DOCKETED	
Docket Number:	18-IRP-01
Project Title:	Integrated Resource Plan
TN #:	261087
Document Title:	Review of Vernon Public Utilities 2023 Integrated Resource Plan
Description:	** This document supersedes document TN #261069. **
Filer:	Mikayla Roberts
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	1/14/2025 11:25:26 AM
Docketed Date:	1/14/2025

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

California Energy Commission

STAFF REPORT

Review of Vernon Public Utilities 2023 Integrated Resource Plan

January 2025 | CEC-200-2025-001

California Energy Commission

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ACKNOWLEDGEMENTS

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ABSTRACT

Senate Bill 350 (De León, Chapter 547, Statutes of 2015), established Public Utilities Code Section 9622, which requires the California Energy Commission to review the integrated resource plans of identified publicly owned utilities to ensure they meet various requirements specified in the law, including greenhouse gas emission reduction targets and renewable energy procurement requirements.

Integrated resource plans are long-term planning documents that outline how publicly owned utilities will meet demand reliably and cost effectively while achieving state policy goals and mandates. Vernon Public Utilities submitted its Integrated Resource Plan and supplemental information for review on November 20, 2023. This staff paper presents the results of the California Energy Commission staff review of the *Vernon Public Utilities 2023 Integrated Resource Plan*.

Keywords: Publicly owned utility, integrated resource plan, Vernon Public Utilities, VPU, demand, resources, portfolio, generation, transmission, distribution, Renewables Portfolio Standard, forecast, energy efficiency, transportation electrification, demand response, greenhouse gas, GHG, emissions, system reliability

Please use the following citation for this report:

Tanghetti, Angela, Brian McCollough. 2025. *Review of Vernon 2023 Integrated Resource Plan*. California Energy Commission. Publication Number: CEC-200-2025-001.

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EXECUTIVE SUMMARY

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires publicly owned utilities meeting an electrical demand threshold to adopt an integrated resource plan that meets certain requirements, targets, and goals, including greenhouse gas emission reduction targets and renewable energy procurement requirements set forth in Public Utilities Code Section 9621. The California Energy Commission's *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* require the utilities to file an integrated resource plan with data and supporting information sufficient to demonstrate that they meet these requirements as well as the targets and planning goals from 2018 to 2030. Pursuant to PUC Section 9622, the CEC must then review the integrated resource plans for consistency with the requirements of PUC Section 9621.

The *Vernon Public Utilities Integrated Resource Plan* serves as a framework for the utility's transition away from carbon resources, such as natural gas, to clean renewable resources such as wind, geothermal, biogas, hydroelectric, and solar. The utility's long-term strategy is to identify the optimal resource procurement strategy at the bulk-power-system level. This strategy encourages distributed energy resource growth, promotes a highly reliable distribution system, and fosters customer engagement. In late 2021, Vernon Public Utilities repurchased the Malburg Generating Station from Bicent Power LLC, which allows it to use this plant and the H. Gonzales units, the second facility within its service territory, more efficiently depending on operating and market conditions. Vernon Public Utilities' decision to repurchase Malburg Generating Station allows it, starting in 2030, to operate this natural gas facility in a one-by-one configuration (one combustion turbine and one steam turbine) with limited strategic dispatch in the off-peak months. After 2035, Vernon Public Utilities plans to stop operating Malburg Generating Station and expects to meet over 90 percent of its load with carbon-free resources.

In reviewing the *2023 Vernon Public Utilities Integrated Resource Plan* and determining consistency with the requirements of Public Utilities Code Section 9621, CEC staff relied on the four standardized reporting tables and narrative descriptions in the integrated resource plan filing, as well as analysis and verification of the materials submitted. Staff presents the following conclusions in accordance with the requirements:

- *Achieving Greenhouse Gas Emissions Targets and Renewables Portfolio Standard Requirements:* The utility plans to meet the greenhouse gas emission reduction requirements of PUC Section 9621(b)(1), and the renewable energy procurement requirement of PUC Section 9621(b)(2). Two recently signed Renewable Portfolio Standard-eligible Power Purchase Agres for solar photovoltaic plus battery energy storage systems allows the utility to serve this requirement and target. One system, the Daggett facility is online and consists of 60 megawatts of solar photovoltaics and 30 megawatts of battery electric storage, and the second consists of 39 megawatts of solar photovoltaics and 19.67 megawatts of battery electric storage at the Sapphire Solar facility, scheduled to come online by year end 2026.

- *Meeting Planning Goals:* The utility intends to meet planning goals related to retail rates, reliability, transmission and distribution systems as set forth in Public Utilities Code Section 9621(b)(3). The utility's retail rates are competitive with other utilities in this region and the preferred portfolio is on track to offer the lowest rates in California by 2030. This portfolio also includes resources for sufficient capacity to meet anticipated resource adequacy requirements. To meet transmission and distribution systems goals, Vernon Public Utility plans to make investments in existing transmission and distribution facilities, distributed energy resources and in electric vehicle fast chargers for under-resourced communities.
- *Considering Peak Needs:* The utility has considered the role of existing renewable generation, grid operational efficiencies, energy storage, and distributed resources (including energy efficiency) in helping to ensure the utility's energy and reliability needs in the hours that encompass the peak hour as set forth in PUC Section 9621(c). The Vernon Public Utility system peak demand is unique since it occurs between 10:00 a.m. and 2:00 p.m. Monday through Friday, year-round, allowing the use of renewable solar resources to meet energy needs during its peak demand hours.
- *Addressing Resource Procurement Types:* The utility addressed the procurement requirements for energy efficiency and demand response, energy storage, transportation electrification, portfolio diversification, and resource adequacy as set forth in PUC Section 9621(d). Vernon Public Utilities is expected to meet its individual energy efficiency doubling goal in 2026 and has signed two power purchase agreements for energy storage. The preferred portfolio includes solar, wind, and zero-carbon fuels to fire thermal generation which provide renewable diversity; energy storage, nuclear and hydro provide capacity.

CHAPTER 1: Demand Forecast and Procurement

Introduction

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires publicly owned utilities (POUs) with an annual electrical demand exceeding 700-gigawatt hours (GWh) to develop integrated resource plans (IRPs).[1] IRPs are electricity system planning documents that describe how utilities plan to meet their energy and capacity resource needs while achieving policy goals and mandates, meeting physical and operational constraints, and fulfilling other priorities such as reducing impacts on customer rates. SB 350 requires the governing board of a POU to adopt an IRP and a process for updating it at least once every five years starting no later than January 1, 2019.[2] Vernon Public Utilities (VPU), filed its initial IRP on January 10, 2019, and was deemed compliant by the CEC in July of 2019.

PUC Section 9622 requires the California Energy Commission to review POU IRPs to ensure they achieve PUC Section 9621 provisions. If the CEC determines an IRP is inconsistent with the requirements of PUC Section 9621, the CEC shall provide recommendations to correct the deficiencies. The CEC adopted the *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* (*Guidelines*) to govern the submission of the POU's IRPs.[3]

This chapter outlines the CEC's review process and provides an overview of VPU and its IRP development process. In addition, the chapter addresses the *Guidelines'* requirements that POUs provide a demand forecast and a procurement plan as part of its IRP.

Vernon Public Utilities

VPU is a vertically integrated, city-owned, not-for-profit utility that provides electric, water, gas, and fiber optic services in Los Angeles County. It has electric sales of about 1,151 GWh annually and peak loads of approximately 189 MW in the summer and 174 MW in the winter. VPU serves about 1,900 customers which are mainly commercial and industrial in an industrial city of 5.2 square miles.

VPU's electric system includes generation and distribution facilities that are completely located within VPU's electric service territory in the Los Angeles Basin. VPU has two generation facilities within VPU service territory: Malburg Generating Station (MGS), a 139 MW combined-

1 PUC § 9621.

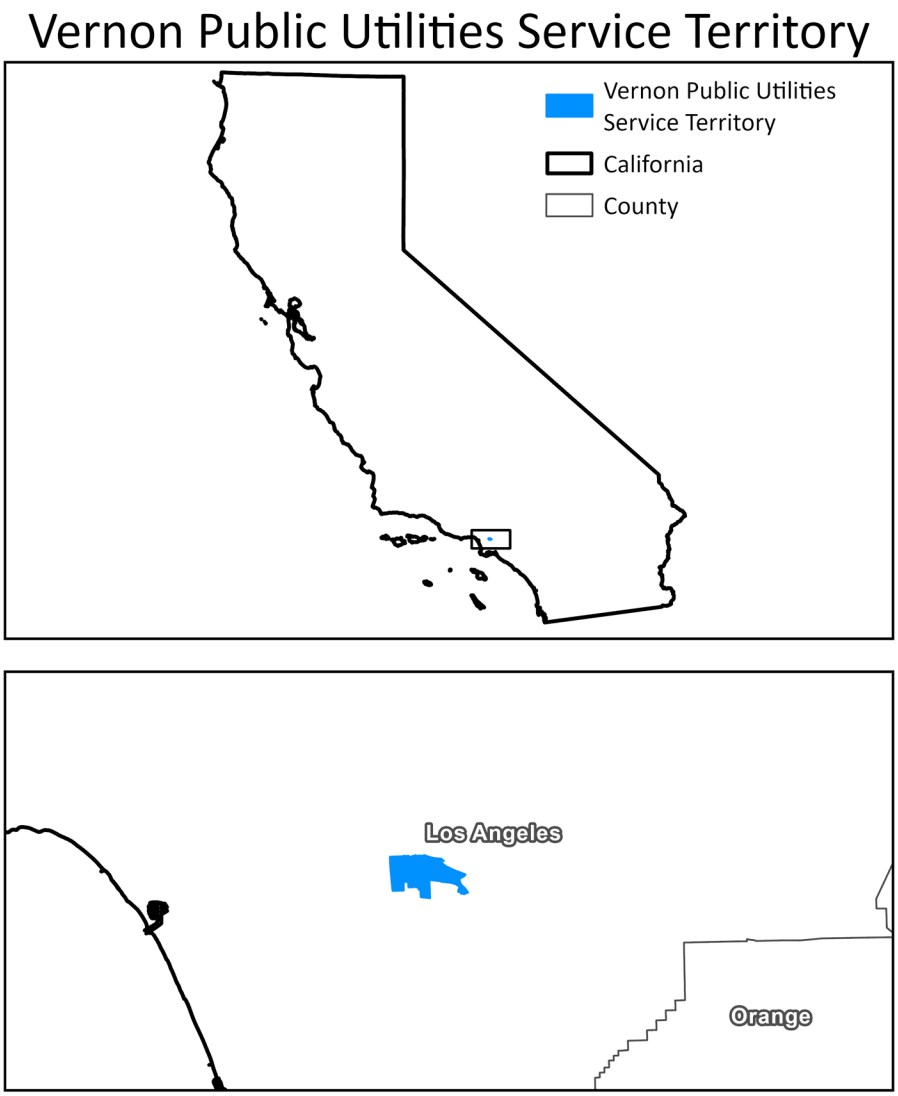
2 PUC § 9621(b).

3 CEC. October 2018. *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines - Revised Second Edition (Chapter 2.E.1)*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=224889&DocumentContentId=55481.

cycle natural gas-fired plant, and H. Gonzales Units 1 and 2, a combined 11.5 MW natural gas plant. VPU has 119 miles of distribution lines and 27 miles of 66 kV sub-transmission lines.

VPU does not own or operate any transmission facilities. On October 7, 2022, VPU terminated all three of its transmission contracts with SCE and LADWP after determining that the existing transmission contracts were no longer economically beneficial for its ratepayers. As a result, VPU no longer participates in the California Integrated System Operator (California ISO) market as a participating transmission owner. VPU does, however, continue to participate in the California ISO market under a metered subsystem agreement. The California ISO concurred with the termination of these three existing transmission contracts and entitlements, and VPU's withdrawal from the transmission control agreement. VPU then filed for Federal Energy Regulatory Commission approval to terminate its transmission owner tariff and received approval in 2023.

Figure 1: Map of Vernon Public Utilities Service Territory



VPU Planning Process

The development of the *Vernon Public Utilities 2023 Integrated Resource Plan (IRP)* focused on four components: resource acquisition and resource retirement, distributed energy resources, customer engagement, and distribution systems. The Vernon City Council is responsible for approving the IRP while the VPU Board of Directors is ultimately responsible for developing and implementing the IRP. To educate stakeholders about this IRP process, purpose, and goals, VPU created a dedicated website and held three meetings for stakeholders, the Green Vernon Commission, and the Vernon Business and Industry Commission. VPU also conducted a customer survey to gauge public interest and insight that prioritized and shaped the IRP. Survey participation was encouraged and gathered at City-sponsored events, through email and phone calls, and leaflets mailed with customers' monthly invoices. On October 17, 2023, the Vernon City Council approved this *IRP*.[4]

Energy and Peak Demand Forecast, Method and Assumptions

The *Guidelines* identify the need for a forecast of energy and peak demand to determine whether a POU's IRP is consistent with the requirements of PUC Section 9621.[5] The *Guidelines* also state that the POU must provide information on the method used in developing the demand forecast if a POU uses a forecast other than the CEC's adopted demand forecast.[6] The demand forecast and supporting information provided present an adequate representation of future energy and peak demand that meets the *Guidelines* requirements.

VPU contracted with NewGen Strategies & Solutions (NewGen) to create the electricity sales and demand forecast used as the basis for this IRP. NewGen used a forest regression-based model to forecast its expected system peak and energy demand.[7] The models were developed with historical monthly data from 2000 through 2017. Variables in the models included heating-degree days, cooling-degree days, industrial production, and manufacturing employment. VPU adjusted the forecast to account for customer load additions, estimated customer-side solar photovoltaic (PV) installations, expected electric vehicle (EV) energy demand, and impacts from energy efficiency and demand-side management.

VPU's forecasted peak demand is 171 MW and 1,314 GWh of energy to be served in 2030. The utility anticipated that EV load is to increase from 4.8 GWh in 2024 to 32.0 GWh in 2030. VPU

4 City of Vernon, *Published Document 3540*, available at: https://www.cityofvernon.org/home/showpublisheddocument/3540/638331613916230000

5 *POU IRP Guidelines*, Chapter 2, E., pp. 5-6

6 Given the timing of these POU IRP submittals the adopted forecast vintage is the 2022 CED Update. California Energy Demand Update, 2022-2035

7 Forest regression models utilize decision trees, which are binary decisions that the model makes to determine data classification and predictor variables. This produces several forecasts for the most likely amount of the predictor variable, energy consumed, in a specific hour.

forecasts an incremental 0.3 MW of energy efficiency savings per year, yielding 2.6 GWh annually.[8] One of VPU's largest customers increased its manufacturing process during weekday off peak hours in the summer of 2020 which caused the utility to see its highest average daily profile in August of 2021. This increase in demand and daily profile impacts future demand and profile projections through the forecast period. Lastly, through its distributed generation solar program, VPU plans to install an additional 40 MW to its existing 4.3 MW of distributed solar by 2030.

Staff compared VPU's energy and peak demand forecast to the Energy Commission's 2022 Demand Forecast Update report and found the VPU demand forecast to be in the acceptable range.

Resource Procurement Plan

The *Guidelines* require that POUs report the mix of resources they plan to use to meet demand through 2030.[9] POUs are also required to provide an IRP with data and supporting information sufficient to demonstrate that the POU's plan to meet the various targets and goals. Staff has determined this IRP filing meets these requirements. The following is a discussion of the utility's existing resources, procurement strategy, the portfolio analysis underlying resource selections, and the resources in 2030 identified in the standardized reporting tables.

Existing Resources

VPU's current resource mix includes natural gas, nuclear, hydroelectric, landfill gas, and solar PV resources along with short-term market power purchases. In addition, VPU has recently signed two solar PV plus battery energy storage systems (BESS) RPS-eligible PPAs; one is recently online and the second scheduled to come online by year end 2026.

In the 1980s, VPU obtained ownership of a natural gas-fired power plant, the H. Gonzales Generating Station (11.5 MW), in Vernon. The utility also entered into long-term contracts for output from the Palo Verde Nuclear Station (11 MW) and the Hoover Dam Hydroelectric Power Plant (12 MW). In 2005, VPU obtained the MGS, a 134 MW natural gas power plant within the city. MGS is the primary source of reliable baseload generation for VPU and is currently the largest source of greenhouse gas (GHG) emissions for the utility. VPU plans to start operating this natural gas facility differently in 2030. VPU plans to change the plant to a 1x1 configuration (one combustion turbine and one steam turbine) allowing more strategic dispatch in the off-peak months. This change to operating the plant as a single combustion turbine will allow VPU more load-following flexibility for renewable integration, which lowers renewable curtailment, and will reduce GHG emissions.

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8 VPU. November 2023. 2023 Integrated Resource Plan, Vernon Public Utilities, pp. 4-10. https://efiling.energy.ca.gov/GetDocument.aspx?tn=253268&DocumentContentId=88473.

9 CEC. October 2018. POU IRP Guidelines, p. 6. https://efiling.energy.ca.gov/getdocument.aspx?tn=224889.

After 2035, VPU plans to stop operating MGS and is expecting to meet over 90 percent of its load with carbon-free resources. In the preferred portfolio the replacement resources are solar and BESS. VPU is monitoring market and technology conditions that could include geothermal and hydrogen resources by 2035.

Resource Portfolio Evaluation

VPU and its consultant Ascend Analytics developed resource portfolios for this IRP, revolving around alternative replacement options for MGS. VPU licensed and configured PowerSIMM for the modeling in this analysis to capture variability and uncertainty in load, renewables, and prices while maintaining structural parameters among the variables. PowerSIMM provides capacity expansion, resource adequacy, and production cost modeling. The modeling in this IRP relied on stochastic models for capacity expansion and production cost.

VPU considered several candidate resources that included both renewable generation (geothermal, solar PV, BESS, and wind) and clean energy generation (hydrogen and carbon capture and sequestration). Its preferred portfolio includes a mix of solar PV, BESS and wind. VPU considered two alternative portfolios that included geothermal and hydrogen generation that were much more expensive and, as such, were not selected in the preferred portfolio.

VPU's near-term action plan for its preferred portfolio will focus on procuring additional RPS sources from Daggett Solar PV plus BESS, and Sapphire Solar PV plus BESS by year end 2026. VPU will continue to monitor the economics and viability of solar, wind, and energy storage versus geothermal and hydrogen generation to assess its viability in future IRPs. By 2030, VPU plans to reduce operation at MGS and replace that energy with new clean energy contracts and spot market purchases.

Procurement Strategy

VPU is focusing procurement in three areas:

1. The repurchase of MGS in 2028 and upgrading the existing combustion system to increase operating flexibility to better integrate intermittent renewables and lower emissions while generating at lower operating levels
2. Deployment in Southern California of 60 MWs of solar PV and 30 MW of BESS at the recently online Daggett Solar facility; and 39 MWs of solar PV and 19.67 MW of BESS at the Sapphire Solar facility by year end 2026.
3. Monitor markets and technology and adapt as new information emerges to adapt the preferred portfolio with additional proven clean technologies, including solar, wind, geothermal, hydrogen, and BESS.

CHAPTER 2:
Review for Consistency with PUC Section 9621 Requirements

This chapter summarizes the main elements of the *IRP* and provides staff's findings regarding the consistency with PUC Section 9621 requirements, as well as the *Guidelines*. These findings include whether the utility meets GHG emission reduction targets and RPS energy procurement requirements, as well as planning goals for retail rates, reliability, transmission and distribution systems, net load, and disadvantaged communities. In addition to the above elements, the IRP must address procurement of energy efficiency and demand response, energy storage, transportation electrification, and portfolio diversification.

Greenhouse Gas Emission Reduction Targets

POUs are required to meet the GHG targets established by the California Air Resources Board (CARB), in coordination with the CEC and CPUC.[10] The initial GHG targets set by CARB reflect the electricity sector's percentage in achieving the economy-wide GHG emission reductions of 40 percent from 1990 levels by 2030. Staff finds that VPU plans to achieve the established GHG emission target range of 30-53 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) published in the *SB 350 IRP Electric Sector GHG Planning Targets: 2020 Update* [11] *(2020 CARB Update)*. VPU's preferred portfolio results are in compliance with the requirement of PUC Section 9621(b)(1).

In 2023, the electricity sector GHG planning target range was brought into alignment with CARB's *2022 Scoping Plan for Achieving Carbon Neutrality* adopted in September 2023 (*2023 CARB Update*).[12] The electricity sector GHG planning target range retains the lower bound of 30 $MMTCO_2e$ from the *2020 CARB Update* but reduces the upper bound from 53 to 38 $MMTCO_2e$. It is important to note that the *2023 CARB Update* electricity sector GHG emission targets were published after VPU's *IRP* analysis was complete.

The IRP preferred portfolio will allow VPU to fall under its utility-specific *2020 CARB Update* GHG target of 149,000 – 263,000 $MTCO_2e$ but not the *2023 CARB Update* target of 149,000 – 189,000 $MTCO_2e$. CEC staff reviewed the GHG emissions associated with VPUs preferred

10 Public Utilities Code § 9621(b)(1).

11 CARB. March 2021. SB 350 IRP Electric Sector GHG Planning Targets: 2020 Update. https://ww2.arb.ca.gov/sites/default/files/2021-04/sb350-final-report-2020.pdf.

12 CARB. September 2023. SB 350 Final Report 2023. https://ww2.arb.ca.gov/sites/default/files/2023-09/sb350-final-report-2023.pdf.

portfolio of resources in 2030 and independently assessed the emission factors associated with various resources in VPU's portfolio to ensure consistency with other data available.

VPU's preferred portfolio results in roughly 220,000 Metric Tons CO_2e, consistent with the requirement of PUC Section 9621(b)(1).

Table 1 shows GHG emissions for VPU's preferred portfolio of resources in 2030.

An area that deserves discussion is the GHG emissions assigned to spot market electricity purchases. From at least 2011 on, a static average value called the GHG emission intensity, was assigned to all spot market purchases for the emissions released by the electric generating resources on the grid. During discussions with VPU staff, the assumptions behind the GHG emission intensity for spot market purchases were questioned. They requested that the CEC consider refining this metric to a more granular time-step. CEC staff will look more closely at this issue when revising the POU IRP Guidelines, which should be in place before the next IRP reporting cycle.

VPU is unique in that its system peak occurs between 10:00 a.m. and 2:00 p.m. Monday through Friday, year-round. In recent years, during these hours, the California ISO consistently observed some of the lowest emission intensity values, including zero, as increasing amounts of solar generation are connected to the system. During the 10:00 a.m. – 2:00 p.m. hours the observed GHG emission intensity is much lower than the 0.428 MT CO_2e/MWh metric required as a default for spot market purchases every year of the forecast period.

VPU is monitoring market conditions for cost-effective clean technology replacements for MGS in 2030 and beyond. Currently VPU is including spot market purchases to backfill the MGS decreased generation from this natural-gas fired resource. If VPU is able to use a GHG intensity metric for spot market purchases that is more granular than the static value, it is possible its Preferred Portfolio could also meet the *2023 CARB Update* of 2030 total emissions. As it stands, VPU is in compliance with the *2020 CARB Update* limit but exceeds the *2023 CARB Update* limit.

Table 1: Greenhouse Gas Emissions from VPU Preferred Portfolio

Power Source	Fuel Type	GHG Intensity (MT CO_2e /MWh)	Total Emissions (MT CO_2e) 2023	Total Emissions (MT CO_2e) 2025	Total Emissions (MT CO_2e) 2030
Malburg Generating Station	Natural Gas	0.428	165,241	166,827	44,645
H Gonzales 1 & 2*	Natural Gas	0.428	0	0	0
Puente Hills Landfill	Renewable Natural Gas	0	0	0	0
Net Spot market purchases (sales)	System	0.428	191,652	167,605	175,400
Total Portfolio emissions	**NA**	**NA**	**356,893**	**334,432**	**220,045**

Source: CEC, Energy Assessments Division, Based on VPU IRP filing

*Below the Cap and Trade Covered Emitting Entities

Renewables Portfolio Standard Planning Requirements

PUC Section 9621(b)(2), as established by SB 350, requires that POU IRPs ensure procurement of at least 50 percent renewable energy resources by 2030, consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3. In 2018, SB 100 (de León, Chapter 312, Statutes of 2018) increased the RPS requirement for 2030 from 50 to 60 percent by 2030.[13] Staff reviewed the renewable procurement table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that VPU's IRP preferred plan is consistent with the RPS procurement requirements and all interim compliance periods, as well as the requirements of PUC Section 9621(b)(2).

VPU's renewable procurement plans include additions of new renewable resources between year-end 2023 and 2030, and VPU anticipates that RPS-eligible renewables will account for at least 60 percent of retail sales in 2030.

Retail Rates

PUC Section 9621(b)(3) requires POUs to develop IRPs that enhance each POU's ability to fulfill its obligation to serve its customers at just and reasonable rates, minimizing impacts to ratepayer bills. Staff reviewed the analysis and information VPU presented in its IRP filing on the rate and bill impacts from different resource portfolios they evaluated. Staff finds the IRP consistent with the rates discussion, as required in PUC Section 9621(b)(3).

Maintaining competitive and stable rates is an essential goal for VPU and was fundamental in developing this IRP. VPU believes it is possible to meet its clean energy and customer-centric

13 Public Utilities Code § 399.11(a).

goals from its power supply in 2030 with rates that are competitive and stable for its customers. VPU also plans to make investments in transmission and distribution facilities, distributed energy resources and in EV fast chargers for under-resourced communities. VPU offers time-of-use (TOU) rates to their commercial and industrial customers which comprise over ninety percent of their customer accounts. VPU's mission for this IRP is to offer the lowest rates in California by 2030.

System and Local Reliability

SB 350 requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.[14] Staff reviewed the IRP filing capacity reporting table and discussion and finds that VPU has planned for sufficient resources to maintain a reliable electric system. In addition, VPU's preferred portfolio of resources contains sufficient capacity to meet anticipated resource adequacy requirements in 2030. Staff finds this IRP is consistent with reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Section 9621(d)(1)(E).

System Reliability

VPU strategic vision places significant emphasis on operational reliability indices. VPU tracks the following three reliability indicators that the electric utility industry uses to assess and improve the performance of power distribution systems.

- System Average Interruption Frequency Index (SAIFI): Quantifies the frequency of power outages per customer within a year.
- System Average Interruption Duration Index (SAIDI): Measures the duration of power outages experienced by the average customer over a year.
- Customer Average Interruption Duration Index (CAIDI): Provides the average time it takes to restore power after an outage, calculated by dividing SAIDI by SAIFI.

VPU utilizes data from the U.S. Energy Information Administration, which annually calculates the above mentioned nationwide and regional electric utility reliability benchmarks. These benchmarks enable VPU to evaluate and compare its operational performance against industry standards and best practices. This process involves measuring these various reliability indices and then comparing against other utilities in California. Using these indices and 2021 as a comparison year, VPU is approximately equal with other POUs in California.

VPU plans to meet its projected peak hour 1-in-2 electricity demand by following federal, state, and North American Electric Reliability Corporation requirements and standards for

14 Public Utilities Code § 9621(b)(3); Public Utilities Code § 454.52(a)(1)(E).

reliability and operations. VPU plans to meet its peak load conditions, plus a 15 percent planning reserve margin.

Local Capacity Needs

VPU resides in the Los Angeles Basin Local Reliability Area and meets the California directed 70 MW local resource adequacy (RA) obligation through its owned and operated MGS and H. Gonzales power plants. This local generation insulates VPU from a double contingency (N-2)[15] involving two transmission lines.

Flexible Capacity Needs

The California ISO dictates the flexible RA requirements for VPU who meets those requirements by deploying locally sited eligible capacity of 105 MW with MGS and 23 MW with H. Gonzales.

Incorporating more wind and solar PV power production increases the variability of the electrical generation in the system. As such, other resources that can be dispatched or turned on to balance out decreases in generation from solar and wind must also be added, so loads on the system can be reliably served. This need is described in utility planning as an increase in flexible RA requirements. VPU's flexible RA requirement increased by more than 58 percent compared to the requirements stated in VPU's previous IRP. VPU assumed the addition of approximately 60 MW of solar with BESS would require an approximate increase of 50 MW flexible RA capacity. Ongoing increases in flexible RA requirements, together with associated costs, were factored into the modeling and analysis of this IRP's preferred portfolio. The *VPU* flexible RA requirement was 66 MW in 2023 and its flexible RA capacity available from MGS and H. Gonzales local facilities is 116.5 MW. This 116.5 MW will meet the future increase in the flexible RA requirement due to the 60 MW of solar capacity that will be online by the end of 2026.

Transmission and Distribution Systems

PUC Section 9621(b)(3) requires filing POUs to adopt an IRP that achieves the goal of strengthening the diversity, sustainability, and resilience of the bulk transmission and distribution systems and local communities, as further specified in PUC Section 454.52(a)(1)(G). Staff determined that the IRP filing adequately plans to maintain and enhance its transmission and distribution systems. Staff finds that VPU is planning for enough transmission to adequately deliver resources to its service area to meet the requirement as discussed below. Staff also finds that VPU plans to address the adequacy of its distribution system and as such, finds the IRP is consistent with the transmission and distribution requirements set forth above.

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15 An N-2 contingency is a power system event that occurs when two or more major components fail simultaneously.

Transmission System

VPU's service territory, entirely located within the California ISO Balancing Authority Area, includes approximately 145 miles of sub-transmission and distribution lines which include three voltage levels: 7 kV, 16 kV, and 66 kV. Approximately 80 percent of the distribution system lines are overhead. The VPU electric system has nine substations four of which, Leonis, McCormick, Vernon, and Ybarra, are system-wide distribution substations. The remaining five are customer-dedicated substations: Owill, Beejay, Kinetic, Trigas, and Maisano.

The City of Vernon has limited real estate to site additional generation resources. Thus, a robust transmission system is necessary to import the renewable and zero-carbon resources necessary to reliably satisfy demand while meeting state energy and environmental goals. To that end, VPU is benefiting from upgrades beyond its service territory that were approved in the California ISO 2022-2023[16] and 2023-2024[17] transmission planning process. These approved upgrades are to the Laguna Bell-Mesa and the Lighthipe-Mesa 230 kV transmission lines, as well as upgrades to the Laguna Bell substation and the repowering of the Huntington Beach transmission line. These upgrades increase reliability and transmission line capacity.

Distribution System

VPU's distribution system is also located entirely within the California ISO Balancing Authority Area. It is connected to California ISO transmission and distribution system through the SCE 220-66 kV Laguna Bell Substation. Five 66 kV source lines that exit the SCE Laguna Bell 220-66 kV Substation supply and support the VPU load. Due to the presence of local MGS generation, VPU's electric system can withstand a double contingency (N-2) situation where two 66 kV transmission lines are out of service.

Locally, VPU has recently completed a $25 million Capital Improvement Plan, upgrading the aging distribution system to increase its load carrying capacity and increase system reliability.

The following actions are part of VPUs 2024 Five-Year Capital Improvement Plan:

- Continue to replace and upgrade distribution infrastructure to increase capacity, maintain system reliability, and system resilience.
- Implement additional distribution system automation by installing intelligent line switches and automatic reclosers to improve VPU's smart grid and diminish the impact of electric system outages on customers.
- Upgrade line conductors, transformers, and complete voltage conversions at electric substations to foster higher reliability and increase capacity.

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16 California Independent System Operator (CAISO), *2022-2023 Transmission Plan*, available at: https://www.caiso.com/documents/iso-board-approved-2022-2023-transmission-plan.pdf.

17 Ibid.

- Replace obsolete and aging circuits, cables, and relays with state-of-the-art technology.
- Proactively replace utility poles in a strategic manner.
- Perform system undergrounding in conjunction with development and City projects for improved system reliability.

VPU plans to complete these upgrades and improvements and all other resource planning actions by the next IRP cycle in five years.

Disadvantaged Communities and Localized Air Pollutants

VPU is making efforts to minimize localized air pollutants and GHG emissions. Staff reviewed this IRP filing to determine the extent to which it minimizes local air pollutants with a priority placed on disadvantaged communities.

Within proximity to the City of Vernon are some of the highest priority communities in southern California in terms of exposure to air pollution. The City is developing an Environmental Sustainability Action Plan and has already undertaken several initiatives toward this issue.

As the City's electric utility, VPU noted the following efforts in its IRP to minimize air pollutants.

1. VPU reduced generation from its local natural gas power plant, MGS, over the last year by approximately 23 percent by favoring lower cost renewables during peak production. This in turn, has reduced GHG emissions and other criteria pollutants including SOx, NOx, PM 10/2.5, and CO in the area.

2. VPU offers two rebate programs that help reduce GHG emissions and other criteria pollutants including SOx, NOx, PM 10/2.5, CO. The first is a rebate of up to $5,000 for EV purchases for residential electric customers and a second rebate for gas customers. For the second rebate VPU will fund Vernon business customers' approved emission reduction programs that can include the purchase of lower emission machinery, electric forklifts, and natural gas truck fueling stations.

3. VPU provides net metering rates for customers who install behind-the-meter renewable generation.

Net Energy Demand in Peak Hours

Senate Bill 338 (Skinner, Chapter 389, Statutes of 2017) requires POUs to consider existing renewable generation, grid operation efficiency, energy storage, distributed energy resources, and energy reduction measures (such as energy efficiency and demand response) to reduce the need for new or additional gas-fired generation and distribution and transmission resources (PUC Section 9621(c)). The IRP includes a discussion of how it considers preferred resources to meet peak demand when selecting its portfolio. VPU's preferred portfolio is consistent with the requirement set forth above.

VPU's Preferred Portfolio for 2030 includes reducing generation from its local natural gas power plant, MGS, in favor of lower cost renewables during VPUs peak demand hours of 10:00 a.m. to 2:00 p.m. It also includes approximately 50 MW of regional storage, capturing excess solar from the Dagget and Sapphire Solar PV facilities. The near-term plan for MGS replacement is to utilize spot market purchases, allowing the utility to focus on long-term plans that include lithium-ion energy storage, a green hydrogen combustion turbine or geothermal generation.

Additional Procurement Goals

PUC Section 9621(d)(1) requires filing POUs to address procurement of energy efficiency and demand response, energy storage, transportation electrification, and a diversified portfolio, which are discussed in the next section. The resource adequacy provisions of this code section are discussed in system reliability section above.

Energy Efficiency and Demand Response Resources

CEC Staff finds that VPU's IRP is consistent with the requirement in PUC Section 9621(d)(1)(A) as it includes a discussion of energy efficiency and demand response programs it plans to implement and quantifies the amount of energy efficiency savings it plans to achieve.

This *IRP* demonstrates the integration of energy efficiency (EE) programs and demand response (DR) opportunities in the forecasting process. VPU has a unique blend of customers, as 99 percent of its power is distributed to commercial businesses and industrial facilities. This distinction is important because VPU's unique customers base has a distinct set of needs.

With that context, this IRP lists its energy efficiency programs, including a customer incentive program. Historic energy efficiency savings are enumerated for VPU's non-residential customer base between two program categories, lighting incentive programs and non-lighting incentive programs. VPU continues to provide free comprehensive energy audits tailored to the needs of industrial businesses, including recommendations for efficient lighting, cold storage refrigeration, and energy efficient machinery.

For the upcoming years in the forecasting horizon, VPU performed an EE potential study leading up to 2031 and set an intermediary annual energy efficiency target of 2.5 GWh. If VPU continues to hit this target for the remainder of the SB 350 forecast period, it will achieve its individual energy efficiency doubling goal early in 2026 and is already 11 GWh ahead of schedule.[18]

For VPU, traditional demand response initiatives have been challenging because the demand of its commercial and industrial customer base cannot easily shift. Doing so would interrupt or

18 Revised SB 350 Doubling Energy Efficiency Savings by 2030, California Energy Commission (October 2017), https://efiling.energy.ca.gov/GetDocument.aspx?tn=224615&DocumentContentId=55172.

reshuffle business operations, so customers show little interest in traditional DR programs. VPU outlined its plan to address this challenge by continuing to "identify strategic partnerships to advance energy storage on customer premises as a form of DR."

is on track to surpass the energy efficiency goal set forth by Senate Bill 350 and help achieve the doubling of energy efficiency statewide. Thus, VPU has demonstrated throughout its IRP that it is working to actively incorporate energy efficiency and demand response into its planning process.

Energy Storage

CEC staff finds that this IRP is consistent with the requirement in PUC Section 9621(d)(1)(B) to address procurement of energy storage as it discussed the potential role of energy storage on its system. Assembly Bill 2514 (Skinner, Chapter 469, Statutes of 2010) also requires POUs to evaluate the potential of energy storage systems as a resource and establish procurement targets, if appropriate.

VPU added 30 MW of BESS to its portfolio at year end 2023 and has contracted for an additional 19.67 MW of BESS located at the Sapphire Solar PV project by year end 2026.

Transportation Electrification

Staff finds that this IRP is consistent with the requirement of PUC Section 9621(d)(1)(C) as it addresses transportation electrification, projecting for light-duty EV growth.

Vernon has programs to encourage transportation electrification that include a VPU Commercial EV Charger Incentive Program, a VPU Commercial Electric Forklift Incentive Program, and a VPU Residential EV Program. Vernon also offers customer education and outreach, including cross-promotion, and an "Electrify Vernon" custom brand. The majority of VPU's customer base is commercial. VPU offers qualifying commercial electric customers a time-of-use rate plan (TOU-V)[19] VPU plans to review specific electric rate design options for electric vehicles in future IRPs.

To forecast EV penetration over the short-term planning period, VPU used two EV load profiles: one for public daytime charging, and one for non-business hour charging (mostly for fleets). VPU assumed that approximately 2,500 passenger EVs were added each year, which represents an estimated five percent of the 50,000 vehicles estimated to enter the City of Vernon daily. Finally, VPU assumed that 35 percent of these EVs were charged in VPUs service area, each averaging 5,000 kilowatt hours (kWh) of total charging consumption annually. The VPU forecast for EV adoption levels include light-duty, medium-duty, and heavy-duty

19 https://www.cityofvernon.org/government/public-utilities/rates-fees/-folder-49

penetration for the next decade as well as the small amount of peak demand and energy consumption for the existing VPU EV population.

In 2023, the capacity (in MW) required for charging EVs in the VPU service area represented only 0.45 percent of peak demand. In the long-term, that amount rises to 1.17 percent of peak demand, an increase of almost 260 percent. Similarly, the energy (in GWh) required for charging EVs in VPU represented only 0.38 percent. In the long-term, that amount rises to 0.94 percent, an increase of almost 250 percent.

Portfolio Diversification

PUC Section 9621(d)(1)(D) requires that POUs address the procurement of a diversified portfolio of resources consisting of both short-term and long-term electricity, and demand-response products. The VPU preferred portfolio includes modeling and reliability analyses as well as a diverse array of zero-emission resources. Those resources include solar, wind, and zero-carbon fuels to fire thermal generation which provide renewable diversity to the VPU Preferred Portfolio; while BESS, nuclear and hydro provide capacity.

APPENDIX A: Abbreviations

Abbreviation	Term
BESS	Battery Energy Storage System
BYOD	Bring your own device
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DR	Demand Response
EE	Energy Efficiency
EV	Electric vehicle
GHG	Greenhouse gas
GWh	Gigawatt-hours
IEPR	Integrated Energy Policy Report
IPP	Intermountain Power Plant
IRP	Integrated resource plan
kWh	Kilowatt-hours
kV	Kilovolt
LADWP	Los Angeles Department of Water and Power
MGS	Magnolia Generating Station
MMTCO2e	Million metric tons of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
NOx	Nitrogen Oxides
PM 10/2.5	Particulate matter 10 includes particles less than 10 µm in diameter, 2.5 are those less than 2.5 µm
POU	Publicly owned utility
PPA	Power purchase agreement
PUC	Public Utilities Code

Abbreviation	Term
RA	Resource Adequacy
RPS	Renewables Portfolio Standard
SB 1020	Senate Bill 1020 (Laird, Chapter 361, Statutes of 2022)
SB 350	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)
SCE	Southern California Edison
SOx	Sulfur Oxides
TOU	Time of Use
VPU	Vernon Public Utility

APPENDIX B:
Glossary

Term	Definition
Behind-the-meter resources	Generation and storage located at the customer site. More generally, it can refer to any device located at the customer site that affects the consumption of grid-provided energy (appliance control systems, for example)
California Air Resources Board (CARB)	The "clean air agency" in California government. CARB's main goals include attaining and maintaining healthy air quality, protecting the public from exposure to toxic air contaminants, and providing innovative approaches for complying with air pollution rules and regulations.

Term	Definition
California Energy Commission (CEC)	The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's seven major areas of responsibilities are: 1. Forecasting statewide energy demand. 2. Licensing of power plants and transmission lines sufficient to meet those needs. 3. Promoting energy conservation and efficiency measures. 4. Promoting the development of renewable energy. 5. Promoting the transition to clean transportation fuels. 6. Investing in energy innovation. 7. Planning for and supporting the state's response to energy emergencies. Funding for the Commission's activities comes from the Energy Resources Program Account, Federal Petroleum Violation Escrow Account, and other sources.
Demand forecast	A forecast of electricity demand served by the electric grid, measured by peak demand and energy consumption. Some factors that determine load forecast include economics, demographics, behind-the-meter resources, and retail rates.
Demand response	Providing wholesale and retail electricity customers with the ability to choose to respond to time-based prices and other incentives by reducing or shifting electricity use, particularly during peak demand periods, so that changes in customer demand become a viable option for addressing pricing, system operations and reliability, infrastructure planning, operation and deferral, and other issues.

Term	Definition
Distributed energy resources	Small-scale power generation technologies (typically in the range of 3 to 10,000 kilowatts) located close to where electricity is used (for example, a home or business) to provide an alternative to or an enhancement of the traditional electric power system.
Greenhouse gas (GHG)	Any gas that absorbs infra-red radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), halogenated fluorocarbons (HCFCs) , ozone (O3), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).
Integrated Energy Policy Report (IEPR)	Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the Energy Commission to prepare a biennial integrated energy report. The report contains an integrated assessment of major energy trends and issues facing California's electricity, natural gas, and transportation fuel sectors. The report provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies, enhance the state's economy, and protect public health and safety.
Integrated resource plan (IRP)	A plan adopted by the governing board of a POU under PUC Section 9621.
IRP filing	An IRP adopted by the filing POU's governing board that is electronically submitted to the Energy Commission, along with the standardized tables and supporting Information, by the filing POU or authorized representative.
Nitrogen Oxides	NOx emissions come from burning fossil fuels, decaying vegetation, and many industries
Plug-in electric vehicle (EV)	A vehicle that uses one or more electric motors for propulsion. Electric vehicles include battery-electric and plug-in hybrid vehicles.
Public Utilities Code (PUC)	The set of laws that regulates public utilities in California, including natural gas, telecommunications, private energy producers, and municipal utility districts.

Term	Definition
Renewable Portfolio Standard (RPS)	A regulation that requires a minimum procurement of energy from renewable resources, such as wind, solar, biomass, and geothermal.
Senate Bill 1020 (Laird, Chapter 361, Statutes of 2022) (SB 1020)	This bill revised state policy to require eligible renewable energy resources and zero-carbon resources supply 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035, 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040, 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045, and 100 percent of electricity procured to serve all state agencies by December 31, 2035, as specified
Senate Bill 350 (De León, Chapter 547, Statutes of 2015) (SB 350)	Also known as the Clean Energy and Pollution Reduction Act, this bill established clean energy, clean air, and greenhouse gas reduction goals, including reducing greenhouse gas to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050. The California Energy Commission is working with other state agencies to implement the bill.
Sulfur Oxides	Emissions that come from the burning of fuels that contain sulfur
Standardized Tables	The four tables that are required with the IRP filing submitted to the Energy Commission. These tables include information and data necessary to help staff determine if the IRP is consistent with PUC Section 9621. The four standardized tables are Capacity Resource Accounting Table (CRAT), Energy Balance Table (EBT), Renewable Procurement Table (RPT), and Greenhouse Gas Emissions Accounting Table (GEAT).

Term	Definition
Time-of-use rates	(TOU) rates in California vary by time of day, season, and day type, with higher rates during peak demand hours and lower rates during off-peak hours. The goal of TOU rates is to encourage energy users to shift their usage from peak hours to off-peak hours, which can reduce overall costs for both the utility and customers.
Zero-emission resources	An engine, motor, process, or other energy source, that emits no waste products that pollute the environment or disrupt the climate.