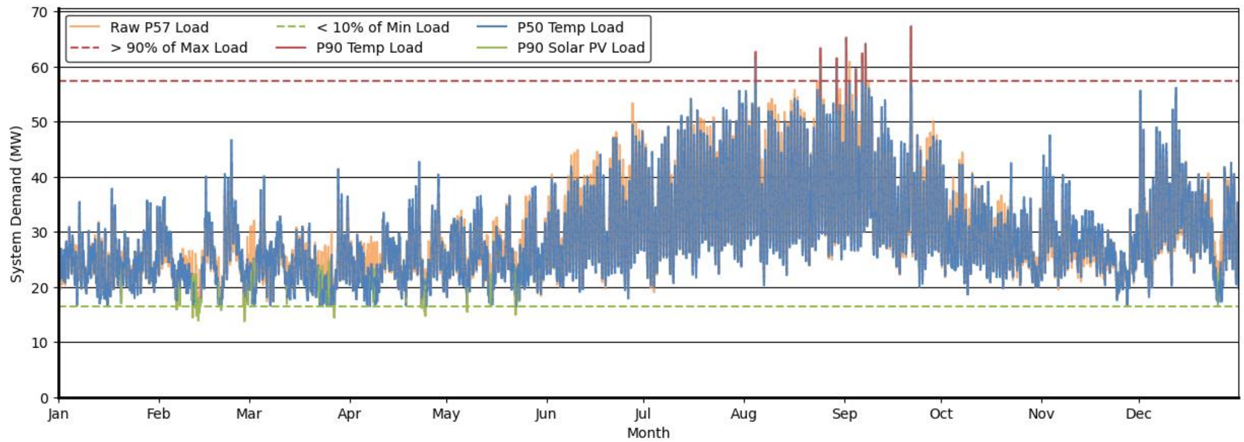
- **Peak Demand Hours**: For high-demand periods, utilities must consider thermal constraints to prevent assets from exceeding their thermal ratings.
- **Minimum Demand Hours**: For low-demand periods, voltage constraints become a primary focus. With high customer solar generation, for example, low demand can lead to voltage issues that require specific interventions to maintain system stability.

Methodology for Normalization

1. **Segmentation by Percentile**: The normalization process leverages percentile-based demand values (e.g., P10, P50, and P90) to capture typical and extreme conditions. Here, “P” indicates the probability of exceedance, with P90 representing the top 10% of demand (peak hours) and P10 representing the lowest 10% of demand (minimum hours).
2. **Regression for Independent Variables**: For each hour in a typical year (8760 hours), we create a unique dataset, incorporating weather-sensitive variables like temperature. Using univariate or multivariate linear regression, we generate coefficients that quantify the relationship between these variables and load demand. The variables with positive correlations to demand (e.g., temperature) are selected for peak demand calculations, while variables with negative correlations (e.g., solar generation) are used for minimum demand calculations.
3. **Weather Insensitive Demand Calculation**: The weather insensitive demand represents what load demand would be under standardized weather conditions. We calculate it by subtracting the weather-sensitive component from the raw demand.
4. **Calculation of P10, P50, and P90 Demands**: Using the weather insensitive demand, we calculate percentile-based demands to represent typical and extreme scenarios.

Using the raw demand for extreme cases ensures that actual conditions are represented if they exceed predictions, providing a robust and realistic 8760 profile that accommodates typical and extreme demand levels. This graph illustrates the weather-normalized load profile across the full 8760 hours of the year, capturing demand under typical weather conditions.

Figure 24 – Annual Hourly Weather Corrected System Load (Illustration)



Source: Energeia

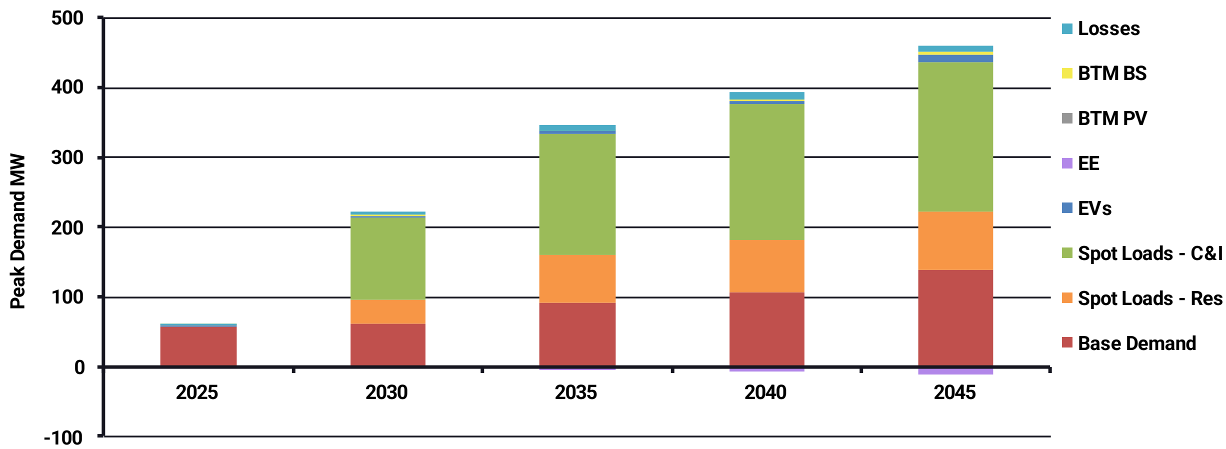
Appendix B – Peak Demand Analysis

Peak Demand Forecast

MVU's Peak Demand forecast represents the maximum instantaneous amount of power consumed over an hour including losses, measured in megawatts (MW), that the system will need to deliver.

The figure below shows the buildup of forecast peak demand over time under the Feasible scenario. The main contributor to the substantial rise in peak demand over the period is forecast spot loads, which ramp up over the next 10 years, and then grow organically from that point at the weather normalized historical trend rate.

Figure 25 – Forecast Contribution to System Peak by Source



Source: Energeia

MVU's annual System Peak Demand forecast was obtained from the 8760 forecasts and has been reported by year in Figure 25.

Coincident Peak Demand Forecast

MVU's Coincident Peak Demand Forecast is the system demand in MW terms during the hour of California's maximum monthly demand.

MVU has calculated the Coincident Peak Demand Forecast using the Demand Profile Forecast and the date stamps from California's 8760 profile provided by the IEPR.

This value is used to determine MVU's resource obligation over time and the associated cost in terms of rate impact.

Appendix C – REC Forecasts

Background and Purpose

In compliance with California's Renewable Portfolio Standard (RPS) and to support MVU's renewable energy goals, accurately forecasting Renewable Energy Credit (REC) prices is critical to our Integrated Resource Plan (IRP). As MVU increases our renewable energy procurement to meet RPS targets, the cost of RECs becomes a significant financial consideration in our long-term budget planning. Our REC price forecasts were provide by a key energy procurement partner and allow MVU to model future costs based on the proportion of PCC1, PCC2, and PCC3 RECs within the portfolio. These forecasts inform our financial planning, helping us anticipate compliance costs and make informed procurement decisions.

The forecasted REC prices were provided with a detailed breakdown for each REC type:

- **PCC1 RECs** are derived from renewable resources connected to the California grid, meeting California's highest RPS compliance standards.
- **PCC2 RECs** are associated with out-of-state renewable generation paired with firmed and shaped energy delivery.
- **PCC3 RECs** include unbundled RECs, often the lowest-cost option but subject to usage limitations under California RPS rules.

The team has taken prices provided by our partner, which forecast up to 2032, and forecasted the prices out to 2045. Our internal REC cost projections assume that the forecasted price trends will remain consistent barring significant policy or market changes. Additionally, the portfolio distribution of PCC1, PCC2, and PCC3 RECs is based on MVU's current procurement plan, with adjustments as needed to meet future RPS requirements.

REC Price Forecast Summary

Table 2 below shows forecasted REC prices for each category, allowing us to track projected price changes by REC type. This breakdown helps MVU optimize our portfolio to manage compliance costs effectively while aligning with California's renewable energy mandates.

Table 2 – REC Prices by Type

REC Prices by Type	2025	2026	2027	2028	2029	2030
PCC1	$73.00	$80.00	$79.00	$58.00	$50.00	$45.00
PCC2	$59.00	$61.00	$58.00	$47.00	$35.00	$30.00
PCC3	$7.50	$7.75	$8.00	$8.00	$8.25	$8.25

Appendix D – RA Prices and Forecasts

As part of the Integrated Resource Plan (IRP), forecasting Resource Adequacy (RA) prices is essential to ensuring compliance with California's RA requirements and accurately modeling future capacity procurement costs.

The RA price forecasted used in the model are in $/kW-mon, and represent the unit cost charged to MVU by the CEC for the difference between RA required MW generation and what MVU actually generates in MW during peak periods. Each month, the MVU's coincident peak demand to the California monthly system peak is identified, and the RA obligation is estimated (in MWs). Following state mandates, a 17%[21] planning reserve margin is onto to forecast MVU coincident demand to ensure adequate resource procurement.

The RA price forecast was derived by trending 2017-2024 historical RA prices from the CPUC's annual RA[22] Report using a logistical regression.

RA prices used in the modeling are shown below, where each column represents a month starting in January.

[21] California Public Utilities Commission (CPUC), Resource Adequacy Homepage. Available at: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/resource-adequacy-homepage (Accessed December 2, 2024).

[22] California Public Utilities Commission (CPUC), *2022 Resource Adequacy Report*. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/2022-ra-report_05022024.pdf (May, 2024).

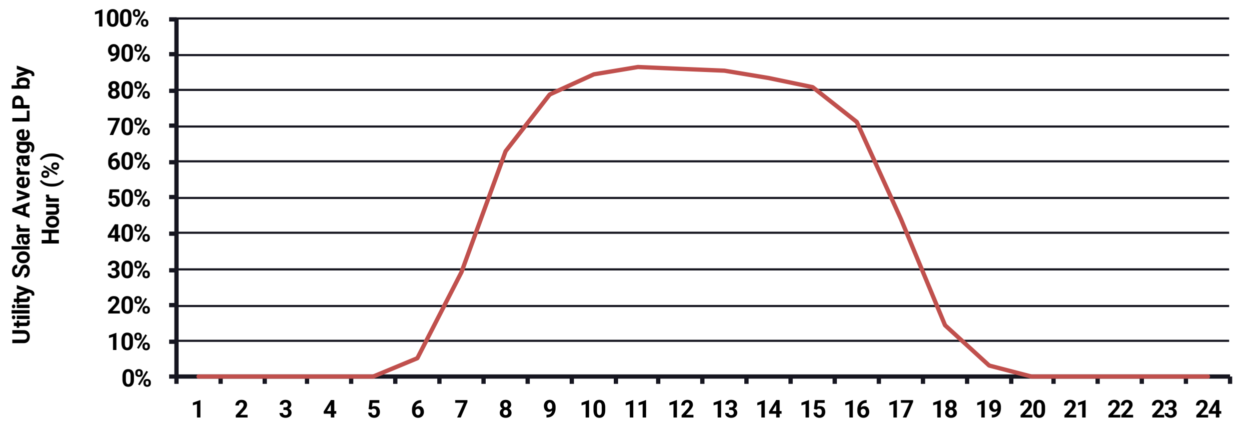
Table 3 – Monthly RA Forecasted Prices ($/kW-month)

Year	1	2	3	4	5	6	7	8	9	10	11	12
2022	$5.9	$5.5	$5.1	$6.1	$7.0	$7.9	$8.4	$8.9	$12.4	$8.5	$7.1	$8.0
2023	$6.3	$5.9	$5.4	$6.5	$7.5	$8.5	$9.0	$9.5	$13.3	$9.2	$7.6	$8.6
2024	$6.7	$6.2	$5.8	$6.9	$8.0	$9.0	$9.5	$10.1	$14.1	$9.7	$8.1	$9.1
2025	$7.0	$6.5	$6.1	$7.2	$8.4	$9.5	$10.0	$10.6	$14.8	$10.2	$8.5	$9.6
2026	$7.3	$6.8	$6.3	$7.5	$8.7	$9.9	$10.4	$11.1	$15.4	$10.6	$8.9	$10.0
2027	$7.6	$7.1	$6.5	$7.8	$9.1	$10.3	$10.8	$11.5	$16.0	$11.0	$9.2	$10.3
2028	$7.8	$7.3	$6.8	$8.1	$9.3	$10.6	$11.1	$11.8	$16.5	$11.4	$9.5	$10.7
2029	$8.1	$7.5	$7.0	$8.3	$9.6	$10.9	$11.5	$12.2	$17.0	$11.7	$9.8	$11.0
2030	$8.3	$7.7	$7.1	$8.5	$9.9	$11.2	$11.8	$12.5	$17.4	$12.0	$10.0	$11.3
2031	$8.5	$7.9	$7.3	$8.7	$10.1	$11.4	$12.0	$12.8	$17.8	$12.3	$10.3	$11.5
2032	$8.6	$8.0	$7.5	$8.9	$10.3	$11.7	$12.3	$13.1	$18.2	$12.5	$10.5	$11.8
2033	$8.8	$8.2	$7.6	$9.1	$10.5	$11.9	$12.5	$13.3	$18.5	$12.8	$10.7	$12.0
2034	$9.0	$8.3	$7.7	$9.2	$10.7	$12.1	$12.8	$13.6	$18.9	$13.0	$10.9	$12.2
2035	$9.1	$8.5	$7.9	$9.4	$10.9	$12.3	$13.0	$13.8	$19.2	$13.2	$11.1	$12.4
2036	$9.3	$8.6	$8.0	$9.6	$11.1	$12.5	$13.2	$14.0	$19.5	$13.5	$11.2	$12.6
2037	$9.4	$8.7	$8.1	$9.7	$11.2	$12.7	$13.4	$14.2	$19.8	$13.7	$11.4	$12.8
2038	$9.5	$8.9	$8.2	$9.8	$11.4	$12.9	$13.6	$14.4	$20.1	$13.8	$11.6	$13.0
2039	$9.7	$9.0	$8.3	$10.0	$11.5	$13.1	$13.7	$14.6	$20.3	$14.0	$11.7	$13.2
2040	$9.8	$9.1	$8.4	$10.1	$11.7	$13.2	$13.9	$14.8	$20.6	$14.2	$11.9	$13.3
2041	$9.9	$9.2	$8.5	$10.2	$11.8	$13.4	$14.1	$15.0	$20.8	$14.4	$12.0	$13.5
2042	$10.0	$9.3	$8.6	$10.3	$12.0	$13.5	$14.2	$15.1	$21.1	$14.5	$12.1	$13.6
2043	$10.1	$9.4	$8.7	$10.4	$12.1	$13.7	$14.4	$15.3	$21.3	$14.7	$12.3	$13.8
2044	$10.2	$9.5	$8.8	$10.5	$12.2	$13.8	$14.5	$15.5	$21.5	$14.8	$12.4	$13.9
2045	$10.3	$9.6	$8.9	$10.6	$12.3	$14.0	$14.7	$15.6	$21.7	$15.0	$12.5	$14.1

Appendix E – Resource Generation Profiles

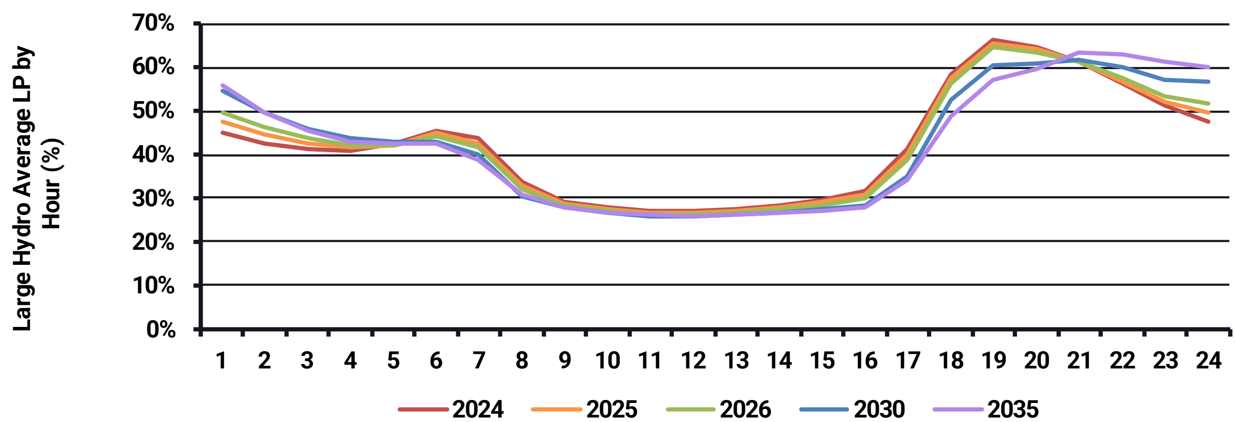
Hourly resource generation shapes (i.e. 8760 generation profiles) were used to estimate how much energy was served by a given resource's nameplate capacity at a given hour. The below views show the average hourly generation shape over a given year. The hourly generation shapes were used in the portfolio optimization model, in combination with configure nameplate capacity and resource costs, to help develop a portfolio that met system demand needs and RPS requirements at least cost. The profiles were derived from the CPUC's Clean System Power (CSP) tool.

Figure 26 – Utility-Scale Solar Generation Average Hourly Load Profile



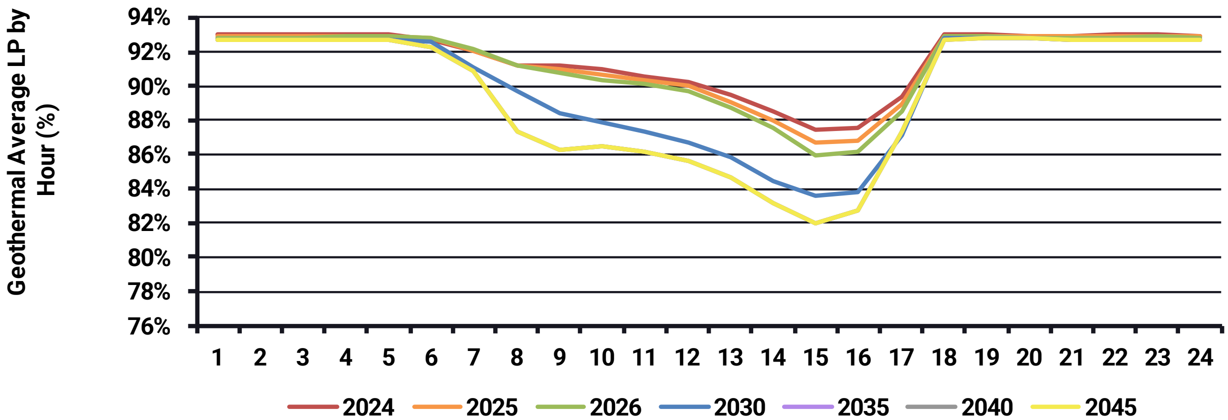
Source: Energeia, CPUC CSP Tool

Figure 27 – Large Hydro Average Hourly Load Profile by Year



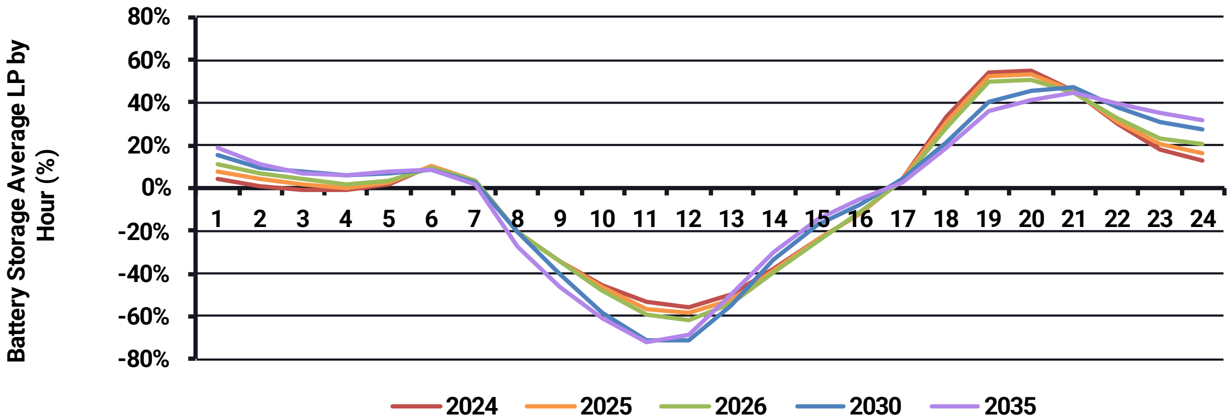
Source: Energeia, CPUC CSP Tool

Figure 28 – Geothermal Average Hourly Load Profile by Year



Source: Energeia, CPUC CSP Too

Figure 29 – Battery Storage Average Hourly Load Profile by Year



Source: Energeia, CPUC CSP Tool

Appendix F – Peak Days Forecast

The below tables represent the yearly and monthly California system peak electricity demand forecast from 2023 – 2045. These timestamps were used when estimating MVU's monthly RA obligation. The RA obligation assumed that MVU must show how it will meet the level of MVU system demand at the California system coincident peak time with an additional 17% of added to the requirement as planning reserve margin.

Table 4 – CAISO Annual Peak Timestamp Forecast

Year	Month	Day	Hour
2023	7	26	15
2024	7	24	15
2025	7	23	15
2026	9	2	15
2027	9	1	15
2028	9	6	15
2029	9	5	15
2030	9	4	15
2031	9	3	15
2032	9	1	15
2033	9	7	15
2034	9	6	15
2035	9	5	15
2036	9	3	15
2037	9	2	15
2038	9	1	15
2039	9	7	15
2040	2	1	12
2045	2	1	12

Table 5 – CAISO Monthly Peak Timestamp Forecast

Year	Month	Day	Hour
2023	1	11	19
2023	2	8	19
2023	3	15	19
2023	4	26	19
2023	5	31	18
2023	6	29	17
2023	7	26	17
2023	8	30	17
2023	9	6	17
2023	10	4	18
2023	11	1	18
2023	12	20	18
2024	1	31	19
2024	2	14	19
2024	3	20	19
2024	4	30	19
2024	5	29	19
2024	6	26	18
2024	7	24	17
2024	8	29	17
2024	9	4	17
2024	10	2	18
2024	11	6	18
2024	12	18	18
2025	1	29	19
2025	2	12	19
2025	3	4	24

2025	4	30	19
2025	5	29	19
2025	6	30	18
2025	7	23	17
2025	8	13	18
2025	9	3	17
2025	10	1	18
2025	11	5	18
2025	12	31	18
2026	1	14	19
2026	2	11	19
2026	3	18	19
2026	4	29	19
2026	5	29	19
2026	6	30	18
2026	7	22	18
2026	8	12	18
2026	9	2	18
2026	10	7	18
2026	11	4	18
2026	12	30	19
2027	1	6	20
2027	2	10	19
2027	3	17	19
2027	4	29	19
2027	5	31	19
2027	6	30	18
2027	7	28	18
2027	8	31	18

2027	9	1	18
2027	10	6	18
2027	11	3	18
2027	12	8	12
2028	1	5	20
2028	2	9	19
2028	3	15	19
2028	4	26	19
2028	5	31	19
2028	6	29	18
2028	7	26	18
2028	8	30	18
2028	9	6	18
2028	10	4	18
2028	11	30	18
2028	12	20	19
2029	1	3	8
2029	2	7	8
2029	3	21	19
2029	4	30	19
2029	5	30	19
2029	6	27	18
2029	7	25	18
2029	8	29	18
2029	9	5	18
2029	10	3	18
2029	11	7	18
2029	12	19	8
2030	1	2	8

2030	2	6	8
2030	3	20	19
2030	4	30	19
2030	5	29	19
2030	6	26	19
2030	7	24	18
2030	8	29	18
2030	9	4	18
2030	10	2	18
2030	11	6	18
2030	12	7	20
2031	1	15	8
2031	2	5	8
2031	3	19	19
2031	4	30	19
2031	5	29	19
2031	6	30	19
2031	7	23	19
2031	8	13	18
2031	9	3	18
2031	10	1	18
2031	11	5	18
2031	12	31	8
2032	1	21	8
2032	2	4	8
2032	3	16	7
2032	4	29	19
2032	5	31	19
2032	6	30	19

2032	7	28	19
2032	8	31	18
2032	9	1	18
2032	10	6	18
2032	11	3	18
2032	12	29	8
2033	1	19	8
2033	2	2	8
2033	3	15	7
2033	4	27	20
2033	5	31	19
2033	6	29	19
2033	7	27	19
2033	8	31	18
2033	9	7	18
2033	10	5	18
2033	11	2	18
2033	12	21	8
2034	1	18	8
2034	2	1	8
2034	3	21	7
2034	4	25	23
2034	5	31	19
2034	6	29	19
2034	7	26	19
2034	8	30	18
2034	9	4	13
2034	10	4	18
2034	11	29	8

2034	12	20	8
2035	1	17	8
2035	2	7	8
2035	3	22	7
2035	4	3	15
2035	5	30	19
2035	6	27	19
2035	7	25	19
2035	8	29	18
2035	9	5	18
2035	10	3	18
2035	11	28	8
2035	12	19	8
2036	1	16	8
2036	2	6	8
2036	3	27	7
2036	4	30	19
2036	5	29	19
2036	6	30	19
2036	7	23	19
2036	8	13	18
2036	9	3	18
2036	10	1	18
2036	11	26	8
2036	12	17	8
2037	1	15	20
2037	2	4	8
2037	3	26	7
2037	4	31	20

2037	5	27	8
2037	6	30	19
2037	7	22	19
2037	8	31	18
2037	9	2	18
2037	10	7	18
2037	11	25	8
2037	12	4	19
2038	1	20	8
2038	2	3	8
2038	3	25	7
2038	4	29	21
2038	5	31	19
2038	6	30	19
2038	7	28	19
2038	8	31	18
2038	9	1	18
2038	10	6	18
2038	11	19	21
2038	12	15	8
2039	1	19	8
2039	2	2	8
2039	3	24	7
2039	4	6	22
2039	5	31	19
2039	6	29	19
2039	7	27	19
2039	8	31	18
2039	9	7	18

2039	10	5	18
2039	11	4	8
2039	12	10	11
2040	1	18	8
2040	2	18	10
2040	3	22	7
2040	4	6	17
2040	5	30	19
2040	6	27	19
2040	7	25	19
2040	8	29	18
2040	9	5	18
2040	10	3	18
2040	11	8	1
2040	12	19	9
2045	1	18	8
2045	2	18	10
2045	3	22	7
2045	4	6	17
2045	5	30	19
2045	6	27	19
2045	7	25	19
2045	8	29	18
2045	9	5	18
2045	10	3	18
2045	11	8	1
2045	12	19	9

Appendix G – Assumed Resource Prices

Table 6 – Technology Representative Class Chosen in Modeling

Technology Representative Classes
Land-Based Wind - Class 4 - Technology 1
Offshore Wind - Class 3
Utility PV - Class 5
Geothermal - Hydro / Flash
Hydropower - NPD 1

Table 7 – Technology Costs

Type	2025	2030	2035	2040	2045
Overnight Capex ($/kW)					
Wind - On-Shore	$1,380	$1,228	$1,159	$1,090	$1,021
Wind - Off-Shore	$4,135	$3,131	$2,417	$2,326	$2,258
Solar - Utility Scale	$1,323	$1,044	$764	$696	$628
Geothermal	$4,559	$4,311	$4,127	$4,025	$3,925
Hydro	$3,045	$3,045	$3,045	$3,045	$3,045
4-Hr Battery	$1,551	$1,300	$1,200	$1,100	$999
8-Hr Battery	$2,791	$2,283	$2,093	$1,904	$1,716
OCGT	$1,084	$1,040	$996	$952	$908
Opex ($/kW-yr)					
Wind - On-Shore	$31	$29	$28	$27	$26
Wind - Off-Shore	$84	$79	$74	$72	$71
Solar - Utility Scale	$21	$18	$15	$14	$14
Geothermal	$119	$116	$112	$112	$112
Hydro	$92	$92	$92	$92	$88
4-Hr Battery	$39	$33	$30	$27	$25
8-Hr Battery	$70	$57	$52	$48	$43

OCGT	$24	$23	$22	$22	$21

Appendix H – Demand Modifiers

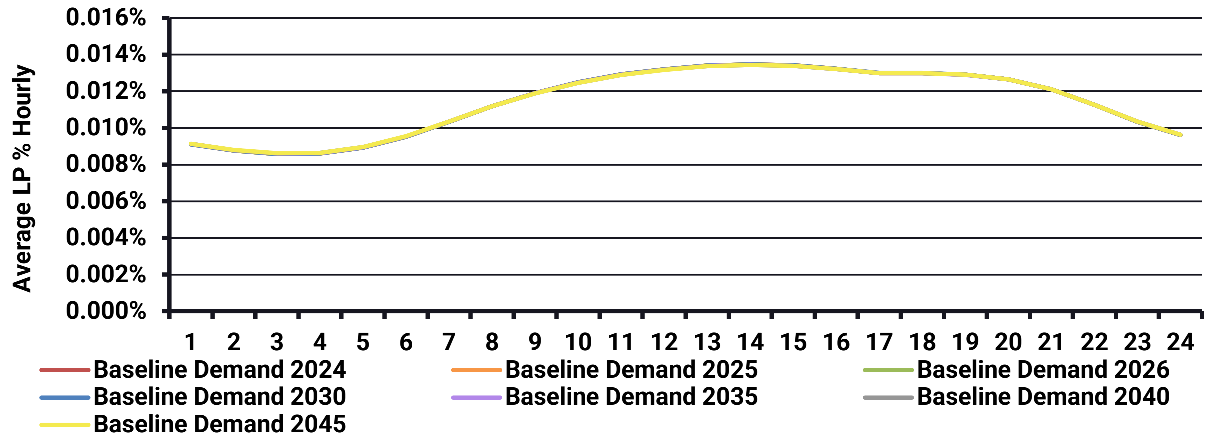
Table 8 – Demand Modifier Data (2021-2035)

Category	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Baseline	106%	106%	105%	105%	104%	104%	104%	103%	103%	103%	102%	102%	101%	101%	100%
EVs	1.4%	2.1%	2.9%	3.7%	4.5%	5.1%	5.7%	6.3%	6.9%	7.6%	8.3%	8.9%	9.5%	10.2%	10.9%
AAEE	0.0%	-0.5%	-1.0%	-1.4%	-1.9%	-2.4%	-2.9%	-3.3%	-3.7%	-4.1%	-4.4%	-4.8%	-5.1%	-5.4%	-5.6%
AAFS	0.0%	0.1%	0.3%	0.4%	0.6%	0.7%	0.9%	1.1%	1.2%	1.4%	1.6%	1.7%	1.9%	2.0%	2.2%
BTM Storage	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02

Table 9 – Demand Modifier Data (2036-2045)

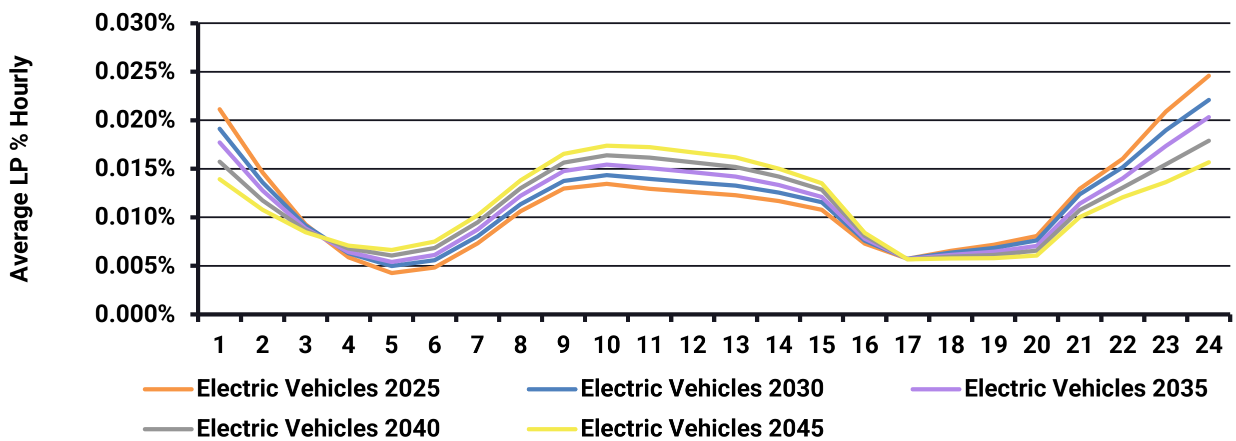
Category	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
Baseline	100%	99%	98%	98%	97%	97%	96%	96%	95%	95%
EVs	12.0%	12.8%	13.6%	14.4%	15.3%	16.1%	16.9%	17.7%	18.6%	19.4%
AAEE	-6.5%	-7.0%	-7.5%	-8.0%	-8.5%	-9.0%	-9.5%	-10.0%	-10.5%	-11.0%
AAFS	2.5%	2.7%	2.9%	3.1%	3.3%	3.5%	3.7%	3.8%	4.0%	4.2%
BTM Storage	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03

Figure 30 – Average Baseline Demand Hourly Load Profile by Year



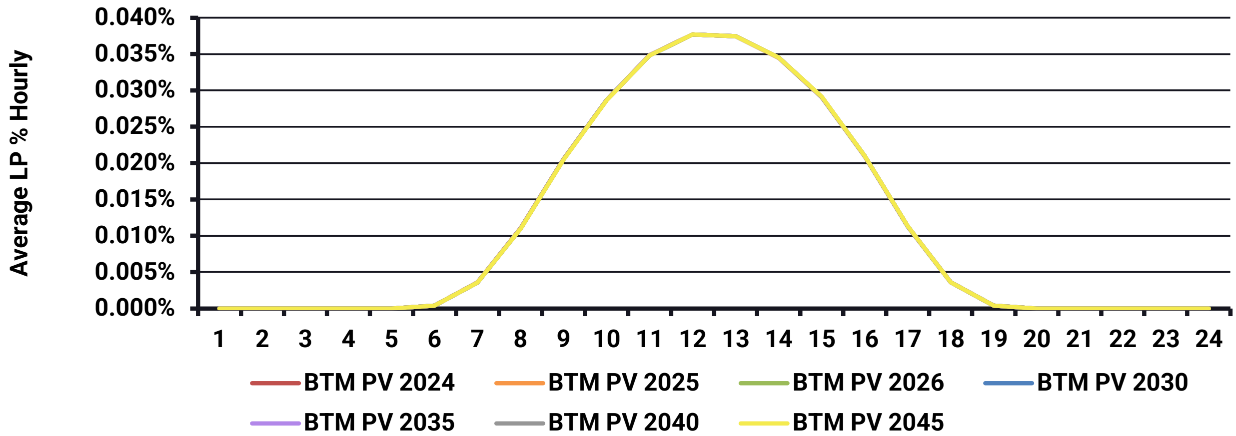
Source: Energeia, CPUC CSP Tool

Figure 31 – Average Electric Vehicle Hourly Load Profile by Year



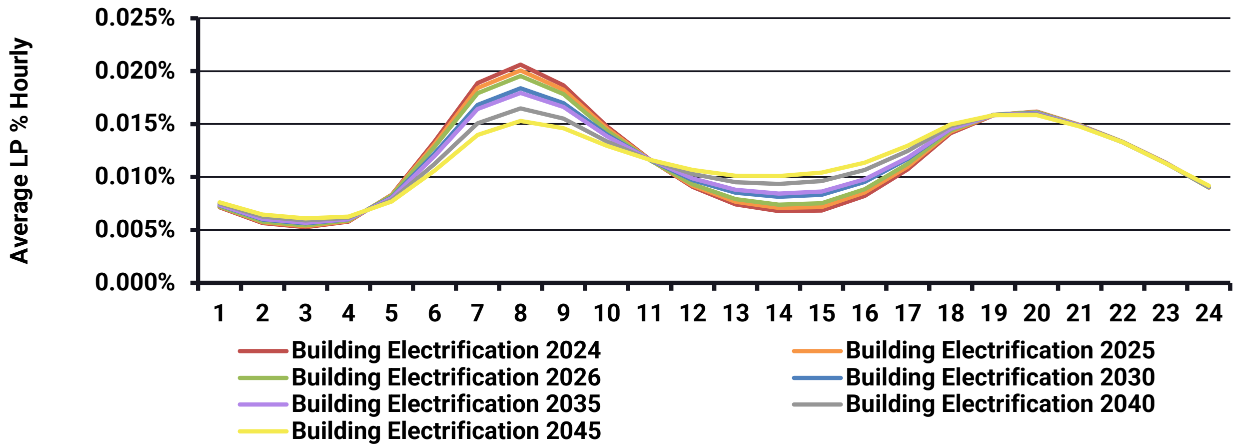
Source: Energeia, CPUC CSP Tool

Figure 32 – Average BTM Solar PV Hourly Load Profile by Year



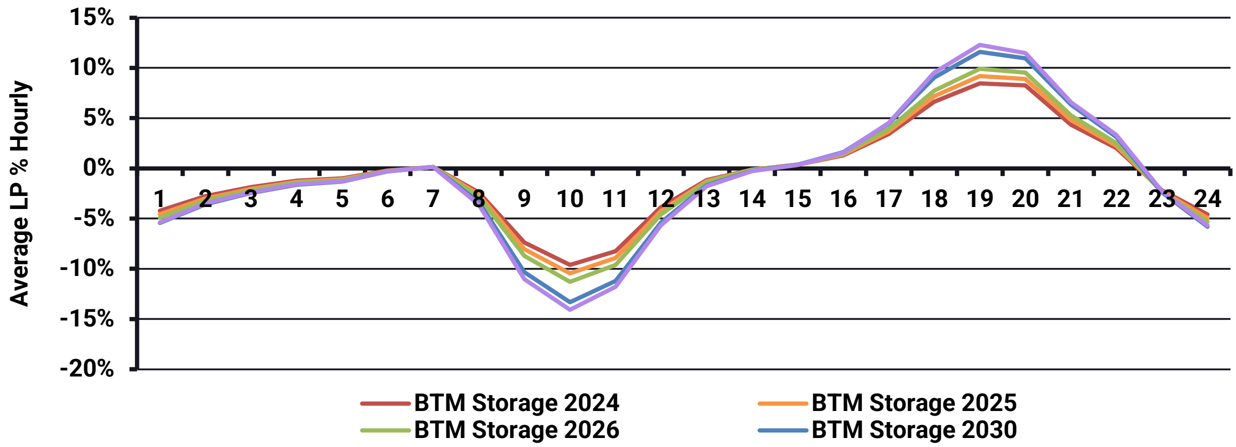
Source: Energeia, CPUC CSP Tool

Figure 33 – Average Building Electrification Hourly Load Profile by Year



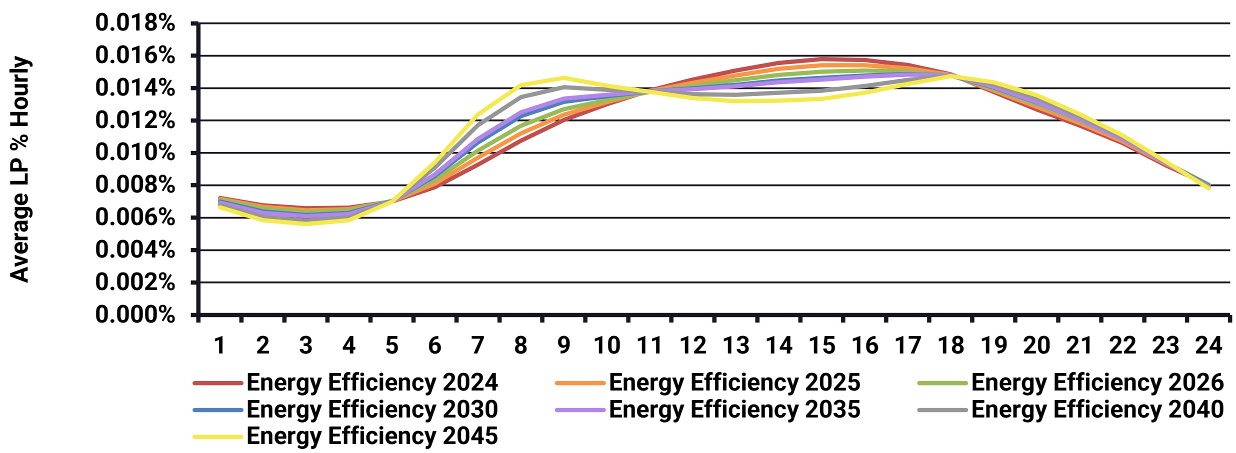
Source: Energeia, CPUC CSP Tool

Figure 34 – Average BTM Storage Hourly Load Profile by Year



Source: Energeia, CPUC CSP Tool

Figure 35 – Average Energy Efficiency Hourly Load Profile by Year



Source: Energeia, CPUC CSP Tool

ELCC by Resource in Modeling

The Effective Load Carrying Capability (ELCC) values in these tables reflect the reliability contributions of different resources, capturing their capacity to meet peak demand. In the model, ELCC for a given year were taken from the CPUC's Resource Data Template (RDT) Version 3 file, and solar and wind profiles were modified based on monthly ELCC shapes taken from CPUC's 2017 Revised Proposal for Monthly LOLE and Monthly ELCC.

The below as table provides a view of the ELCC utilized from the CPUC RDT tool.

Table 10 – ELCC by General Resource Type Full Dataset

Resource Type	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
in_state_wind _south	15%	15%	15%	12%	8%	8%	8%	7%	7%	6%	5%	4%
in_state_wind _north	30%	30%	31%	24%	17%	17%	16%	15%	13%	12%	10%	9%
out_of_state_ wind_WYID	43%	39%	36%	37%	39%	31%	24%	25%	26%	27%	29%	30%
out_of_state_ wind_WAOR	26%	24%	22%	23%	24%	19%	14%	15%	16%	17%	18%	18%
out_of_state_ wind_AZNM	38%	35%	32%	34%	35%	28%	21%	22%	24%	25%	26%	27%
Offshore Wind	55%	51%	46%	49%	51%	47%	43%	40%	38%	36%	34%	32%
Utility PV	10%	10%	11%	10%	9%	8%	6%	6%	6%	6%	6%	6%
BTM PV	9%	9%	10%	8%	7%	6%	5%	5%	5%	5%	5%	6%
4hr batteries	89%	90%	92%	85%	77%	76%	75%	68%	61%	54%	47%	40%
5hr batteries	89%	90%	92%	86%	80%	78%	77%	71%	65%	59%	53%	47%
6hr batteries	89%	91%	92%	87%	82%	81%	80%	75%	70%	65%	60%	55%
7hr batteries	89%	91%	93%	89%	84%	83%	82%	78%	74%	70%	66%	62%
8hr batteries	89%	91%	93%	90%	87%	86%	85%	82%	79%	76%	73%	70%
Pumped storage	89%	91%	93%	91%	89%	89%	89%	86%	83%	80%	76%	73%
Demand Response	89%	91%	92%	77%	62%	61%	59%	50%	41%	32%	23%	14%
Hydro	57%	56%	56%	53%	50%	49%	48%	47%	46%	45%	44%	43%
Small Hydro	41%	40%	40%	38%	36%	35%	35%	34%	33%	32%	32%	31%
Geothermal	86%	88%	89%	91%	93%	92%	92%	93%	93%	94%	95%	95%
Biomass Wood	79%	81%	83%	83%	83%	82%	82%	83%	85%	86%	88%	89%
Biogas	76%	78%	80%	80%	79%	78%	77%	79%	81%	83%	85%	87%
Nuclear	93%	94%	95%	94%	94%	94%	93%	94%	95%	95%	96%	96%
Gas CC	85%	86%	88%	87%	87%	86%	85%	86%	88%	89%	90%	91%

Gas CT	80%	82%	83%	83%	82%	81%	79%	80%	81%	82%	83%	84%
Cogen	90%	92%	95%	92%	89%	89%	89%	90%	90%	91%	92%	93%
Ice	93%	90%	87%	90%	92%	92%	91%	90%	89%	88%	87%	86%
Coal	69%	72%	74%	74%	73%	71%	69%	72%	74%	77%	80%	83%
Steam	78%	80%	82%	81%	81%	79%	78%	80%	82%	84%	86%	88%
Unspecified Import	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The table below details monthly ELCC values for solar and wind generation utilized from CPUC's 2017 Revised Proposal for Monthly LOLE and Monthly ELCC.

Table 11 – Monthly ELCC

Month	Solar	Wind
Jan	2.90%	4.60%
Feb	2.40%	15.80%
Mar	8.50%	16.60%
Apr	24.10%	33.10%
May	25.00%	25.50%
Jun	33.10%	48.40%
Jul	31.00%	30.10%
Aug	30.70%	26.50%
Sep	24.10%	28.60%
Oct	22.10%	8.60%
Nov	4.10%	6.10%
Dec	1.50%	11.60%

Appendix I – CPUC Regulatory Requirements

The regulatory and statutory framework outlined in Table 12 in this appendix serves as the foundation for the development and implementation of this Integrated Resource Plan (IRP). These laws and mandates play a crucial role in guiding utilities like MVU to operate sustainably, responsibly, and in alignment with California's ambitious energy and environmental goals. By specifying requirements for renewable procurement, greenhouse gas (GHG) reductions, transportation electrification, and energy efficiency, these statutes ensure that utilities contribute meaningfully to state and national targets, including reductions in GHG emissions to combat climate change.

The California Public Utilities Code, in particular, mandates that Publicly Owned Utilities (POUs) like MVU adopt an IRP if their annual electrical demand exceeds 700 gigawatt hours (CPUC Section 9621), meeting a spectrum of regulatory objectives—such as achieving GHG reductions, expanding renewable energy portfolios, and implementing transportation electrification efforts. Additional sections within the CPUC Code (like Sections 380, 454.52, and 2835) detail the need for resource adequacy, the integration of demand-side resources, and the role of energy storage in maintaining reliability and grid efficiency.

Incorporating these regulations into MVU's IRP ensures compliance with state and federal policies while aligning with best practices in resource management, grid reliability, and customer service. As detailed in the table below, each regulation not only fulfills a compliance requirement but also highlights MVU's ongoing commitment to sustainability, cost-effectiveness, and reliability.

Table 12 – CPUC Regulatory Requirements

Key CPUC Codes	Description/Requirements
CPUC Section 9621	POUs must adopt an integrated resource plan if their annual electrical demand exceeds 700 gigawatt hours.
	POUs meet the GHG emissions reduction targets established by CARB, to achieve 40% reductions from 1990 levels by 2030.
	Procurement of at least 50% eligible renewable energy resources by 2030 consistent with Section 399.11
	IRP meets the goals specified in Section 454.52
	IRP must include details of utility's electrical service rate design that support transport electrification and existing or planned incentives to support TE including rebates.
	The Rate Design in the IRP shall details of all applicable transportation sectors.
	IRP must include information on customer education and outreach efforts implemented to inform customers of available incentives and decision making tools such as TE cost calculators.
	POU shall consider role of existing renewable generation, grid operational efficiencies, energy storage, DER, and energy efficiency to meet energy needs and reliability needs during peak hours excluding demand met by variable renewable generation directly connected to California balancing authority as defined in Section 399.12, at least cost
	The IRP must address procurement of the following:
	Energy Efficiency and demand response resources pursuant to Section 9615.
	Energy Storage Requirements in Chapter 7.7 Sections 2835-2839
	Transport Electrification

	Resource Adequacy Requirements established in Section 9620
	POU must procure the optimum resource mix
	POU's governing board may authorize procurement of resource types that will reduce GHG emissions but may not compete favorably in price against other resources over time.
	POU must satisfy the notice and public disclosure requirements of Section 399.30
Article 16 Section 399.11	Attain target of generating 50% of total retail sales of electricity from renewable energy resources by 2026, and 60% by 2030
Section 454.52 Subdivision a Paragraph 1 Subparagraphs C to H	All load serving entities must comply with the following:
	Each electrical corporation must fulfill its obligation to serve its customers at just and reasonable rates.
	Minimize impacts on ratepayers' bills.
	Ensure system and local reliability, and meeting the near-term and forecast long-term resource adequacy requirements of Section 380
	Comply with paragraph (1) of subdivision (b) of Section 399.13.
	Strengthen diversity and sustainability of bulk transmission and distribution systems.
	Enhance distribution systems and demand side energy management
Section 380	Establishes resource adequacy program shall achieve:
	Facilitate development of new generating, nongenerating, and hybrid capacity and retention of existing generating, nongenerating, and hybrid capacity that is economical and needed to achieve policy specified in 454.53
	Establish new, or maintain existing, demand response products and tariffs that facilitate the economical dispatch and use of demand response that can either meet or reduce resource adequacy requirements.
	Equitably allocate the cost of generating capacity and demand response in a manner that prevents the shifting of costs between customer classes
	Minimize enforcement requirements and costs.
	Maximize the ability of CCAs to determine the generation resources used to serve their customers.
Section 454.53	State agencies should ensure that actions taken in furtherance of this policy shall do the following:
	Maintain and protect the safety, reliable operation, and balancing of the electric system.
	Prevent unreasonable impacts to electricity, gas, and water customer rates and bills taking into full consideration the economic and environmental costs and benefits of renewable energy and zero-carbon resources
	Lead to adoption of policies and taking of actions in other sectors to obtain GHG emission reductions that ensure equity between other sectors and the electricity sector
	Not affect California RPS Program
	Not consider the energy, capacity, or any attribute from the Diablo Canyon Unit 1 or Unit 2 Powerplant after August 26, 2025

	This section must not affect a retail seller's obligation to comply with the Federal Public Utility Regulatory Policies Act of 1978 (16 U.S.C. Section 2601)
	This section does not limit any entity from accelerating their targets
Federal Public Utility Regulatory Policies Act of 1978 (16 U.S.C Section 2601 et seq.)	Electric Utilities Establishes a program for:
	Providing increased conservation of electrical energy, increased efficiency in the use of facilities and resources by electrical utilities
	Improve the wholesale distribution of electrical energy, the reliability of electric service, the procedures concerning consideration of wholesale rate applications before the FERC
	To provide for the expeditious development of hydroelectric potential at existing small dams to provide needed hydroelectric power
	The conservation of natural gas while insuring rates to natural gas consumers are equitable
	Encourage the development of crude oil transportation systems
Article 16 Section 399.13	A retail seller may enter into a combination of long and short term contracts for electrical and associated renewable energy credits
	At least 65% of the procurement a retail seller counts toward the renewables portfolio standard requirement of each compliance period shall be from its contracts of 10 years or more in duration
Executive Order B-55-18	A new statewide goal is established to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter
	This goal is in addition to the existing statewide targets of reducing greenhouse gas emissions
Article 16 Section 399.12	"California balancing authority" us a balancing authority with control over a balancing authority area primarily located in this state and operating for retail sellers and local publicly owned electric utilities subject to the requirements of this article
	They are responsible for the operation of the transmission grid within its metered boundaries which is not limited by the political boundaries of the State of California
Section 9615	Each POU shall require all EE and demand reduction resources that are cost effective, reliable, and feasible, in procuring energy to serve the load of its retail end-use customers
Division 1 Part 2 Chapter 7.7 Section 2835-2839	
CPUC Section 2835	"Energy storage system" means commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy. Can have characteristics of:
	Be either centralized or distributed.

	Be either owned by a load-serving entity or local publicly owned electric utility, a customer of a load-serving entity or local publicly owned electric utility, or a third party, or is jointly owned by two or more of the above
	An "energy storage system" shall be cost effective and either reduce emissions of greenhouse gases, reduce demand for peak electrical generation, defer or substitute for an investment in generation, transmission, or distribution assets, or improve the reliable operation of the electrical transmission or distribution grid
	An "energy storage system" shall do one or more of the following:
	Use mechanical, chemical, or thermal processes to store energy that was generated at one time for use at a later time.
	Store thermal energy for direct use for heating or cooling at a later time in a manner that avoids the need to use electricity at that later time.
	Use mechanical, chemical, or thermal processes to store energy generated from renewable resources for use at a later time.
	Use mechanical, chemical, or thermal processes to store energy generated from mechanical processes that would otherwise be wasted for delivery at a later time.
	"Load-serving entity" has the same meaning as defined in Section 380.(c)
	"New" means, in reference to an energy storage system, a system that is installed and first becomes operational after January 1, 2010.(d)
	"Off peak" means, in reference to electrical demand, a period that is not within a peak demand period
	"Peak demand period" means a period of high daily, weekly, or seasonal demand for electricity. "Procure" and "procurement" means, in reference to the procurement of an energy storage system, to acquire by ownership or by a contractual right to use the energy from, or the capacity of, including ancillary services, an energy storage system owned by a load-serving entity, local publicly owned electric utility, customer, or third party.
CPUC Section 2836	On or before March 1, 2012, the governing board of each local publicly owned electric utility shall initiate a process to determine appropriate targets, if any, for the utility to procure viable and cost-effective energy storage systems to be achieved by December 31, 2016, and December 31, 2020
	The governing board shall adopt the procurement targets, if determined to be appropriate pursuant to paragraph (1), by October 1, 2014
	The governing board shall reevaluate the determinations made pursuant to this subdivision not less than once every three years
CPUC Section 2836.2	Regulations for the commission when adopting and reevaluating appropriate energy storage system procurement targets and policies

CPUC Section 2836.4	An energy storage system may be used to meet the resource adequacy requirements established for a load-serving entity pursuant to Section 380 if it meets applicable standards
	An energy storage system may be used to meet the resource adequacy requirements established by a local publicly owned electric utility pursuant to Section 9620 if it meets applicable standards
Section 9620	Each local publicly owned electric utility serving end-use customers shall prudently plan for and procure resources that are adequate to meet its planning reserve margin and peak demand and operating reserves, sufficient to provide reliable electric service to its customers. , or
	Customer generation located on the customer's site shall not be subject to these requirements if:
	It takes standby service from the local publicly owned electric utility on a rate schedule that provides for adequate backup planning and operating reserves for the standby customer class
	It is not physically interconnected to the electric transmission or distribution grid, so that, if the customer generation fails, backup power is not supplied from the electricity grid
	There is physical assurance that the load served by the customer generation will be curtailed concurrently and commensurately with an outage of the customer generation
Section 218	"Electrical corporation" does not include a corporation or person employing cogeneration technology or producing power from other than a conventional power source for the generation of electricity solely for any one of more of the following purposes: Its own use or the use of its tenants.
	The use of or sale to not more than two other corporations or persons solely for use on the real property on which the electricity is generated or on real property immediately adjacent thereto, unless there is an intervening public street constituting the boundary between the real property on which the electricity is generated and the immediately adjacent property and one or more of the following applies:
	The real property on which the electricity is generated, and the immediately adjacent real property is not under common ownership or control
	That common ownership or control was gained solely for purposes of sale of the electricity so generated and not for other business purposes
Planning Reserve and Reliability Criteria by WECC	Requirements per the NERC Website
Public Resource Code Section	The commission establishes annual targets for statewide energy efficiency savings and demand reduction

25310 Subdivision (c)	
CPUC Section 2836.6	All procurement of energy storage systems by a load-serving entity or local publicly owned electric utility shall be cost effective
CPUC Section 2836.7	By June 1, 2018, the following shall occur regarding the Los Angeles Department of Water and Power
	The Los Angeles Department of Water and Power shall determine the cost-effectiveness and feasibility of deploying, on an expedited basis, a minimum aggregate total of 100 megawatts of cost-effective energy storage solutions to help address the Los Angeles Basin's electrical system operational limitations resulting from reduced gas deliverability from the Aliso Canyon natural gas storage facility.
	Shall consider deploying those cost-effective energy storage solutions after June 1, 2018, if cost effective and feasible
	The commission shall direct an electrical corporation serving the Los Angeles Basin to deploy, pursuant to a competitive solicitation, a minimum aggregate total of 20 megawatts of cost-effective energy storage solutions to help address the Los Angeles Basin's electrical system operational limitations resulting from reduced gas deliverability from the Aliso Canyon natural gas storage facility.
CPUC Section 2837	Each electrical corporation's renewable energy procurement plan prepared pursuant to Article 16 of Chapter 2.3 of Part 1 shall require the utility to procure new energy systems that comply with procurement targets pursuant to Section 2836.
	The renewable energy procurement plan shall address the acquisition and use of energy storage systems to achieve the following purposes:
	Integrate intermittent generation from eligible renewable energy resources into the reliable operation of the transmission and distribution grid.
	Allow intermittent generation from eligible renewable energy resources to operate at or near full capacity.
	Reduce the need for new fossil-fuel powered peaking generation facilities by using stored electricity to meet peak demand.
	Reduce purchases of electricity generation sources with higher emissions of greenhouse gases.
	Eliminate or reduce transmission and distribution losses, including increased losses during periods of congestion on the grid.
	Reduce the demand for electricity during peak periods and achieve permanent load-shifting by using thermal storage to meet air-conditioning needs.
	Avoid or delay investments in transmission and distribution system upgrades.
Article 16	

Article 16 Section 399.14	An electrical corporation can apply to build and operate renewable energy resources to meet its RPS goals, with approval based on technology viability and cost-effectiveness. The commission will approve projects up to 8.25% of the company's retail sales by 2020, applying cost-of-service ratemaking to ensure reasonable costs.
Article 16 Section 399.15	The commission sets a renewables portfolio standard (RPS) requiring retail sellers to source a minimum percentage of electricity from eligible renewable resources within specific compliance periods. The targets progressively increase, reaching 60% by 2030. The commission may waive enforcement if circumstances beyond the retail seller's control prevent compliance. Penalties are imposed for noncompliance unless a waiver is granted, and cost limitations are set to prevent undue rate impacts on consumers.
Article 16 Section 399.16	Electricity products from eligible renewable resources within the WECC area can fulfill RPS requirements, with procurement focused on least-cost, best-fit principles. Retail sellers must meet increasing targets for preferred renewable products, reaching 75% by 2020. Contracts before June 1, 2010, count fully, and sellers may request reductions in obligations if uncontrollable conditions prevent compliance.
Article 16 Section 399.17	Section 399.17 applies to electrical corporations that, as of January 1, 2010, had 60,000 or fewer customer accounts in California and either served customers outside California or were located in a non-California balancing area. Such entities can meet renewable energy requirements using electricity from out-of-state facilities connected to the WECC system, provided specific conditions are met, including compliance with the Energy Commission's accounting and verification processes. These corporations may also use resource plans from other states to fulfill California's renewable energy procurement plan requirements.
Article 16 Section 399.18	Section 399.18 applies to electrical corporations that, as of January 1, 2010, either had 30,000 or fewer customer accounts in California and issued at least four solicitations for renewable energy before June 1, 2010, or had 1,000 or fewer accounts and were not connected to a transmission system or the Independent System Operator. Such corporations, or their successors, can use renewable energy for compliance regardless of procurement content limitations, as long as they meet specific conditions related to Energy Commission accounting and verification, and continue to satisfy the original criteria.

Article 16 Section 399.19	The commission will modify and extend the monetary incentive program for biomethane projects, originally adopted in Decision 15-06-029, until December 31, 2026, or until funds are exhausted. The incentive cap for most biomethane projects will increase from $1.5 million to $3 million, while dairy cluster biomethane projects will have a higher limit of $5 million, which can be used for interconnection and gathering line costs. This extension supports efforts to reduce short-lived climate pollutants and will remain effective until January 1, 2027, unless further extended by legislation.
Article 16 Section 399.20	The state policy encourages the generation of electricity from renewable resources by ensuring fixed-price contracts for energy purchases from eligible facilities. Electrical corporations are required to offer tariffs to renewable energy projects, including bioenergy, while ensuring system reliability and compliance with state regulations.
Article 16 Section 399.21	The commission is authorized to allow the use of renewable energy credits (RECs) for meeting renewable portfolio standard requirements. Conditions include ensuring the tracking system is operational and capable of verifying that RECs are not double counted, with RECs eligible for compliance only if retired within 36 months of generation. Additionally, revenues from REC sales must benefit ratepayers, and RECs cannot be created for certain contracts executed before 2005 unless specified.
Article 16 Section 399.22	For the purposes of this section, a "state agency" includes any agency, board, department, or commission, as defined in Section 15814.12 of the Government Code. State agencies generating electricity under a tariff adopted pursuant to Sections 387.6 or 399.20, and owning or controlling electric generation facilities, must consider the total annual kilowatt-hours exported to the grid when determining whether they have met their legally established policy goals and objectives.
Article 16 Section 399.24	The commission must establish policies to support the in-state production and distribution of biomethane from various sources. Biomethane is defined as biogas that meets specific standards for injection into a common carrier pipeline.
Article 16 Section 399.25	The Energy Commission will certify renewable resources, ensure compliance with the renewables portfolio standard, and track renewable energy credits to prevent double counting. It will also verify credits for local publicly owned utilities.
Article 16 Section 399.30	Local publicly owned electric utilities must adopt and implement renewable energy procurement plans to meet specified percentages of their electricity from renewable resources for each compliance period. Starting January 1, 2019, these plans must be integrated into broader resource plans. Utilities must ensure procurement targets increase over time, reaching 60% by December 31, 2030. They can exclude certain renewable energy credits from retail sales calculations if credited to participating customers. Utilities may adopt measures for compliance

	delays and cost limitations. They must also enforce and publicly disclose their procurement programs and follow procedures for compliance and potential penalties set by the Energy Commission and State Air Resources Board.
Article 16 Section 399.31	A retail seller can use renewable energy credits from an eligible renewable energy resource delivered to a local publicly owned electric utility for compliance with the renewables portfolio standard if: (a) The utility has a compliant renewable energy resources procurement plan. (b) The utility is procuring enough renewable energy to meet its target standard.
Article 16 Section 399.32	Article 16, Section 399.32 sets forth a policy to boost renewable energy generation by mandating that local publicly owned electric utilities adopt standard tariffs for small generation facilities (up to 3 MW). The section ensures that electricity from these facilities counts toward renewable energy targets and outlines requirements for interconnections, metering, and performance standards.
Article 16 Section 399.33	Article 16, Section 399.33 applies to gas-fired powerplants within the state that serve a single local publicly owned electric utility and meet specific criteria, including the plant's operational capacity and emissions standards. It allows for adjustments in renewable energy procurement targets if the plant operates below 20% capacity, provided the utility has met renewable procurement requirements and has made efforts to mitigate capacity reductions. This section is valid until the powerplant's original bonded indebtedness term expires.
	Use energy storage systems to provide the ancillary services otherwise provided by fossil-fueled generating facilities.
CPUC Section 2838	By January 1, 2021, each load-serving entity shall submit a report to the commission demonstrating that it has complied with the energy storage system procurement targets and policies adopted by the commission pursuant to subdivision (a) of Section 2836
	Each load-serving entity shall submit a report to the commission demonstrating that it has complied with the energy storage system procurement targets and policies
CPUC Section 2838.2	The following definitions apply to the deployment of distributed energy storage systems:
	"Distributed energy storage system" means an energy storage system with a useful life of at least 10 years that is connected to the distribution system or is located on the customer side of the meter
	"Energy storage management system" means a system by which an electrical corporation can manage the charging and discharging of the distributed energy storage system in a manner that provides benefits to ratepayers
CPUC Section 2838.3	It is the intent of the Legislature, that the commission shall ensure that the costs for the programs and investments are recovered in proportion to the benefits received, consistent with Section 451
CPUC Section 2838.5	The requirements of this chapter do not apply to either of the following:
	An electrical corporation that has 60,000 or fewer customer accounts within California

	A public utility district that receives all of its electricity pursuant to a preference right adopted and authorized by the United States Congress pursuant to Section 4 of the Trinity River Division Act of August 12, 1955
CPUC Section 2839	The commission does not have the authority or jurisdiction to enforce any of the requirements of this chapter against a POU
Section 399.30 Subdivision (f)	Each POU shall annually post notice on its renewable energy resources procurement plan
Ralph M. Brown Act - Government Code Title 5 Division 2 Part 1 Chapter 9 Section 54950	The PUCs exist to aid the conduct of people's business. Their actions are to be taken openly and their deliberations to conducted openly
PUC Section 9622	Integrated resource plans and plan updates shall be submitted to the Energy Commission
	If a plan or plan update is deemed inconsistent with the requirements of Section 9621, the Energy Commission shall provide recommendations to correct the deficiencies
PUC Section 9505	By March 15, 2013, and by March 15 of each year thereafter, each local publicly owned electric utility shall report to the Energy Commission and to its customers all of the following:
	Its investments in energy efficiency and demand reduction programs
	A description of each energy efficiency and demand reduction program, program expenditures, the cost-effectiveness of each program, and expected and actual energy efficiency savings and demand reduction results
	The sources for funding of its energy efficiency and demand reduction programs
	The methodologies and input assumptions used to determine the cost-effectiveness of its energy efficiency and demand reduction programs
	A comparison of the local publicly owned electric utility's annual targets established pursuant to subdivision (b) and the local publicly owned electric utility's reported electricity efficiency savings and demand reductions
CPUC Section 385	Each local publicly owned electric utility shall establish a non-bypassable, usage based charge on local distribution service of not less than the lowest expenditure level of the three largest electrical corporations in California on a percent of revenue basis, calculated from each utility's total revenue requirement for the year ended December 31, 1994, and each utility's total annual expenditure under paragraphs (1), (2), and (3) of subdivision (c) of Section 381 and Section 382 to fund investments in: