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STAFF REPORT

Review of SMUD 2022 Integrated Resource Plan

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ABSTRACT

Senate Bill 350 (De León, Chapter 547, Statutes of 2015), (Public Utilities Code Section 9622) 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. Sacramento Municipal Utility District (SMUD) submitted its *2022 Integrated Resource Plan* and supplemental information for review on September 14, 2022. The SMUD IRP filing includes the 2030 Zero Carbon Plan, which the SMUD Board of Directors adopted as their IRP on June 16, 2022. This staff paper presents the results of the Energy Commission staff review of the SMUD 2022 integrated resource plan.

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

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EXECUTIVE SUMMARY

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

SMUD has a goal to eliminate GHG emissions from its electric generation supply by 2030. The resource planning process includes a focus on decarbonization strategies while also meeting statutory and regulatory requirements for reliability, GHG emissions, RPS requirements, and energy efficiency. To meet its zero-carbon goals, SMUD is focusing on:

- **Natural gas generation repurposing:** Prioritizing retirement of two natural gas plants located in disadvantaged communities, and re-tooling remaining thermal assets to use renewable fuels.
- **Proven clean technologies:** Use of carbon-free technologies available at utility-scale today, including solar, wind, geothermal energy, and battery storage.
- **New technologies and business models:** These may be currently unknown or not suitable for large-scale adoption but can be tested with pilot projects.
- **Financial impact and options:** Identifying savings, partnerships, and grants that support goals while maintaining reasonable rates.

In reviewing the SMUD IRP and determining consistency with the requirements of PUC Section 9621, Energy Commission staff relied on the four standardized reporting tables and narrative descriptions in the IRP filing, as well as analysis and verification of the materials submitted. Staff presents the following conclusions in accordance with the requirements of PUC Section 9621:

- *Achieving Greenhouse Gas Emissions Targets and Renewables Portfolio Standard Requirements:* The values reported in the standardized forms along with the narrative discussion in the IRP filing demonstrate the utility plans to meet the GHG emission reduction requirements of PUC Section 9621(b)(1) and the renewable energy procurement requirement of PUC Section 9621(b)(2).
- *Meeting Planning Goals:* The values reported in standardized forms along with the analysis and discussion in the IRP filing demonstrate the utility intends to meet planning goals related to retail rates, reliability, transmission and distribution systems, localized air pollution, and disadvantaged communities, as set forth in PUC Section 9621(b)(3).
- *Considering Peak Needs:* The values reported in the standardized forms along with analysis and narrative discussion demonstrate 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).

- *Addressing Resource Procurement Types:* The IRP filing includes values reported in the standardized forms and narrative discussion that demonstrate 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).

CHAPTER 1: Demand Forecast and Procurement

Introduction

Senate Bill 350 (de León, Chapter 547, Statutes of 2015) (SB 350) requires publicly owned utilities (POU) with an annual electrical demand exceeding 700-gigawatt hours (GWh) to develop integrated resource plans (IRPs) (California Public Utilities Code (PUC) Section 9621). 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 by January 1, 2019.¹

Further, PUC Section 9622 requires the California Energy Commission (CEC) 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 (POU IRP Guidelines) to govern the submission of the POU's IRPs. PUC Section 9622 requires the CEC to review POU IRPs to ensure they achieve PUC Section 9621 provisions.

This chapter outlines the CEC's review process and provides an overview of the Sacramento Municipal Utility District (SMUD) and its IRP development process. In addition, the chapter addresses the POU IRP Guidelines requirements that POU's provide a demand forecast and a procurement plan as part of their IRP.

Sacramento Municipal Utility District

SMUD is a community-owned, not-for-profit utility that provides electricity to Sacramento County and a small portion of Placer County as described below:

- SMUD began providing power to its customers in 1946 and is now the sixth-largest community-owned electric utility in the country and the second largest in California.
- SMUD has over 600,000 customers within a service area of 900 square miles.

In compliance with SB 350, SMUD filed the initial SMUD IRP with the CEC in 2019, which was found to be consistent with SB 350 and the requirements of PUC Section 9621.

SMUD's Board of Directors adopted a resolution on July 16, 2020, declaring a Climate Emergency and directing SMUD's Chief Executive Officer and General Manager to report on strategies and plans to achieve the goal of carbon neutrality by 2030. SMUD staff worked to identify a pathway to eliminate all of its power supply carbon emissions by 2030 and

¹ Public Utilities Code, Article 16 (commencing with Section 399.11) of Chapter 2.3 of Part 1 of Division 1.

developed SMUD’s 2030 Zero Carbon Plan.² The Zero Carbon Plan is based on community outreach, Board and stakeholder input, and SMUD’s internal modeling and was adopted by SMUD’s Board as an update to the SMUD IRP.

Demand Forecast

The POU IRP Guidelines (Chapter 2.E.1) 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 9621.³ Under the POU IRP Guidelines (Chapter 2.E.2), 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.⁴ The demand forecast and supporting information provided present an adequate representation of future energy and peak demand that meets the *POU IRP Guidelines* requirements.

Energy and Peak Forecast, Method and Assumptions

SMUD uses an internally developed electricity sales and demand forecast, with long-term monthly sales combined with short-term hourly models. SMUD plans for a 1-in-2 normal weather year and has a forecast total peak hour 1-in-2 demand of 3,004 MW. When adjusted to include customer-side solar, thermal energy storage, demand response, additional achievable energy efficiency, and a planning reserve margin, SMUD’s IRP plans for a total peak procurement requirement is 3,167 MW in 2030.

The CEC’s California Energy Demand 2023-2040 Forecast – Planning Forecast 1-in-2 Net Electricity Peak Demand projects a 3,250 MW peak demand for 2030 for SMUD.

Resource Procurement Plan

The POU IRP Guidelines require that POU’s report the mix of resources they plan to use to meet demand through 2030.⁵ POU’s 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 that SMUD’s 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

SMUD has an existing range of resources, from natural gas-fired power plants and hydroelectric facilities in the Upper American River Project (totaling 688 MW in the system), to

² SMUD 2030 Zero Carbon Plan available at: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=246077&DocumentContentId=80240>

³ POU IRP Guidelines, Chapter 2, E., Pp 5-6

⁴ The most recently adopted demand forecast is for the California Energy Demand Forecast 2023-2040.

⁵ POU IRP Guidelines, Chapter 2.F., P. 6.

solar and wind projects. SMUD notes that the range of clean energy resources in its portfolio allow it to supply energy that is roughly 50% carbon-free currently.

Resource Portfolio Evaluation

SMUD developed the 2030 Zero Carbon Plan as a flexible roadmap following completion of technical studies, including use of resource planning models, E3's Renewable Energy Capacity (RECAP) loss-of-load probability model and E3's Renewable Energy Solutions (RESOLVE) capacity expansion model.

SMUD considered a Reference Case, representing an updated least-cost plan through 2030, and including a 60% RPS target by 2030 and a GHG emissions target of 1.35 MMT. Another considered scenario was the Absolute Zero Hourly Case, which reaches carbon neutrality through the development of proven clean technologies, retiring thermal powerplants by 2030.

SMUD analyzed proven clean technologies using their internal expertise and consultation with Black & Veatch and E3. SMUD found that reliance only on proven clean technologies would be very expensive and not pass basic reliability tests, but that 1,000 MW of clean technologies at the location of existing thermal generation with availability during summer peak would meet system demands and ensure reliability. The Adopted Scenario is a plan to meet SMUD's 2030 goal through ongoing development and procurement of clean generation and storage, while repurposing the existing thermal fleet, and incorporating additional distributed energy resources.

Procurement Strategy

SMUD is focusing procurement in three main areas:

1. Natural gas generation repurposing through retirement, re-tooling, and using renewable fuels.
2. Deployment of additional proven clean technologies, including solar, wind, geothermal energy, and battery storage.
3. New technologies that are not ready for large-scale adoption or that are currently unknown. Pilot projects and programs to test deployment of these new technologies, with a focus on prioritizing adoption and scaling.

SMUD published its 2030 Zero Carbon Plan in March 2021, and received public comments and recommendations that led to six clarifications of the Zero Carbon Plan, which were accepted by the SMUD Board at its April 28, 2021, meeting. The public feedback led to the following six clarifications that will accelerate or improve the benefits of the Zero Carbon Plan to areas around retiring combustion resources:

1. Study and prioritize retirement of McClellan Gas Turbine in 2024 and Campbell in 2025.
2. Eliminate the use of fossil fuels as soon as possible but no later than 2030 – further reliability studies will determine if some plants can be retired completely or retooled to use either a transition fuel such as biodiesel, biogas, or ethanol, or to green hydrogen, and then only used when necessary to support reliability.
3. Study the potential retirement of Carson, Procter & Gamble, and Cosumnes prior to executing a re-tooling strategy.
4. The 2030 Zero Carbon Plan is flexible and will consider a variety of technologies.

5. Maximize the value of SMUD's existing hydro facilities in the Upper American River Project.
6. Support behind-the-meter resources and virtual net metering.

These clarifications illustrate SMUD's prioritization of meeting its clean energy goals while maintaining a reliable system and reducing pollution impacts on neighboring communities.

CHAPTER 2:

Review for Consistency with PUC Section 9621 Requirements

This chapter summarizes the main elements of SMUD’s 2022 IRP and provides staff’s findings regarding the consistency of the IRP filing with PUC Section 9621 requirements, as well as the POU IRP 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, 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.⁶ The initial GHG targets reflect the electricity sector’s percentage in achieving the economy-wide GHG emission reductions of 40 percent from 1990 levels by 2030. The 2030 electricity sector GHG planning target range was brought into alignment with the 2022 Scoping Plan Update in the Draft 2023 Update adopted in September 2023.⁷ This electricity sector GHG planning target range of 30-38 MMTCO_{2e}, retains the lower bound of 30 from the 2020 CARB Update, but reduces the upper bound from the 53 MMTCO_{2e} found in the 2020 CARB update, informed by the 2017 Scoping Plan. While the updated and reduced electricity sector GHG emission targets were adopted subsequent to SMUD’s IRP filing, SMUD’s 2030 Zero Carbon Plan will allow them to fall under the updated target. CEC staff reviewed the GHG emissions associated with SMUD’s portfolio of resources in 2030, as identified in its IRP and standardized reporting tables. Staff independently assessed the emission factors associated with various resources in SMUD’s portfolio to ensure consistency with other data available to staff.

Staff finds that SMUD plans to achieve the CARB-established GHG emission target range of 30-38 million metric tons of carbon dioxide equivalent (MMT CO_{2e}). SMUD’s resource portfolio results in roughly -0.514 MMT CO_{2e}, consistent with the requirement of PUC Section 9621(b)(1). Using the CEC and CARB accounting, SMUD plans that its 2030 emissions will be net negative if spot market sales are assumed to be accounted for at the default system power GHG intensity. Table 1 shows GHG emissions for SMUD’s portfolio of resources in 2022, 2025, and 2030. Appendix B includes a table identifying the emission intensities and total emissions for individual resources for all years; see Table A-3.

6 Public Utilities Code Section 9621(b)(1).

7 SB 350 IRP Electricity Sector GHG [Planning](#) Targets: 2023 Update.

Table 1: Greenhouse Gas Emissions from SMUD Resources Portfolio

	Fuel Type	GHG Intensity (MT CO2e/MWh)	Total Emissions (MMT CO2e) 2022	Total Emissions (MMT CO2e) 2025	Total Emissions (MMT CO2e) 2030
Campbell Soup	Natural Gas	0.428	0.079	0.000	0.000
Carson Ice	Natural Gas	0.6	0.036	0.031	0.001
Cosumnes Power Plant	Natural Gas	0.396	1.152	1.044	0.025
McClellan	Natural Gas	0.767	0.004	0.000	0.000
Procter & Gamble	Natural Gas	0.633	0.169	0.158	0.001
Cosumnes Power Plant	Renewable Natural Gas	0	0	0	0
Dairy Digesters	Renewable Natural Gas	0	0	0	0
Kiefer 1 & 2	Renewable Natural Gas	0	0	0	0
Net Spot market purchases (sales)	System	0.428	0.337	-0.55	-0.766
Total Portfolio emissions	NA	NA	1.777	0.683	-0.514

Source: CEC, Energy Assessments Division, Based on SMUD 2022 IRP filing

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. In 2018, SB 100 (de León, Chapter 312, Statutes of 2018) increased the RPS requirement for 2030 from 50 to 60 percent.⁸ Staff reviewed the renewable procurement table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that SMUD plans are consistent with the RPS procurement requirements and all interim compliance periods, as well as the requirements of PUC Section 9621(b)(2).

SMUD’s renewable procurement plans include additions of new renewable resources between 2025 and 2030, and SMUD anticipates that RPS-eligible renewables will account for 90 percent of retail sales in 2030, well in excess of the RPS target of 60 percent in 2030.

12Retail Rates

SB 350 (PUC Section 9621(b)(3)) requires POU’s 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, as required in PUC Section 454.52(a)(1)(C)-(D). Staff reviewed the analysis and information SMUD presented in its IRP filing on the rate and bill impacts from different resource portfolios they evaluated. Staff finds the SMUD IRP is consistent with the rates discussion, as required in PUC Section 9621(b)(3).

⁸ PUC Section 399.11(a).

SMUD believes it is possible to eliminate carbon emissions from their power supply by 2030 with rate increases that do not exceed the rate of inflation but acknowledges this will be challenging to achieve. SMUD also plans to make investments in distributed energy resources (DERs) and in electrification for under-resourced communities. SMUD plans on taking steps to minimize costs, including working with staff and vendors to minimize cost increases, to streamline processes, and to create innovative rate structures that partner with customers on distributed energy investments. Additionally, SMUD plans to regularly revisit the 2030 Zero Carbon Plan to adjust as costs for technologies such as solar and battery storage change.

System and Local Reliability

SB 350 requires filing POU to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.⁹ Staff reviewed the SMUD 2022 IRP filing capacity reporting table and discussion and finds that SMUD has planned for sufficient resources to maintain a reliable electric system. In addition, SMUD's selected portfolio of resources contains sufficient capacity to meet anticipated resource adequacy requirements in 2030. Staff finds that the IRP is consistent with the SB 350 reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Sections 9620 and 9621(d)(1)(E).

System Reliability

SMUD delivers power through an integrated system that SMUD owns and operates, which includes generation facilities, transmission, and distribution systems. SMUD supplies power to substations through a 230 kilovolt (kV) and 115 kV transmission system, interconnected with Pacific Gas & Electric and the Western Area Power Administration (WAPA). SMUD is one of several members of the Balancing Authority of Northern California (BANC), which, as a balancing authority matches generation to load and coordinates with other balancing authorities.

SMUD plans to meet electricity demand by following federal, state, and North American Electric Reliability Corporation (NERC) requirements and standards for reliability and operations. SMUD plans to meet 1-in-2 peak load conditions, plus a 15% planning reserve margin.

Local Capacity Needs

SMUD's Local Reliability Area planning assumptions have not changed since the submittal of their 2018 IRP, and so they incorporate by reference the discussion in Section 8 of the 2018 Resource Planning Report.¹⁰

Flexible Capacity Needs

SMUD states that the most economical proven clean energy technologies are solar and wind, which are variable and weather-dependent. SMUD plans to evaluate strategies to help mitigate

⁹ PUC Section 9621(b)(3).

¹⁰ [SMUD 2018 IRP Filing](#).

times with abundant or insufficient energy supply, with further enhancements of forecasting technology and control systems to help mitigate this variability. One of the zero carbon solutions that SMUD will rely on is energy storage, with current technology suitable for short duration energy storage. SMUD plans ongoing exploration of potential long duration energy storage, while also using existing hydro resources to provide flexible support, within the environmental and licensing requirements of those facilities.

Transmission and Distribution Systems

SB 350 (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 SMUD 2022 IRP filing adequately plans to maintain and enhance its transmission and distribution systems. Staff finds that SMUD is planning for enough transmission to adequately deliver resources to its service area to meet the requirement as discussed below. Staff also finds that SMUD plans to address the adequacy of its distribution system. As such, staff finds the IRP is consistent with the transmission and distribution requirements set forth above.

Transmission System

The reliability of SMUD's transmission system is reviewed annually as part of the BANC Planning Coordinator's 10-Year Transmission System Assessment. The assessment follows the NERC TPL-001 Reliability Standard and evaluates the reliability of the transmission system by checking system performance following various contingencies against applicable NERC, Western Electricity Coordinating Council (WECC), and SMUD criteria. The evaluation consists of several power system analyses, such as steady state, voltage stability, transient stability, short circuit, and spare equipment unavailability analyses. The 10-Year Assessment uses General Electric Positive Sequence Load Flow (PSLF) software, widely used throughout the WECC, and SMUD uses their 1-in-10 demand forecast for peak scenarios to better understand potential system deficiencies. The 2022 assessment revealed a possible violation in 2027, but SMUD plans to implement mitigation measures until a new 115kV substation is completed in 2030.

SMUD also performed a steady state contingency analysis on their transmission system model using scenarios reflective of load growth and additional generators reflective of projects in SMUD's interconnection queue. The study did show the need for a higher rated transformer at a substation, and so a project is underway to replace that transformer.

Distribution System

SMUD has a 5-Year Distribution System Capacity Plan 2022-2026 that functions as a guide to the capital projects and expected investments necessary to have a distribution system that can continue to function in a safe, reliable, and cost-effective manner. SMUD sees three initiatives that are also crucial in the efforts to change the distribution system into a bidirectional grid that can help with increasing penetration of DERs. These initiatives are:

- Advanced Distribution Management System
- Substation Automation – SMUD will continue to retrofit remaining 12.5 MVA distribution substations with multiple distribution feeders to have full Supervisory Control and Data Acquisition functionality.

- Line Automation – SMUD will install automated switches to provide remote monitoring and control for distribution operators.

Disadvantaged Communities and Localized Air Pollutants

SMUD is making efforts to minimize localized air pollutants and GHG emissions with early priority on disadvantaged communities, consistent with the requirements outlined in SB 350.¹¹ Staff reviewed the SMUD 2022 IRP filing to determine the extent to which it minimizes local air pollutants with a priority placed on disadvantaged communities. SMUD’s Zero Carbon Plan includes reducing the combustion of fossil fuel fired generation, which will also reduce air pollution in communities neighboring the power plants, including disadvantaged communities. SMUD’s emphasis on prioritizing local air quality impacts early in the clean energy transition outlined in the 2030 Zero Carbon Plan is consistent with the requirement.

Net Energy Demand in Peak Hours

SB 338 (Skinner, Chapter 389, Statutes of 2017) requires POUs to consider existing renewable generation portfolio, 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.¹² SMUD’s IRP includes a discussion of how it considers preferred resources to meet peak demand when selecting resources for its portfolio. SMUD’s 2030 Zero Carbon Plan is consistent with the requirement set forth above.

SMUD’s adopted portfolio for 2030 includes more than 1,800 MW of grid-scale solar coupled with over 500 MW of storage within SMUD’s service territory. The 2030 plan includes an additional 160 MW of regional storage, capturing excess solar and wind generation. These resources would shift the net system peak out to 8:00 PM. The net load is relatively flat for most of the peak day, served mostly by hydroelectric and geothermal resources. For load ramping needs, from 4:00 to 7:00 PM, SMUD will rely on thermal power plants and a fleet of storage projects.

Additional Procurement Goals

SB 350 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.¹³ The resource adequacy provisions of this code section are discussed in system reliability section on page 14.

¹¹ PUC 454.52(a)(1)(I).

¹² PUC Section 9621(c).

¹³ PUC Section 9621(d)(1).

Energy Efficiency and Demand Response Resources

Staff finds that SMUD'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.

SMUD submitted nine documents to the docket which collectively incorporate both energy efficiency and demand response into their forecasting process. Several SMUD energy efficiency programs are each listed with a corresponding description of the program in SMUD's Zero Carbon Plan.¹⁴ Energy efficiency savings estimates are then enumerated at a program level within SMUD's Load Forecast Methodologies Report.¹⁵ SMUD's forecasting process of cumulatively aggregating impacts and then decaying the savings over time also aligns with the methodology used in CEC's SB 350 Report.¹⁶

A similar structure is used to project the quantity of total dispatchable load for each of SMUD's demand response initiatives. SMUD provided descriptions for its current set of demand response initiatives in conjunction with its DR forecast, which can be found in the Distributed Energy Resources subsection of the Zero Carbon Plan.

SMUD's Zero Carbon Plan places an emphasis on building electrification and even forecasts out the added electricity from fuel switching. While fuel substitution itself is not an energy efficiency measure, newer electrical end uses tend to operate at higher efficiency levels than older gas appliances. Thus, building electrification can create efficiency savings while also producing less GHG emissions.

SMUD's energy efficiency initiatives data trends upwards. Ultimately, SMUD has demonstrated, throughout their IRP, it is working to actively incorporate energy efficiency and demand response into their planning process.

Energy Storage

Staff finds that SMUD 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.

14 SMUD Enclosure A – SMUD Resolution No 22-06-03, Sacramento Municipal Utility District (April 2021), at p. 33, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=246075&DocumentContentId=80242>

15 SMUD Enclosure C – Load Forecast Methodologies Report, Sacramento Municipal Utility District (Fall 2021), at p. 27, Figure 18, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=246081&DocumentContentId=80244>

16 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>

SMUD's Board adopted an energy storage procurement target of 9 MW by the end of 2020, which was achieved. The 2030 Zero Carbon Plan anticipates the need for between 700 and 1,100 MW of energy storage by 2030.

Transportation Electrification

Staff finds that SMUD's IRP is consistent with the requirement of PUC Section 9621(d)(1)(C) as it addresses transportation electrification, projecting for light-duty electric vehicle (LDEV) growth.

SMUD has promoted the use of electric transportation both internally and through efforts in the communities it serves. SMUD anticipates significant increases in energy and distribution needs from electrification through 2030 and outlines the planning process to achieve significant decarbonization.

SMUD currently offers discounted EV charging rates to its customers, such as incentives to charge their vehicles during off peak hours, as well as incentives to encourage EV adoption. SMUD is also working with CEC to offer incentives for the purchase and installation of fast charger infrastructure. The SMUD Zero Carbon Plan 2030 acknowledges that despite the many benefits to electrification, customer awareness and adaptation still has significant opportunity to grow. SMUD states that it will continue to integrate marketing and advertising campaigns to offer EV programs and incentives to encourage transportation electrification. In an effort to achieve SMUD's IRP and zero carbon goals, it plans to increase investments across its communities, including through work with community partners to expand access to all customer households. To this end, SMUD will bolster communications about electrification to SMUD customers through a comprehensive outreach and education program over the next several years that will last for decades. This includes introducing more online tools, expanding experiential "behind the wheel" events and launching more sophisticated direct, digital, and broadcast marketing campaigns.

In terms of quantitative reporting, SMUD includes an estimate of increased electrical load from EV Charging and increased peak from EV charging¹⁷.

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, electricity related, and demand response products. Based on staff's review of SMUD's IRP, SMUD's standardized tables and 2030 Zero Carbon Plan show that the mix of resources combined with modeling and reliability analyses include a diverse array of zero-emission resources, including geothermal, zero-carbon fuels firing thermal generation, wind, solar, hydrothermal, and battery storage.

¹⁷ Tables 2 and 3, [SMUD 2030 Zero Carbon Plan](https://efiling.energy.ca.gov/GetDocument.aspx?tn=246077&DocumentContentId=80240) available at:
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=246077&DocumentContentId=80240>

Glossary

Term	Definition
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.
Filing POU	A local publicly owned electric utility with an annual electrical demand exceeding 700 gigawatt-hours, as determined on a three-year average commencing January 1, 2013.
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 CEC, along with the standardized tables and supporting information, by the filing POU or authorized representative.
Net-peak demand	The highest hourly electricity demand in the utility area, when excluding demand met by variable renewable generation resources directly connected to a California Balancing authority. Net-peak demand is calculated by taking the highest hourly demand (peak demand) and subtracting the electricity produced by variable renewable resources meeting that demand
Noncoincident peak demand	The largest amount of power a POU must generate or procure in any hour of the year. Compare this to coincident peak demand which is the amount of power the POU must generate or procure in the hour in which system wide demand is greatest. Noncoincident peak demand is referred to as peak demand throughout these guidelines.
Electric vehicle (EV)	A vehicle that uses one or more electric motors for propulsion. Electric vehicles include battery-electric and plug-in hybrid vehicles.

Renewable energy credit (REC)	A certificate of proof, as defined in PUC Section 399.12(h)(1), associated with the generation of electricity from an eligible renewable energy resource. Renewable energy certificates are certificates that represent the environmental attributes of renewable electricity production.
Renewables Portfolio Standard (RPS)	A regulation that requires a minimum procurement of energy from renewable resources, such as wind, solar, biomass, and geothermal
Retail sales	Electricity consumption after accounting for behind-the-meter onsite generation including storage charge and discharge. It indicates the net energy delivered through the meter to the end-use customer, and thus excludes any generation or procurement in satisfaction of firm wholesale commitments (for example, firm and spot market sales).
Scenario	A set of assumptions about future conditions used in power system modeling performed to support generation or transmission planning.
Sensitivity	A technique that determines how a scenario analysis changes when an assumption is varied with all other scenario assumptions unchanged.
Standardized tables	The four tables that are required to be submitted with the IRP filing submitted to the CEC. 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, Energy Balance Table, Renewable Procurement Table, and Greenhouse Gas Emissions Accounting Table.

Supporting information	Analyses, studies, data, and work papers, or other material (on which inputs, assumptions, or conclusions are based) that the POU used or relied upon in creating the IRP (such as market conditions current at the time of the analyses, energy infrastructure, state policies and laws, and needs of the filing POU) but are not included in the IRP itself; and additional information required by these guidelines. Supporting information may also include the inputs and assumptions that are based on the analyses, studies, data, work papers, and other material.
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