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CALIFORNIA ENERGY COMMISSION

California Energy Commission

STAFF REPORT

Review of Silicon Valley Power's 2018 Integrated Resource Plan

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ABSTRACT

Senate Bill 350 (De León, Chapter 547, Statutes of 2015), (Public Utilities Code Section 9621) 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. Silicon Valley Power submitted its *2018 Integrated Resource Plan* and supplemental information, which the City of Santa Clara adopted on November 27, 2018, to the California Energy Commission for review April 26, 2019. This staff paper presents the results of the California Energy Commission staff review of Silicon Valley Power's 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, integration, local reliability, energy storage, distributed generation.

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TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

EXECUTIVE SUMMARY

Public Utilities Code (PUC) Section 9621 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 reduction targets and renewable energy procurement requirements. The California Energy Commission's (CEC) *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 various targets and planning goals from 2018 to 2030. The CEC must review the IRPs to ensure consistency with the requirements of PUC Section 9621.

Silicon Valley Power (SVP) is a municipal electric utility owned and operated by the City of Santa Clara. Its IRP provides a detailed plan to meet its customers' annual peak and energy needs in a cost-effective manner while providing reliable service and helping the state meet its clean energy goals. SVP has a unique customer base with a relatively flat demand profile driven by its industrial customers, almost 50 percent of which are data centers and server farms that operate around the clock. SVP has a wide range of energy efficiency programs that offer incentives and efficiency measures for its various customer classes. However, the flat demand profile of many SVP customers may limit their opportunities to participate in demand response programs.

SVP considered a wide variety of supply and demand alternatives in modeling its system and used multiple scenarios with varying assumptions about demand, regulatory changes, and resource characteristics to find the optimal portfolio. While SVP's preferred plan is able to meet a 50 percent renewable energy procurement requirement in 2030 with its current renewable resources, the utility is already planning to meet the 60 percent Renewables Portfolio Standard established by Senate Bill 100 (De León, Chapter 312, Statutes of 2018) by accelerating additions of wind and solar resources.

In reviewing SVP's IRP and determining consistency with the requirements of PUC Section 9621, the staff relied on the four standardized reporting tables and narrative descriptions in the IRP, 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 tables, along with the narrative in the IRP filing demonstrate 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).

- *Achieving Planning Goals:* The values reported in the 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 has addressed the procurement requirements for energy efficiency and demand response, energy storage, transportation electrification (the use of electricity for vehicles vessels, trains, boats, or other equipment that are mobile sources of air pollution), portfolio diversification, and resource adequacy as set forth in PUC Section 9621(d).

This IRP is consistent with the requirements of PUC Section 9621. In addition to the IRP provisions, Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires the CEC to establish statewide and utility specific targets to achieve a statewide doubling of energy efficiency by 2030. Staff observes that aggressive energy efficiency and demand response programs are needed for utilities and energy efficiency providers to meet the 2030 energy efficiency doubling targets and capture the benefits of demand response. As part of the *2019 Integrated Energy Policy Report*, the CEC will report on progress in achieving the doubling targets, including those for SVP, and update the targets as necessary.

Chapter 1:
Background, Demand Forecast, and Procurement Plan

Introduction

California Public Utilities Code (PUC) Section 9621 requires publicly owned utilities (POU) with an annual electrical demand exceeding 700 gigawatt hours (GWh) to develop integrated resource plans (IRP). 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. PUC Section 9621 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 9621 requires the POUs meeting the demand threshold to submit an IRP and updates to the California Energy Commission (CEC) for review to determine consistency with the requirements of PUC Section 9621. If the CEC determines an IRP is inconsistent with these requirements, 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 IRPs.[2] PUC Section 9622 requires the CEC to review POU IRPs to ensure they achieve PUC Section 9621 provisions (see **Appendix I**).

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

California Energy Commission IRP Review Process

On April 26, 2019, SVP submitted its IRP and supporting documentation as outlined in the *POU IRP Guidelines* to the CEC for review. Staff's review occurred in two stages. First, staff performed a completeness review to ensure the IRP

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

2 California Energy Commission. *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines*. Revised Second Edition. October 2018, Publication Number CEC-200-2018-004-CMF.

filing contained the POU board adopted IRP, the four standardized tables, and supporting information needed for staff to conduct the review. Then staff conducted a detailed review to determine consistency with the requirements of PUC Section 9621.

Staff assessed and analyzed the data in the standardized tables and narrative provided, conducted informal discussions with SVP staff, and verified data and information as needed. Staff considered the data supporting the assertions in the IRP in assessing whether the IRP is consistent with the requirements of PUC Section 9621.

Staff relied on internal subject matter experts to review technical sections of the IRP filing including energy and peak demand forecasts, projections for renewable resource additions. Staff also examined whether the POU achieved Renewables Portfolio Standard (RPS) requirements, energy efficiency savings projections and programs, and plans for transportation electrification.

Overview of Silicon Valley Power

SVP is a municipal electricity provider doing business on behalf of the City of Santa Clara as described below:

- SVP serves the City of Santa Clara's population of approximately 129,000.
- SVP delivers more than 3,700 gigawatt hours of energy to over 55,000 customers and has a peak demand of 587 MW.
- Residential customers constitute 84 percent of total customers; however, commercial and industrial customers make up over 90 percent of utility retail sales, and 46 percent of the utility retail sales comes from data centers.
- SVP has provided all electric service within the City of Santa Clara's boundaries since 1896 and is a member of two joint powers agencies – the Northern California Power Agency (NCPA) and M-S-R Public Power Agency (M-S-R PPA).
- SVP has an obligation to contribute a sum equivalent to up to 5 percent of the utility's revenues net of expenses to the City of Santa Clara, as a contribution in lieu of taxes.

Silicon Valley Power's Planning Process

SVP is encountering growing demand in its territory. While data center new builds are the primary driver of this growth, the City of Santa Clara is also planning for mixed use commercial and residential development. SVP continually adapts, enhances, and plans load procurement strategies for a diversified portfolio of resources that meet customer loads and state mandated requirements.

Throughout the planning process, SVP sought out groups who have an interest in future resource plans and invited their participation so that relevant issues were identified and addressed. Participants were engaged and involved early in the IRP development, beginning with a strategic plan launched in the spring of 2018 and continuing through that summer and fall with additional IRP specific meetings. Stakeholders included large customers, local businesses, the community at large, and employees. SVP also sought stakeholders' input through a public survey. The public survey was conducted using the City of Santa Clara's OpenGov – Open City Hall Platform. The IRP was discussed at the large customer meeting in fall 2018 along with additional follow up with residential customers to coincide with the timing of the IRP presentation to the City Council in November 2018.

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. In addition, under the *POU IRP Guidelines* (Chapter 2.E.2) the POU must provide information on the method used in developing the demand forecast if the POU uses a forecast other than the CEC's adopted demand forecast.[3] The demand forecast and supporting information provided were determined to present an adequate estimation of future energy and peak demand that meets the *POU IRP Guidelines* requirements.

Energy and Peak Forecast, Methodology and Assumptions

SVP's load forecast is based on future loads derived from historical base data and an assessment of future system load growth potential. SVP divides its customers into three segments and analyzes each one separately to differentiate between growth patterns and load profiles. SVP applies different load factors, adjusted for each end-user type, and individual forecasted growth rates to each of the segments. To refine the assessment further, SVP works with the City of Santa Clara's Community Development project and engages customers to assess impacts and timing of large developments. In the near-term, SVP's growth is dependent on mixed-use growth and data center growth, but in later years it is more heavily weighted to data centers due to their much higher potential in energy usage density.

3 The most recently adopted demand forecast is for the *California Energy Demand Updated Forecast, 2018-2030*, available at https://www.energy.ca.gov/2018_energypolicy/documents/#californiaenergydemandupdatedforecast.

SVP's energy demand (or net energy for load) is projected to increase from 3,888 GWh in 2019 to 4,758 GWh in 2030.[4] SVP's peak demand is projected to grow from 635 MW in 2019 to 770 MW in 2030. The annual average growth rate from 2019 to 2030 is forecasted to be 2.1 percent for energy demand and 3 percent for peak demand.[5]

During development of the *2017 Integrated Energy Policy Report (IEPR) Demand Forecast*, SVP noted that CEC forecasts showed steady and declining growth in SVP's energy requirements and were significantly lower than SVP's forecasts. The CEC's energy and peak forecast models are based on econometric specifications relating historical electricity consumption data as a function of economic and demographic variables with adjustments for policy based drivers such as additional achievable energy efficiency (AAEE) and zero net energy homes or additional achievable PV (AAPV). SVP explained that its load growth and customer base is not typical compared to other utilities in California. The high density of data centers in SVP's territory and the planned addition of new data centers drive the higher energy demand and load factor for the utility.[6] While the CEC's forecasts for individual load serving entities are generally derived from aggregate planning area forecasts, staff adjusted its *2018 Demand Forecast Update* for SVP to account for this significant data center load.

A comparison of SVP's forecasts of energy and peak demand to the CEC's *2018 Demand Forecast Update* is shown in **Figure 1** and **Figure 2**, respectively. SVP's expected growth scenario for energy starts below the CEC's low-demand case with no AAEE and AAPV, but increases over the forecast period to nearly the same level as the CEC's low-demand case with no AAEE and AAPV by 2030.[7]

SVP's expected growth scenario for peak demand also starts below the CEC's low-demand case with no AAEE and AAPV, but increases to nearly the CEC's low-demand case with no AAEE and AAPV by 2021, then stays just below this case through 2030. This increase in peak demand may be attributed to information

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4 For the purposes of IRP filings, a load-serving entity's net energy for load is the total amount of energy that it must generate or purchase to meet its retail load obligations. It includes retail consumption and transmission, distribution, storage and other losses, but excludes energy needed to meet wholesale sales obligations.

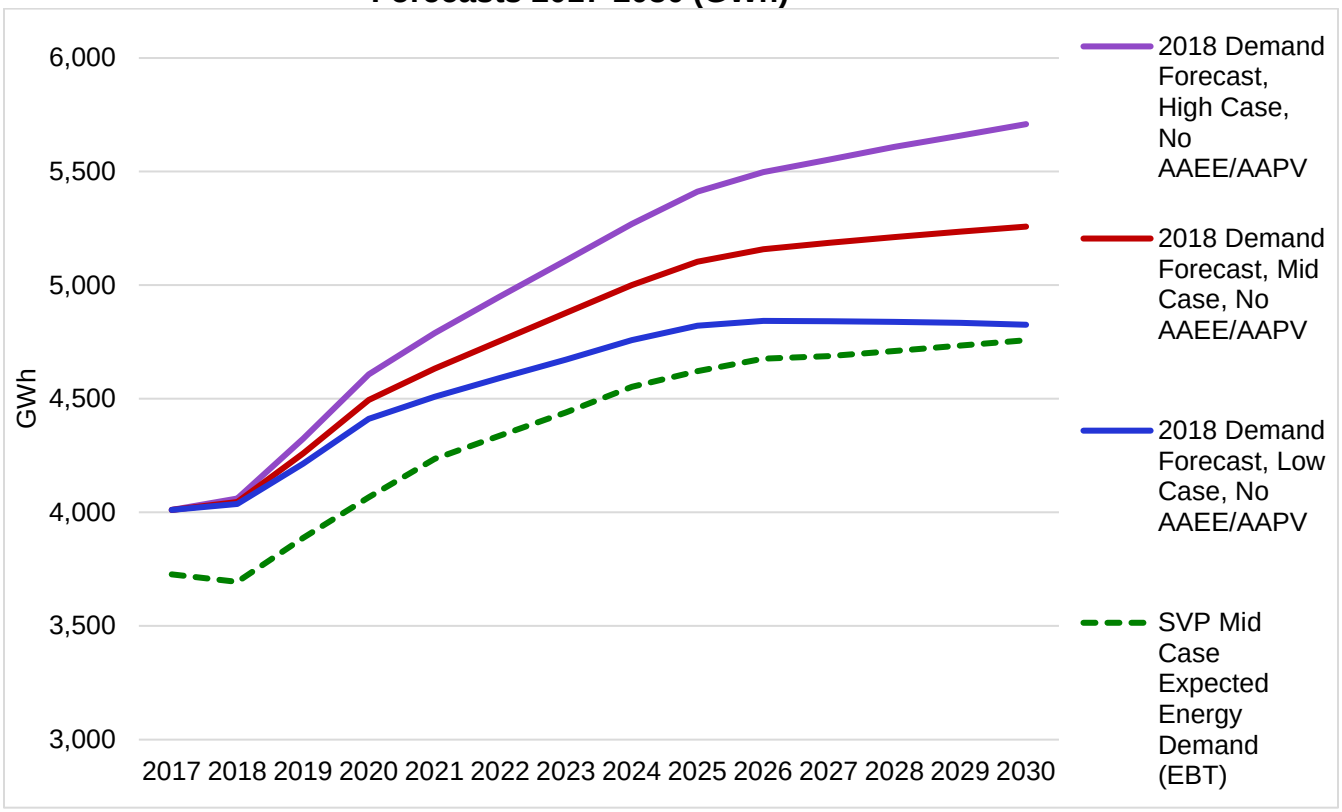
5 SVP modeled their supply and demand for the 20 year period from 2018 to 2038, while the *POU IRP Guidelines* only requires reporting through 2030.

6 The average system load factor is the average energy load compared with the annual peak load. The higher the load factor the flatter the peak demand.

7 The Energy Commission produced seven different demand forecast for load-serving entities/balancing authorities for the *2018 Integrated Energy Policy Report* that reflect varying demand conditions (low, mid and high) combined with varying amounts of energy efficiency and solar photovoltaic.

garnered from SVP's engagement with key customers concerning the impact and timing of new energy demand.

Figure 1: Silicon Valley Power and California Energy Commission Energy Forecasts 2017-2030 (GWh)



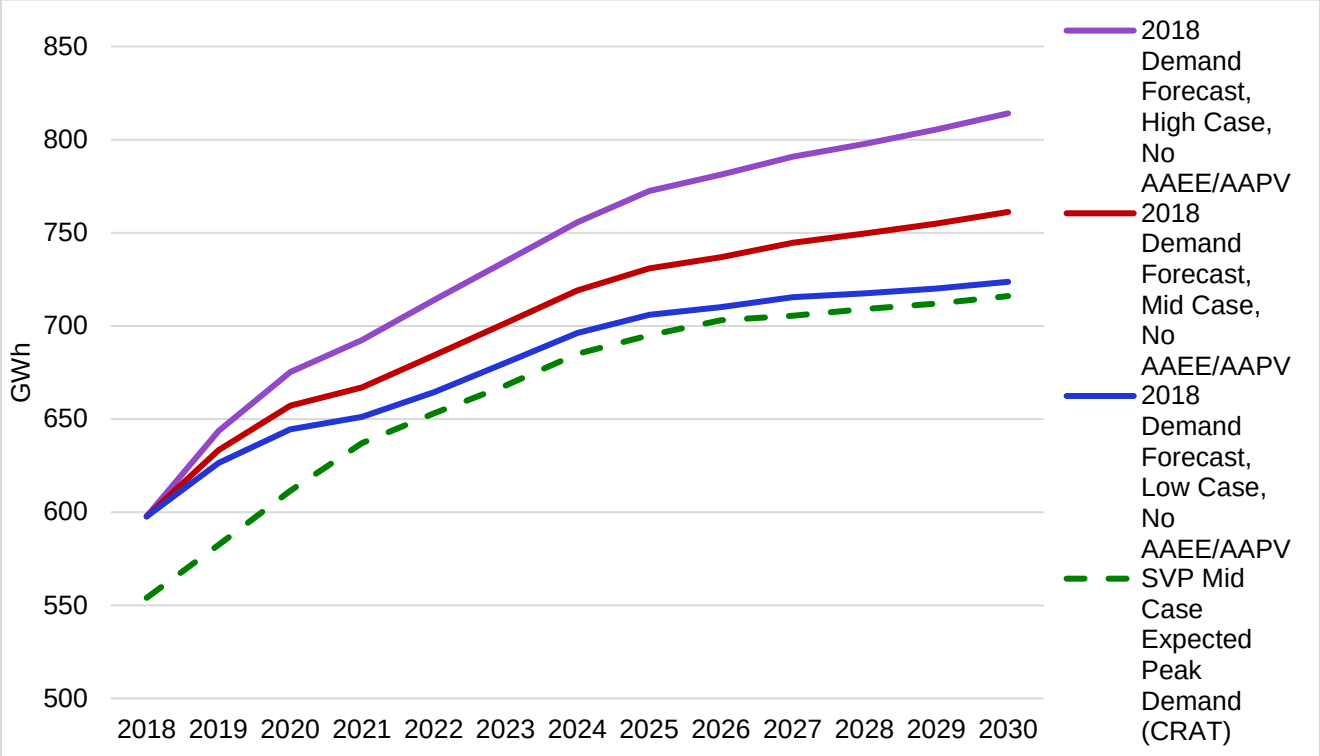
Source: California Energy Commission, based on 2018 SVP IRP filing and California Energy Commission 2018 Demand Forecast.

Resource Procurement Plan

The *POU IRP Guidelines* require that POUs report the mix of resources they plan to use to meet demand from 2018-2030.[8] POUs are also required to provide an IRP with data and supporting information sufficient to demonstrate that the POUs plan to meet targets and goals. Staff has determined that SVP's IRP filing meets the requirements. The following is a discussion of the utility's existing resources, its procurement strategy, the portfolio analysis underlying resource selections, and the resources in 2030 identified in the standardized forms.

8 *POU IRP Guidelines*, Chapter 2.F., P. 6.

Figure 2: Silicon Valley Power and California Energy Commission Peak Demand Forecasts 2018 — 2030 (MW)



Source: California Energy Commission, based on 2018 SVP IRP filing and California Energy Commission 2018 Demand Forecast

Existing Resources

SVP either owns or has long-term contracts to energy generated from natural gas, landfill gas, solar, wind, hydro, and other renewable resources. SVP owns and operates the Donald R. Von Raesfeld natural gas power plant and the Gianera Generating Station natural gas power plant. As a member of NCPA, SVP has an ownership share in hydroelectric, geothermal, and gas-fired generation facilities. In addition, as a member of M-S-R PPA, SVP along with Modesto Irrigation District and the City of Redding, also have contracts for power from wind resources.[9] SVP has an agreement with the Western Area Power Administration (WAPA) for the continued purchase of large hydroelectricity from the Central Valley Project.

In 2017, SVP generated 21 percent of its electricity from renewable resources and anticipates 40 MWs of solar and 49.5 MWs of wind coming online in 2021 and an additional 200 MWs of wind coming online in 2022. SVP uses a combination of its gas-fired generation and market purchases to integrate the

9 M-S-R PPA also had contracts with the San Juan Coal Power Plant, which SVP officially divested from at the end of 2017.

renewable generation. The utility also takes advantage of market purchases when prices are low and uses its gas fleet to generate electricity when that is the more cost-effective option. In recent years, SVP has increased its reliance on hydro resources, from about 17 percent of its generation portfolio in 2015 to 32 percent in 2016 and 56 percent in 2017. SVP procures more renewable resources than needed to meet its renewable energy procurement requirements. As a result, the utility either sells excess renewable generation to other entities or banks the Renewable Energy Credits (RECs) from the excess renewable generation for use in future years to meet RPS requirements.

Resource Portfolio Evaluation

SVP's goals for its future resource portfolio is to provide reliable electricity at low cost, while meeting renewable energy procurement requirements, doubling targets for energy efficiency and GHG emission reduction targets by 2030.[10] SVP also felt it important to achieve a balance in solar and wind resource additions to reduce the risk of over-reliance on one technology. The utility conducted economic analysis to meet these objectives, while minimizing the long-term net present value of incremental power to customers.[11] For its scenario analysis, the utility used PLEXOS, a production cost modeling tool, to analyze and compare the cumulative net present value of different scenarios. The analysis optimized the operation of existing and new resources along with spot market purchases to ensure SVP could reliably satisfy net peak demand and maintain sufficient reserves to meet reliability requirements.

SVP has sufficient resources to meet a 50 percent RPS requirement through 2030, as well as a 60 percent RPS by 2030 required by SB 100 (De León, Chapter 312, Statutes of 2018). To meet its goal for achieving low costs and renewable energy procurement requirements, SVP only considered the addition of solar and wind resources in their expansion plans to match its customers' desire for additional renewables at reasonable costs. SVP evaluated five modeling cases (two different resource mixes and three sensitivity cases). All cases were built off a base case that meets the 60 percent RPS requirement:

- Base case with half solar and half wind additions
- Base case with high wind (80 percent wind and 20 percent solar) additions

10 Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires the Energy Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will cumulatively double retail customers' savings in electricity and natural gas end uses by 2030.

11 The net present value method is a financial calculation that measures the positive and negative cash flows or stream of payments in today's dollars adjusted for interest and inflation. The method allows for comparison of investment alternatives based on their economic potential.

- Base case with high GHG price forecast
- Base case with high load growth
- Base case with low load growth

SVP concluded that the base case is the preferred plan. While the high wind case is less expensive, the base case offers the best combination of low cost, flexibility, reliability, and environmental responsibility while reducing risk through increased resource portfolio diversification. SVP also concluded a balanced wind and solar energy generation combination better fit SVP's hourly system energy demand profile than a plan heavily weighted toward either wind or solar. In addition to the already planned wind and solar additions in 2021 and 2022, the base scenario adds 136 MWs of new solar and 104 MWs of new wind by 2030. By the end of SVP's full study period in 2038, the base case scenario adds 670 MWs of new solar and 500 MWs of new wind.

Procurement Strategy

SVP's procurement strategy is to maintain a diverse portfolio of generating resources and market energy purchases to reduce risk and minimize exposure to loss of generating capacity. The utility applies risk management practices to decisions concerning the mix of resources and their loading order, including the decision to use supply or demand-side resources, whether to operate resources inside Santa Clara versus remote resources, and what type of generation to procure.[12] SVP also procures fuel for its natural gas-fired generating facilities with supply contracts with staggered start times and durations to reduce and limit the effects of fluctuations and spikes in fuel prices. Due to SVP's dependence on transmission services provided by the California Independent System Operator (California ISO) and others to bring power from remote locations, SVP is exposed to costs increases and to power delivery interruptions during emergencies or facility failures. SVP continually works to reduce the impacts of transmission cost increases and maintains contingency plans for such occurrences.

Over the planning period, SVP faces the expiration of some of its large and small hydro contracts, as well as decreasing production at its geothermal facility and the expiration of two power purchase agreements with small landfill gas projects. SVP's agreement with the Tri-Dam Power Authority to purchase output from four hydroelectric projects is scheduled to terminate at the end of 2023. SVP looks to expand its procurement of hydroelectric, wind, and solar resources to meet its increasing demand. SVP expects the output from the NCPA Geothermal Project

12 Loading order refers to setting a priority list for electricity sources. For example, the state established a loading order that calls for reducing demand with energy efficiency and demand response, and meeting new generation needs first with renewable and distributed resources and second with clean fossil generation.

to decrease gradually over time, but anticipates replacing this supply with additional generation and short-term purchases or reduced wholesale sales.

Table 1 provides a summary of the amount of energy from the different resources in the utility's portfolio in 2019, 2025, and 2030. Large hydro declines from roughly
21 percent of the resource mix in 2019 to 17 percent in 2030, while natural gas generation declines from 33 percent in 2019 to 21 percent in 2030. Spot purchases fluctuate — purchases occur in 2019 to 2021, then again in 2026 to 2029, while sales occur in 2022 to 2025 and in 2030. These decreases are offset by purchases of renewable resources that by 2030 constitute about 53 percent of the portfolio.

Table 1: Energy Resources by Type 2019, 2025, and 2030 (GWh)

Resource	2019	2025	2030
Total Net Energy for Load	**3,888**	**4,621**	**4,758**
Non-RPS Resources			
Large Hydroelectric	814	534	534
Natural Gas	1,285	1,140	981
Generic Non-Renewable Procurement	0	549	281
Spot Purchases	308	0	0
Spot Sales	0	**(55)**	**(164)**
RPS Resources			
Geothermal	350	311	282
Landfill Gas	98	98	84
Small Hydroelectric	518	182	182
Solar PV	61	155	153
Wind	453	1,416	1,417
Generic Renewable Procurement	0	291	1,009
Non-RPS Energy Procured	2,407	2,168	1,632
RPS Energy Procured	1,481	2,453	3,126
Total Energy Procured	3,888	4,621	4,758
Surplus/Shortfall	0	0	0

Source: California Energy Commission, based on 2018 SVP IRP filing.

Table 2 provides a summary of the capacity resources it will rely on to meet peak demand plus the 15 percent planning reserve margin in the same years. SVP's procurement of wind and solar PV resources help meet the utility's increasing demand, but are not enough alone. SVP also plans to procure significant amounts of generic non-renewable resources (large hydroelectric) and

generic renewable resources (small hydroelectric, wind, and solar PV) to make up the capacity shortfall. These generic resource procurements provide sufficient capacity to meet planning reserve requirements and a capacity surplus. **Appendix B**: Summary Tables includes tables identifying the energy and capacity for individual resources for all years, see **Table B-1** and **Table B-2**.

Table 2: Capacity Resources by Type for 2019, 2025, and 2030 (MW)

Resource Type	2019	2025	2030
Peak Demand	583	695	716
Planning Reserve Margin	87	104	107
Peak Procurement Requirement	670	799	823
Non-RPS Resources			
Large Hydroelectric	289	217	217
Natural Gas	311	311	305
Generic Non-Renewable Procurement	0	157	72
RPS Resources			
Geothermal	50	50	50
Landfill Gas	11	11	9
Small Hydroelectric	99	61	61
Solar PV	9	26	26
Wind	69	137	137
Generic Renewable Procurement	0	38	122
Total Capacity Procured	**839**	**1,008**	**998**
Surplus/(Shortfall)	**169**	**209**	**175**

Source: California Energy Commission, based on 2018 SVP IRP filing.

Chapter 2:
Review for Consistency with Public Utilities Code Section 9621 Requirements

This chapter summarizes the main elements of SVP's 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 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, in coordination with the CEC and California Public Utilities Commission.[13] These 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 staff reviewed the GHG emissions associated with SVP'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 SVP's portfolio to ensure they are consistent with other data and information available to staff.

Staff finds that SVP plans to meet the GHG emission target range established by California Air Resources Board of 275 to 485 thousand metric tons of carbon dioxide equivalent (MT CO_2e). SVP's resource portfolio emissions are in the middle of the GHG range, at roughly 334 MT CO_2et, which is consistent with the requirement of PUC Section 9621(b)(1). SVP estimated emissions for individual resources based on their emissions rates, then determined the amount of generation from each resource using a production cost modeling tool. **Table 3** shows GHG emissions for SVP's portfolio of resources in 2019, 2025, and 2030. **Table B-3** in **Appendix A** identifies the emission intensities and total emissions for individual resources for all years.

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

Table 3: Greenhouse Gas Emissions From Silicon Valley Power's Resources Portfolio

Total Emissions (MT CO2e)	Fuel Type	GHG Intensity (MT CO2e/MWh)	2019	2025	2030
Donald Von Raesfeld (DVR)	natural gas	0.422	352,540	303,761	278,719
Gianera Generating Station	natural gas	0.803	6,346	4,278	1,369
Lodi Energy Center (NCPA Joint Powers Agency Resource)	natural gas	0.390	153,492	143,134	124,349
NCPA CT (NCPA Joint Powers Agency Resource)	natural gas	0.803	152	25	51
Santa Clara Cogeneration	natural gas	0.858	41,236	41,236	-
Spot market purchases	system	0.428	131,693	-	-
Spot market sales	system	0.428	0	**(23,443)**	**(70,079)**
Total Portfolio emissions	**NA**	**NA**	**685,457**	**468,991**	**334,408**

Source: California Energy Commission, based on 2018 SVP IRP filing.

Renewables Portfolio Standard Planning Requirements

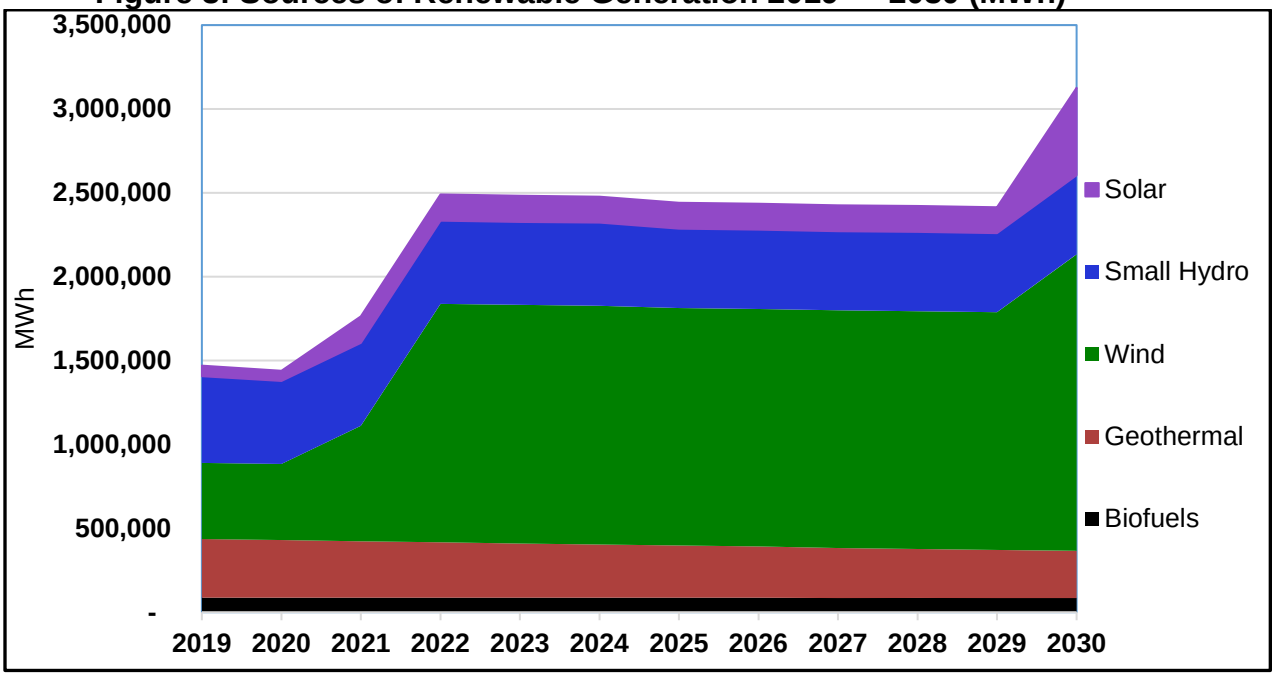
PUC Section 9621(b)(2) requires that POU IRPs ensure procurement of at least 50 percent renewable energy resources under the Renewables Portfolio Standard (RPS) by 2030 consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3.[14] Staff reviewed the renewable procurement standardized reporting table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that SVP's plans are consistent with the RPS procurement requirements in 2030 and all interim compliance periods, as well as the requirements of PUC Section 9621(b)(2).

SVP has more renewable resources than needed to meet RPS procurement requirements and plans to either sell excess renewable generation to other entities, or accumulate additional RECs, or banked RECs, from the surplus procurement that can be used to meet RPS requirements in future years. SVP has planned for sufficient renewable generation to meet their targets through 2027, with the exception of using banked RECs in 2020. SVP will begin to withdraw from banked RECs in 2028 to meet their RPS targets. While SVP has enough banked RECs to meet the RPS requirements through 2030, the utility is planning to meet 60 percent renewables by 2030 and is choosing to accelerate

14 PUC Section 9621(b) requires the governing board of POUs to adopt an IRP on or before January 1, 2019, while PUC Section 9621(b)(3) requires the IRP ensure procurement of at least 50 percent eligible renewable resources by 2030. SB 100 (De León, Chapter 312, Statutes of 2018) increases the RPS requirement for 2030 from 50 to 60 percent. However, since the POUs were required to adopt their IRPs before SB 100 went into effect, the POU was only required to plan for the 50 percent RPS target in their IRP. Future POU IRPs will need to meet RPS requirements in effect when their IRP updates are filed.

the purchase of renewable resources by two years to increase flexibility in future resource procurement. **Figure 3** shows the increase in renewable generation from 2019 to 2030.

Figure 3: Sources of Renewable Generation 2019 — 2030 (MWh)



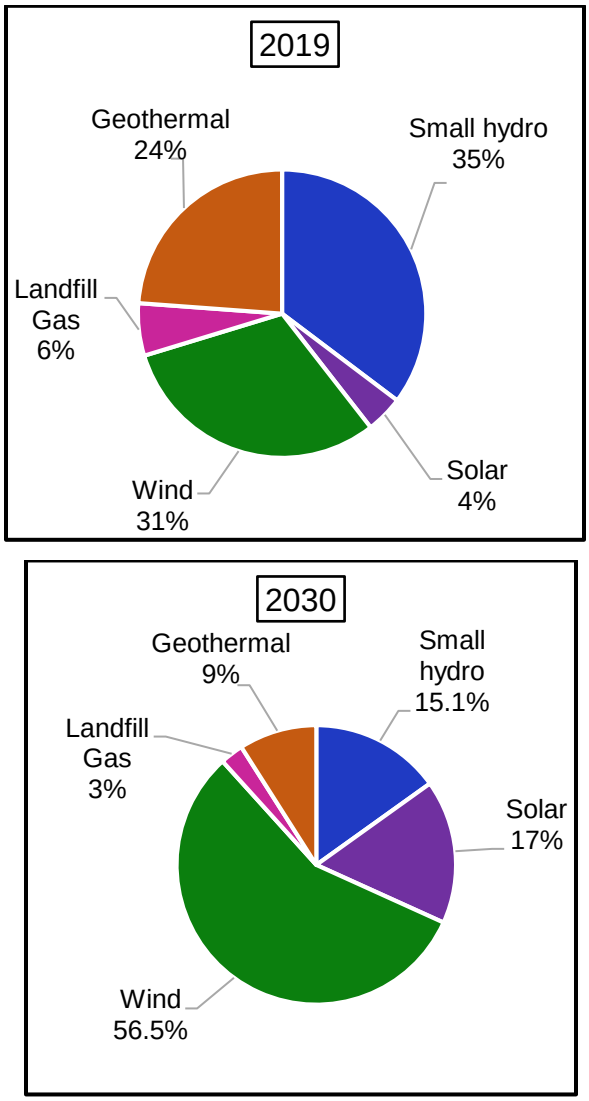
Source: California Energy Commission, based on 2018 SVP IRP filing.

SVP plans to comply with the long-term procurement requirement, which requires 65 percent of RECs come from eligible renewable resources under long-term contracts starting in 2021. All of SVP's reported RPS eligible contracted projects are either Portfolio Content Category (PCC) 0 RECs or PCC 1 resources.[15] SVP's forecasted procurement and REC retirement demonstrates expected compliance with the portfolio balance requirement, as its planned procurement of PCC 3 RECs is below the maximum of 10 percent in compliance period 3, with no

15 The RPS defines three categories of RPS procurement. PCC 1 is renewable energy produced in or transmitted directly to California. PCC 2 is renewable energy that is produced out-of-state and purchased by a California load-serving entity, but provided to an out-out-state utility in exchange for an often smoother stream of electricity ("firmed and shaped") from unspecified generation sources. PCC 3 is RECs that are purchased without the underlying renewable energy ("unbundled RECs"). At least 75 percent of a utility's RPS procurement must be in PCC 1 and no more than 10 percent can be in PCC 3. PPC 0 are RECs associated with contracts signed before June 1, 2010 that meet all the following criteria: (1) the renewable energy resource was eligible under the rules in place at the time the contract was executed; (2) for an electrical corporation, the contract has been approved by the CPUC, even if that approval occurs after June 1, 2010; and (3) any contract amendments or modifications occurring after June 1, 2010, do not increase the nameplate capacity or expected quantities of annual generation, or substitute a different renewable energy resource. PCC 0 is a separate group of contracts or ownership agreements that are governed by special rules, grandfathering them into the RPS program.

PCC 3 RECs used for compliance in periods 4 through 6. **Figure 4** shows the mix of renewable resources for 2019 and 2030.

Figure 4: SVP RPS Portfolios in 2019 and 2030



Source: California Energy Commission, based on 2018 SVP IRP filing.

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 and minimize impacts on ratepayer bills. Staff reviewed the analysis and information SVP presented on the rate and bill impacts from different resource portfolios it evaluated. Staff finds that SVP's IRP is consistent with the rates discussion, as required in PUC Section 9621(b)(3).

As discussed earlier, SVP considered five cases in its portfolio analysis to meet its future energy supply needs. While SVP's preferred scenario provides a better fit

for SVP's hourly system energy demand profile, it is the next to lowest cost option explored. SVP estimates that under the preferred plan overall retail rates would escalate at about 2 percent per year. Power portfolio costs (excluding debt service and fixed O&M for existing power plants) are estimated to increase by approximately $215 million in nominal dollars over the 20-year forecast period SVP analyzed, or approximately 4 percent per year. Approximately 1.9 percent per year of these cost increases are attributed to the increased annual energy sales. The remaining 2.1 percent per year are attributed to higher prices for wind and solar resources, along with higher natural gas prices that are expected despite decreased reliance on natural gas in the future.

System and Local Reliability

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.[16] Staff reviewed SVP's capacity reporting table and discussion and finds that SVP has planned for sufficient resources to maintain a reliable electric system. SVP'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 reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Section 9621(d)(1)(E).

System Reliability and Resource Adequacy

SVP uses NCPA as its scheduling coordinator and expects to continue operating within NCPA's agreement with the California ISO.[17] SVP uses a planning reserve margin of 15 percent and meets other reliability requirements established by the North American Electric Reliability Council and the Western Electric Coordinating Council. SVP modeled the ability of each resource portfolio, including generation and purchases, to meet its planning reserve requirement. SVP expects system peak demand, including its planning reserve margin, to increase from 729 MW in 2019 to 885 MW by 2030. SVP expects to have surplus capacity over the planning period with a 115 MW surplus in 2030. While adding new wind and solar resources, SVP will continue to maintain its existing natural gas and non-intermittent renewable resources to ensure system reliability. To the extent SVP requires transmission, ancillary, or power services beyond those contained in existing contracts or from SVP's own generating resources, the utility plans to procure those services directly from the California ISO or through the markets they operate.

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16 Public Utilities Code Section 9621(b)(3).

17 In 2002, the Federal Energy Regulatory Commission approved a series of agreements between Santa Clara, PG&E, the California ISO, and NCPA to allow Santa Clara to operate within the California ISO control area.

Local Capacity Needs

The California ISO establishes requirements for local capacity needs. SVP is located in the California ISO's Greater Bay Area local reliability area. The California ISO conducts an annual Local Capacity Technical Analysis based on its system's one-in-ten-year peak forecast to establish local capacity needs for distribution companies.[18] SVP's local capacity requirement in 2019 is 308 MW. SVP may meet this requirement by procuring capacity in any local reliability area in northern California, not just in the Greater Bay Area. SVP owns and contracts for sufficient local capacity, ranging from 356 MW to over 400 MW depending on the month, to meet local capacity requirements and any excess is available to be sold to other load serving entities.

Flexible Capacity Needs

The California ISO establishes requirements for flexible resources. To count towards flexible resource adequacy, a resource must be able to ramp up and maintain its output for a minimum of three hours. Based on the California ISO's 2018 flexible resource adequacy requirements analysis, in 2019, SVP has a flexible resource adequacy obligation between 15 MW to 50 MW. Typically, SVP plans to meet this requirement with its peaking natural gas resources located within the City of Santa Clara. For months that exceed the limit of these peaking resources (48 MW), SVP has a pool of additional resources in its portfolio that are qualified to provide flexible resource adequacy to make up the difference, including its portion of the Lodi Energy Center.

Transmission and Distribution Systems

PUC Section 9621(b)(3) also requires filing POUs to adopt an IRP that ensures that the POU achieves the goal of strengthening the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities. Staff determined that SVP's IRP filing adequately plans to maintain and enhance its transmission and distribution systems. Staff finds that SVP has planned for enough transmission to adequately deliver resources to its service area to meet the requirements as discussed below. Staff also finds that SVP conducts planning to address the adequacy of its distribution system. As such, staff finds SVP's IRP is consistent with the transmission and distribution requirements set forth above.

Transmission System

SVP owns 230 kV and 115 kV lines in and around the City of Santa Clara. SVP's service area is surrounded by a portion of PG&E's service area and the two

18 One-in-ten system peak demand is the peak demand that can be expected to occur 10 percent of the time and reflects adverse weather conditions.

systems are interconnected at SVP-owned 115 kV receiving stations (Northern Receiving Station and Kifer Receiving Station, located in Santa Clara's city limits) and a 230 kV interconnection with PG&E at the Los Esteros Substation in San Jose.

SVP is a member of the Transmission Agency of Northern California (TANC) and participates in its transmission rights transfer capacity agreements. Being a member of TANC enables SVP to provide transmission of energy generated from the Big Horn wind facilities in the northwest via the California-Oregon Transmission Project and access to power supplies in the southwest via the Tesla-Midway Transmission Service. [19]

SVP uses NCPA as one of its own scheduling coordinator, and the SVP related resources under the NCPA Scheduling Coordinator ID are not obligated to be offered into the California ISO market. However, the utility participates in the California ISO transmission system to move electricity from generators to load and pays a Transmission Access Charge to the California ISO for energy delivered into its service area.

With SVP's anticipated growth, it is looking to increase the capacity of its existing system. The following projects have been approved to increase the capacity or enhance the reliability of its transmission system:

- Upgrade breakers and install larger transformers at the Scott Receiving Station
- Upgrade breakers and install larger transformers at the Northern Receiving Station
- Design reconfiguration and restructuring of the South Loop (one of four 60 kV circuit loops within the City of Santa Clara)
- Upgrade lines at the Northern Receiving Station and Scott Receiving Station Lines #1 and #2

Distribution System

SVP owns facilities for the distribution of electric power within the Santa Clara city limits (approximately 19.3 square miles), which includes approximately 27 miles of 60 kV power lines and approximately 500 miles of 12 kV distribution lines (approximately 64 percent of which are underground). SVP also owns 21 distribution stations of which seven are single customer dedicated substations.

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19 TANC is a joint powers agency established by a group of California publicly owned utilities in 1984, with the initial purpose of developing the California-Oregon Transmission Project (COTP). Its primary purpose today is to provide transmission to its members through ownership or contracts.

Based on 2017 peak summer loading data, the typical maximum loading on a distribution transformer bank is approximately 50 percent of the highest rating of the transformers. All the distribution feeders have sufficient capacity and operate within the thermal capability ratings. The distribution planning study, which includes the load forecast and distribution area capacity study, ensures adequacy of the capacity in the distribution system and identifies upgrades and construction of new distribution systems, including substations. The following distribution projects have been identified for implementation:

- Serra Substation replacement, which involves replacing the existing single transformer bank substation with a two-transformer bank substation
- Homestead Substation, which involves replacing the existing two-transformer bank substation with a higher capacity two-transformer bank substation
- Parker Substation, which will be a new substation dedicated to a single customer
- Fairview Substation expansion, which will add a third transformer bank in existing two-transformer bank substation
- Oaks Junction (RW) Substation, which will be a new substation dedicated to a single customer
- Laurelwood Substation, which will be a new substation dedicated to a single customer
- Freedom Circle Junction Substation, which will be a new substation dedicated to a single customer
- Esperanca Substation, which will be a new general distribution substation to serve new developments proposed around Levi's stadium

Disadvantaged Communities and Localized Air Pollutants

PUC Section 9621(b)(3) requires POUs to minimize localized air pollutants and GHG emissions with early priority on disadvantaged communities. Staff reviewed SVP's IRP filing to determine the extent to which it is minimizing local air pollutants with a priority on disadvantaged communities. Staff finds that SVP has made efforts to address these issues in selecting the resources it plans to include in its portfolio consistent with the requirement.

SVP used the current version of the California Environmental Protection Agency's California Communities Environmental Health Screening Tool (CalEnviroScreen) to identify disadvantaged communities in its service area. SVP identified one area within its service area meeting the air pollution, socio-economic, and health criteria that qualify it as a disadvantaged community. This area borders Highway

101 and the San Jose Airport.[20] As such, the City of Santa Clara has kept this area of the city zoned for heavy industrial and commercial and has kept infill of housing at a minimum except where it makes sense.

SVP offers a number of customer programs and rebates to all of their customers regardless of disadvantaged community designation with additional programs to specifically support low-income and disadvantaged communities. Examples of programs include:

- Financial Rate Assistance Program, which provides a 25 percent discount on the electric portion of utility bills for income-qualified residential customers, up to the first 800kWh of use per month.
- Low Income EV Charging Station Grant for multi-family properties, where SVP will offer a grant of up to $1,000 per charging station for multi-family properties where 15 percent of customers residing at the property qualify for SVP's low income programs.
- Medical Rate Assistance Program, which provides customers a 25 percent discount on their electric bill if they qualify due to high electric use for medical reasons.
- Residential Electric Dryer Rebate Program, which provides a rebate of $100 or $200 for any ENERGY STAR-qualified electric clothes dryer, depending on the unit's specified Combined Energy Factor rating.
- Residential Pool Pump Rebate, which provides a $100 rebate to residential customers installing a new variable speed pool pump with a qualifying controller.
- Energy Star Ceiling Fan, which provides a $35 rebate to residential customers who purchase Energy Star qualified ceiling fans (limit 3 per household).
- Residential Heat Pump Electric Water Heater Rebate, where SVP offers a maximum rebate of $500 per household for the purchase of an ENERGY STAR-qualified electric heat pump water heater.
- Residential In-Home Energy Audits, Education, and Hot Line, which encourages residents to become more energy efficient and reduce their energy bills. Staff members visit homes and provide information and energy saving items, and an information booth will be displayed at several City events, providing education on energy efficiency and solar electric generation systems to residents.
- Residential Attic Insulation Rebate, which pays $0.10/square foot for attic insulation of R-38 over conditioned space in single family homes or in

20 Identified in CalEnviroScreen by census tract as 6085505202.

multifamily homes where the attic space is completely separated from that of the other multifamily units.

Net Energy Demand in Peak Hours

PUC Section 9621(c) 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. SVP's IRP discusses the use of preferred resources in its portfolio, compared to other resources to meet peak hour requirements and is consistent with the above requirement.

SVP's peak demand occurs on a late summer afternoon, typically in September. Renewable and hydro resources contribute less toward meeting energy demand during these hours. Over the planning period, SVP reduces the total amount of natural gas generation needed to meet energy demand, but still relies on it during peak hours. In 2019, 37 percent of SVP's available capacity on peak comes from natural gas generation, and 35 percent comes from large hydro resources. By 2030, the dependable capacity from natural gas generation is down slightly to 31 percent of the available capacity, while large hydro declines slightly to 29 percent and RPS eligible renewable resources increases to 40 percent of available capacity. By 2030, SVP is more weighted towards wind generation than solar. Wind is a better match for SVP's load profile as it has the ability to generate energy throughout the day. In addition, SVP is planning to make use of market purchase during mid-day summer when there is ample solar generation on the grid and prices are advantageous.

Significant energy efficiency improvements in the design and operation of data centers over the past has allowed data center energy use to remain nearly constant, despite a dramatic increase in demand for data center services. However, data center growth is projected to continue and to outpace energy reductions through efficiency improvements. The average load factor of SVP's industrial customers is 85 percent, while most large customers are operating 24 hours a day, 7 days a week and observe minimal differences between peak and off-peak load. Therefore, they do not have the ability to load shift.

SVP's customers have installed 17 MW of solar, 14 MW of natural gas fuel cells, 0.45 MW of micro-turbines, and 14 kW of wind behind-the-meter. SVP no longer offers commercial and residential solar rebates, but will evaluate options for solar programs in future years, with emphasis on a possible low income program and deployable battery storage program. SVP is exploring the role of storage resources as discussed in **Energy Storage** on page **24** and **Energy Efficiency and Demand Response Resources** in the next section.

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 and Local Reliability** on page 17.

Energy Efficiency and Demand Response Resources

Staff finds that SVP'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.

SVP's energy efficiency programs are separated into residential and business programs, with the majority of funding going to its largest customer segment, the business sector. Total funding of energy efficiency programs is about $11 million per year. Residential programs include rate assistance for low-income customers, energy efficiency rebates (ceiling fans, clothes dryers, heat pumps, water heaters, attic insulation, and variable speed pool pumps), energy audits, and programs for schools and libraries. Business programs include energy audits, installation management for small companies, rebates for a wide variety of equipment (lighting, air conditioning systems, chillers, motors, new construction, food service equipment and customized installations, etc.), and design and construction assistance.

The standardized tables submitted by SVP in support of its IRP show that energy efficiency would reduce SVP's demand by 131 GWh by 2027. SVP's energy efficiency savings is less than the targets set by the CEC under SB 350 for doubling energy efficiency savings. **Table 4** shows SVP's estimates of cumulative additional achievable energy efficiency and the SB 350 targets.

Table 4: SVP Additional Achievable Energy Efficiency Estimates (GWh)

Year	AAEE (GWh)	SB 350 Targets (GWh)
2018	12.8	64.0
2019	25.9	77.0
2020	39.9	91.0
2021	54.8	106.0
2022	70.0	121.0
2023	84.5	136.0
2024	97.7	149.0
2025	109.8	161.0
2026	121.1	173.0

Year	AAEE (GWh)	SB 350 Targets (GWh)
2027	131.3	184.0
2028		194.0
2029		203.0
2030		

Source: California Energy Commission, based on 2018 SVP IRP filing.

SVP's unique mix of customers limits the potential for demand response resources. While 84 percent of the customers are residential, over 90 percent of retail sales are to commercial and industrial customers. SVP has an average load factor of over 70 percent with minimal load difference between peak and off-peak times. Currently, data centers make up 46 percent of SVP's commercial and industrial sales and SVP's future growth is more heavily weighted to data centers starting around 2021. Data centers have load factors of 85 percent or higher, meaning that many industrial customers do not have the ability to participate in demand response programs. SVP does offer incentives for customers that can participate in an interruptible program. To date, SVP has one customer that can provide an 8 MW reduction of load. SVP will also complete the installation of its advanced metering infrastructure in 2019 and time-of-use rates may be offered to residential and non-residential customers. Overall, SVP expects the impact of time-of-use rates and demand response programs to be minimal given the limited ability of large customers to shift load.

Energy Storage

Staff finds that SVP's IRP is consistent with the requirement in PUC Section 9621(d)(1)(B) as it discussed the potential role of energy storage on its system. AB 2514 (Skinner, Chapter 469, Statutes of 2010) requires POUs to evaluate the potential of energy storage systems as a resource and establish procurement targets, if determined to be appropriate.

SVP is moving forward with multiple behind-the-meter projects. The largest project is a 2 MW/5 MWh battery energy storage system to be deployed behind the meter at a Bay Area Air Quality Management District data center. The project will demonstrate the economic viability and flexibility of battery energy storage for use as a critical backup power to delay and potentially offset the activation of traditional diesel generators in system emergencies. The project will also demonstrate the use of battery energy storage as a demand response product to reduce peak load and provide the opportunity for net revenue by energy arbitrage.

SVP is also working with a vendor who deploys solar plus storage on large office buildings. SVP is proposing an R&D project to determine the cost effectiveness of smaller scale storage systems (0.75 MW to 1.5 MW) that can co-optimize the benefits of the storage system for both the utility and office building owner. The

goal is to determine the value of this type of project in providing peak savings for commercial customers without impacts to other ratepayers. SVP is continuing to pilot an energy storage project at the Tasman Drive Parking Structure through the CEC grant program to reduce customer-side peak demand changes due to high-energy electric vehicle fast charging. The 30 kW battery energy storage system is installed behind the meter and dampens the demand spikes that occur when the DC fast charging station is used, reducing demand charges that would otherwise occur from its use.

While SVP does not currently have plans to deploy utility-scale storage, it designed a techno-economic model to simulate the performance of a utility-scale lithium-ion battery, which incorporated an economic analysis to evaluate the financial feasibility. The model provides case studies on battery storage system capacity, efficiency, degradation, and estimated lifespan, and cost analysis of market and multi-use applications. SVP will use the model to indicate when it should evaluate large-scale battery deployment at utility-scale renewable projects.

Transportation Electrification

Staff finds that SVP's IRP is consistent with the requirement of PUC Section 9621(d)(1)(C) in that it addresses transportation electrification, primarily for light-duty vehicles.

SVP reports an increase in residential purchases of light duty plug-in hybrid and full battery electric vehicles from 38 in 2011 to more than 2,200 to date. This figure does not include fleet vehicles that entities such as the City of Santa Clara have begun to acquire, or the numerous vehicles that are recharged by non-residents in the course of working, shopping, and visiting entertainment venues. There are more than 450 available charging stations in the city – a majority of them in workplaces – with 70 of them having been installed by the city.

SVP has created an EV program to promote transportation electrification in its service area. The initiatives for fiscal year 2018/19 include:

- Electric Vehicle Charging Equipment Rebate
    - Residential: $750 rebate per installed electric vehicle charger equipment
    - Multi-Family: $3,000 rebate per installed public electric vehicle charger equipment
    - Schools & Non-Profit entities: $5,000 per installed electric vehicle charger equipment
- Electric Vehicle Public Access Charging

- Placing public electric vehicle chargers at City owned facilities, such as at the new Reed and Grant Sports Park (8 charging ports), and Raymond G. Gamma Dog Park (6 charging ports)

In July 2018, the CEC provided a grant to the City of Santa Clara to complete its Electric Vehicle Ready Communities Challenge Blueprint Plan (Blueprint). The Blueprint will help the City understand current gaps and implementation barriers, and achieve electric vehicle readiness. SVP anticipates this Blueprint, in combination with the proposed use of Low Carbon Fuel Standard Program funds for charger rebates and other incentives, will accelerate deployment of transportation electrification within Santa Clara.

SVP used assumptions and scenarios developed by CEC staff in projecting that more than 24,600 light duty plug-in hybrid and full battery electric vehicles will be on the road in its service territory in 2030.[21] Under the assumption that the POU maintains its 2015 share of light duty electric vehicles statewide (0.77 percent), this number is consistent with total deployment of more than 3.7 million vehicles statewide through 2030, more than 3.3 million of which will (still) be in operation in 2030. This is consistent with the 2017 IEPR "mid-case" forecast but well below the target of 5 million vehicles set by then-Governor Brown in January 2018.[22, 23] SVP did not provide estimates of net GHG emissions savings due to light duty electric vehicle deployment in 2030.

Portfolio Diversification

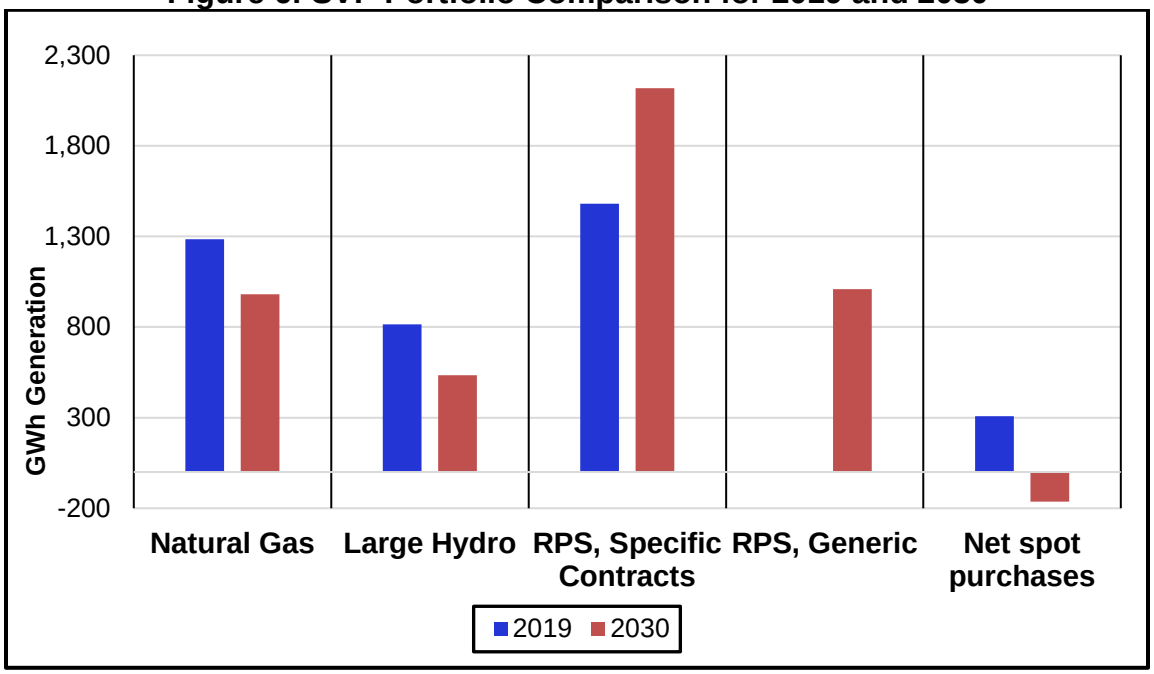
PUC Section 9621(d)(1)(D) requires that POUs address the procurement of a diversified portfolio of resources consisting of both short-term and long-term electricity, electricity related, and demand response products. Based on staff's review of SVP's existing resources, its portfolio analysis, and the selection of resource additions in its IRP, staff concludes that SVP has fulfilled this requirement. **Figure 6** shows a comparison of the energy mix by resource in SVP's preferred portfolio in 2019 and 2030.

21 See staff's *Light-duty PEV Energy and Emission Calculator*, available at https://www.energy.ca.gov/sb350/IRPs/.

22 See the *California Energy Demand 2018 — 2030 Revised Forecast*, pp. 42-43.

23 Executive Order B-48-18.

Figure 6: SVP Portfolio Comparison for 2019 and 2030



Source: California Energy Commission, based on 2018 SVP IRP filing.

SVP faces the challenge of the expiration of its hydro contracts and decreasing dependable generation from its geothermal resources while planning to meet increasing demand with high load factors. The mix of RPS specific resources changes from 59 percent from small hydro and geothermal in 2019 to over 56 percent from wind in 2030. The Viento Loco wind project, which comes online in 2021 and 2022, will help meet increasing energy demand and compensate for the retirement of the Santa Clara Cogeneration facility. Starting in 2030, SVP plans to procure equal amounts of generic wind and solar resources to meet its demand, which will account for roughly 25 percent of its renewable resources.

Although natural gas generation declines from over 33 percent in 2019 to less than 21 percent in 2030, SVP still depends on this resource to integrate renewable generation. In 2019, large and small hydroelectric resources combine for more than a third of SVP's generation. SVP may be subject to increased use of its gas facilities or market purchases during drought years with less than expected hydroelectric generation. SVP is also reliant on contracting with currently designated generic facilities, which make up more than 27 percent of its generation in 2030. Finalizing these contracts will help reduce the utility's market exposure. SVP's energy procurement is a continuous process that provides the flexibility to choose energy resources that fit its load profile, provides reliable energy and reduces risk through a diverse supply profile, and maintains cost-effective rates for its customers.

Acronyms

Acronym	Term
AAEE	Additional achievable energy efficiency
AAPV	Additional achievable photovoltaic
CEC	California Energy Commission
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
GHG	Greenhouse gas
IRP	Integrated resource plan
mT	Metric ton
MT	Thousand metric tons
MMT	Million metric tons
MW	Megawatt
MWh	Megawatt-hour
PCC	Portfolio Content Category
POU	Publicly owned utility
PUC	Public Utilities Code
RPS	Renewables Portfolio Standard
SB 350	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)

Appendix A: Definitions

Additional achievable energy efficiency (AAEE): Energy efficiency savings not yet considered committed but deemed likely to occur, including impacts from future updates of building codes and appliance standards and utility efficiency programs expected to be implemented.

Additional achievable photovoltaic (AAPV): Distributed PV developed as a result of the requirement in the 2019 California Building Energy Efficiency Standards that new residential construction include solar PV as of January 1, 2020.

Assumption: A statement made about the future for a given load forecast, or demand-side or supply-side energy resource, that should be used for procurement and transmission modeling.

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)

Bundled renewable energy credit: A renewable energy credit from an eligible renewable energy resource that is procured as part of the same contract or ownership agreement with the underlying energy from that resource.

Committed energy efficiency: Energy efficiency savings estimated to occur from utility and public agency programs, codes, standards, legislation, and ordinances having final authorization, firm funding, and a design that can be readily translated into evaluable characteristics.

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.

Excess balance: Any amount of RPS-eligible RECs that a utility holds at the end of a compliance period that may be used to meet its compliance obligation in the next compliance period. Excess balance can include excess procurement, historic carryover, or purchased RECs that have not been retired.

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.

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.

Renewable energy credit (REC): A certificate of proof, as defined in PUC Section 399.12 (h), associated with the generation of electricity from an eligible renewable energy resource. RECs are certificates that represent the environmental attributes or 'greenness' 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.

Renewables Portfolio Standard Portfolio Balance Requirements: The minimum and maximum limits on certain types of bundled and unbundled RECs that may counted toward California's Renewables Portfolio Standard.

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 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 scenario analysis changes when an assumption is varied with all other scenario assumptions unchanged.

Standardized tables: The four tables that are required 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.

Unbundled renewable energy credit: A renewable energy credit from an eligible renewable energy resource that is not procured as part of the same contract or ownership agreement with the underlying energy from that eligible renewable energy resource; this includes RECs that were originally procured as a bundled product but were subsequently resold separately from the underlying energy.

Appendix B: Summary Tables

Table B-1: Energy Resources, All Years (GWh)

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Net Energy for Load		**3,888**	**4,067**	**4,236**	**4,339**	**4,440**	**4,553**	**4,621**	**4,676**	**4,687**	**4,711**	**4,734**	**4,758**
	Non-RPS Resources												
Collierville (NCPA Joint Powers Agency Resource)	Large Hydro	203	203	203	203	203	203	203	203	203	203	203	203
Donald Von Raesfeld (DVR)	Natural Gas	835	839	777	711	670	727	720	728	716	701	685	660
Gianera Generating Station	Natural Gas	7.9	6.5	5.1	3.6	3.2	4.5	5.3	4.5	2.7	2.7	1.5	1.7
Lodi Energy Center (NCPA Joint Powers Agency Resource)	Natural Gas	394	418	337	288	280	364	367	371	363	359	352	319
NCPA CT (NCPA Joint Powers Agency Resource)	Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0
Santa Clara Cogeneration	Natural Gas	48	48	48	48	48	48	48	0	0	0	0	0
Tri-Dam Donnells	Large Hydro	281	281	281	281	281	0	0	0	0	0	0	0
WAPA	Large Hydro	331	331	331	331	331	331	331	331	331	331	331	331

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Generic Large Hydro 1	Large Hydro	0	269	269	269	269	269	269	269	269	269	269	0
Generic Large Hydro 2	Large Hydro	0	0	0	0	0	281	281	281	281	281	281	281
Spot Purchases	N/A	308	222	211	0	0	0	0	43	86	133	200	0
Spot Sales	N/A	0	0	0	296	138	163	55	0	0	0	0	164
	RPS Resources												
Ameresco FWD	Landfill Gas	40	40	40	40	40	40	40	40	40	40	40	40
Ameresco Landfill	Landfill Gas	2	2	2	2	2	2	2	2	0	0	0	0
Ameresco VASCO	Landfill Gas	44	44	44	44	44	44	44	44	44	44	44	44
Big Horn 1 (M-S-R JPA resource)	Wind	281	282	281	281	281	282	275	275	275	275	275	275
Big Horn 2 (M-S-R JPA resource)	Wind	42	42	42	42	42	42	42	42	42	42	42	42
Central 40 Solar	Solar	0	0	96	95	95	95	94	94	93	93	92	92
Friant 1	Small Hydro	104	58	58	58	58	58	58	58	58	58	58	58
Friant 2	Small Hydro	39	39	39	39	39	39	39	39	39	39	39	39
G2 Landfill	Landfill Gas	11	11	11	11	11	11	11	11	11	11	0	0
Generic Small Hydro 1	Small Hydro	0	0	0	0	0	96	96	96	96	96	96	96
Generic Small Hydro 2	Small Hydro	0	0	0	0	0	68	68	68	68	68	68	68
Generic Small Hydro 3	Small Hydro	0	0	0	0	0	126	126	126	126	126	126	126

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Generic Solar	Solar	0	0	0	0	0	0	0	0	0	0	0	368
Generic Wind	Wind	0	0	0	0	0	0	0	0	0	0	0	350
Geo 1-4 (NCPA Joint Powers Agency Resource)	Geothermal	342	336	329	322	316	310	303	297	291	286	280	274
Grizzly Hydro	Small Hydro	55	55	55	55	55	55	55	55	55	55	55	55
Jenny Strand	Solar	0	0	0	0	0	0	0	0	0	0	0	0
Manzana Wind	Wind	130	130	130	130	130	130	130	130	130	130	130	130
NCPA Geo 1&2 Onsite Load OSL	Geothermal	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
NCPA Solar Hydro	Solar	0	0	0	0	0	0	0	0	0	0	0	0
NewSpicr (NCPA Joint Powers Agency Resource)	Small Hydro	9	9	9	9	9	9	9	9	9	9	9	9
Recurrent Solar	Solar	59	59	59	59	59	59	59	59	59	59	59	59
Rio Bravo Small Hydro	Small Hydro	0	23	23	23	23	23	0	0	0	0	0	0
Rooney Ranch	Wind	0	0	67	67	67	67	67	67	67	67	67	67
San Hill A	Wind	0	0	44	44	44	44	44	44	44	44	44	44
San Hill B	Wind	0	0	59	59	59	59	59	59	59	59	59	59
Solar Geo Unit 1 (NCPA Joint Powers Agency Resource)	Solar	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar Geo Unit 2 (NCPA Joint Powers Agency Resource)	Solar	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Stony Creek Hydro Project	Small Hydro	11	11	11	11	11	11	11	11	11	11	11	11
Tioga Solar	Solar	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Tri Dam Southern	Small Hydro	96	96	96	96	96	0	0	0	0	0	0	0
Tri-Dam Beardsley	Small Hydro	68	68	68	68	68	0	0	0	0	0	0	0
Tri-Dam Tulloch	Small Hydro	126	126	126	126	126	0	0	0	0	0	0	0
Viento Loco	Wind	0	0	67	800	800	800	800	800	800	800	800	800
WAPA (Small Hydro)	Small Hydro	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	Total Energy	**3,888**	**4,067**	**4,236**	**4,339**	**4,440**	**4,553**	**4,621**	**4,676**	**4,687**	**4,711**	**4,734**	**4,758**
	Surplus/ (Shortfall)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: California Energy Commission, based on 2018 SVP IRP filing.

Table B-2: Capacity Resources, All Years (MW)

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Peak Demand		583	612	637	653	668	685	695	703	706	709	712	716
Planning Reserve Margin		87	92	96	98	100	103	104	105	106	106	107	107
Peak Procurement Requirement		**670**	**703**	**733**	**751**	**768**	**788**	**799**	**808**	**811**	**815**	**819**	**823**
Non-RPS Resources													
Collierville (NCPA Joint Powers Agency Resource)	Large Hydro	91	91	91	91	91	91	91	91	91	91	91	91
Donald Von Raesfeld (DVR)	Natural Gas	148	148	148	148	148	148	148	148	148	148	148	148
Generic Large Hydro 1	Large Hydro	0	85	85	85	85	85	85	85	85	85	85	0
Generic Large Hydro 2	Large Hydro	0	0	0	0	0	72	72	72	72	72	72	72
Gianera Generating Station	Natural Gas	48	48	48	48	48	48	48	48	48	48	48	48
Lodi Energy Center (NCPA Joint Powers Agency Resource)	Natural Gas	78	78	78	78	78	78	78	78	78	78	78	78
NCPA CT (NCPA Joint Powers Agency Resource)	Natural Gas	31	31	31	31	31	31	31	31	31	31	31	31
Santa Clara Cogeneration	Natural Gas	6	6	6	6	6	6	6	0	0	0	0	0
Tri-Dam Donnells	Large Hydro	72	72	72	72	72	0	0	0	0	0	0	0
WAPA	Large Hydro	126	126	126	126	126	126	126	126	126	126	126	126
RPS Resources													
Ameresco FWD	Landfill Gas	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Ameresco Landfill	Landfill Gas	1	1	1	1	1	1	1	1	0	0	0	0
Ameresco VASCO	Landfill Gas	4	4	4	4	4	4	4	4	4	4	4	4
Big Horn 1 (M-S-R JPA resource)	Wind	39	39	39	39	39	39	39	39	39	39	39	39
Big Horn 2 (M-S-R JPA resource)	Wind	6	6	6	6	6	6	6	6	6	6	6	6
Central 40 Solar	Solar	0	0	16	16	16	16	16	16	16	16	16	16

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Friant 1	Small Hydro	17	17	17	17	17	17	17	17	17	17	17	17
Friant 2	Small Hydro	7	7	7	7	7	7	7	7	7	7	7	7
G2 Landfill	Landfill Gas	2	2	2	2	2	2	2	2	2	2	0	0
Generic Small Hydro 1	Small Hydro	0	0	0	0	0	13	13	13	13	13	13	13
Generic Small Hydro 2	Small Hydro	0	0	0	0	0	7	7	7	7	7	7	7
Generic Small Hydro 3	Small Hydro	0	0	0	0	0	18	18	18	18	18	18	18
Generic Solar	Solar	0	0	0	0	0	0	0	0	0	0	0	27
Generic Wind	Wind	0	0	0	0	0	0	0	0	0	0	0	57
Geo 1-4 (NCPA Joint Powers Agency Resource)	Geothermal	50	50	50	50	50	50	50	50	50	50	50	50
Grizzly Hydro	Small Hydro	18	18	18	18	18	18	18	18	18	18	18	18
Manzana Wind	Wind	24	24	24	24	24	24	24	24	24	24	24	24
NewSpicr (NCPA Joint Powers Agency Resource)	Small Hydro	2	2	2	2	2	2	2	2	2	2	2	2
Recurrent Solar	Solar	9	9	9	9	9	9	9	9	9	9	9	9
Rio Bravo	Small Hydro	0	13	13	13	13	13	0	0	0	0	0	0
Rooney Ranch	Wind	0	0	6	6	6	6	6	6	6	6	6	6
San Hill A	Wind	0	0	3	3	3	3	3	3	3	3	3	3
San Hill B	Wind	0	0	5	5	5	5	5	5	5	5	5	5
Stony Creek Hydro Project	Small Hydro	6	6	6	6	6	6	6	6	6	6	6	6
Tioga Solar	Solar	0	0	0	0	0	0	0	0	0	0	0	0
Tri Dam Southern	Small Hydro	13	13	13	13	13	0	0	0	0	0	0	0
Tri-Dam Beardsley	Small Hydro	7	7	7	7	7	0	0	0	0	0	0	0
Tri-Dam Tulloch	Small Hydro	18	18	18	18	18	0	0	0	0	0	0	0
Viento Loco	Wind	0	0	53	53	53	53	53	53	53	53	53	53

Source	Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
WAPA (Small Hydro)	Small Hydro	10	10	10	10	10	10	10	10	10	10	10	10
	Total Capacity Procured	**839**	**937**	**1,021**	**1,021**	**1,021**	**1,021**	**1,008**	**1,002**	**1,001**	**1,001**	**999**	**998**
	Surplus/Shortfall	**169**	**233**	**288**	**270**	**253**	**233**	**209**	**193**	**190**	**186**	**181**	**175**

Source: California Energy Commission, based on 2018 SVP IRP filing.

Table B-3: GHG Emissions from SVP's Resource Portfolio, All Years

Total Emissions (MT CO_2e)	Fuel Type	GHG Intensity (mT CO2e/ MWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Donald Von Raesfeld (DVR)	natural gas	0.422	352,540	353,909	327,722	300,024	282,662	306,756	303,761	307,392	301,994	295,757	288,919	278,719
Gianera Generating Station	natural gas	0.803	6,346	5,221	4,097	2,876	2,570	3,602	4,278	3,650	2,172	2,177	1,208	1,369
Lodi Energy Center (NCPA Joint Powers Agency Resource)	natural gas	0.390	153,492	163,015	131,251	112,510	109,054	142,109	143,134	144,555	141,421	140,014	137,158	124,349
NCPA CT (NCPA Joint Powers Agency Resource)	natural gas	0.803	152	101	101	51	101	101	25	51	0	0	25	51
Santa Clara Cogeneration	natural gas	0.858	41,236	41,350	41,236	41,236	41,236	41,350	41,236	0	0	0	0	0

Total Emissions (MT CO_2e)	Fuel Type	GHG Intensity (mT CO2e/ MWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Spot market purchases	system	0.428	131,693	94,817	90,471	0	0	0	0	18,547	36,746	56,905	85,426	0
Spot market sales	system	0.428	0	0	0	**(126,857)**	**(59,126)**	**(69,889)**	**(23,443)**	0	0	0	0	**(70,079)**
Portfolio emissions	portfolio	NA	685,457	658,413	594,877	329,839	376,496	424,030	468,991	474,195	482,333	494,853	512,737	334,408

Source: California Energy Commission, based on 2018 SVP IRP filing.

ATTACHMENT I:
PUBLIC UTILITIES CODE FOR SB 350

Public Utilities Code - PUC

DIVISION 4.9. RESTRUCTURING OF PUBLICLY OWNED ELECTRIC UTILITIES IN CONNECTION WITH THE RESTRUCTURING OF THE ELECTRICAL SERVICES INDUSTRY [9600 - 9622]

(Division 4.9 added by Stats. 1996, Ch. 854, Sec. 12.)

9621.

(a) This section shall apply to a local publicly owned electric utility with an annual electrical demand exceeding 700 gigawatthours, as determined on a three-year average commencing January 1, 2013.

(b) On or before January 1, 2019, the governing board of a local publicly owned electric utility shall adopt an integrated resource plan and a process for updating the plan at least once every five years to ensure the utility achieves all of the following:

(1) Meets the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each local publicly owned electric utility that reflect the electricity sector's percentage in achieving the economywide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030.

(2) Ensures procurement of at least 50 percent eligible renewable energy resources by 2030 consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3 of Part 1 of Division 1.

(3) Meets the goals specified in subparagraphs (D) to (H), inclusive, of paragraph (1) of subdivision (a) of Section 454.52, and the goal specified in subparagraph (C) of paragraph (1) of subdivision (a) of Section 454.52, as that goal is applicable to each local publicly owned electric utility. A local publicly owned electric utility shall not, solely by reason of this paragraph, be subject to requirements otherwise imposed on electrical corporations.

(c) In furtherance of the requirements of subdivision (b), the governing board of a local publicly owned electric utility shall consider the role of existing renewable generation, grid operational efficiencies, energy storage, and distributed energy resources, including energy efficiency, in helping to ensure each utility meets energy needs and reliability needs in hours to encompass the hour of peak demand of electricity, excluding demand met by variable renewable generation directly connected to a California balancing authority, as defined in Section 399.12, while reducing the need for new electricity generation resources and

new transmission resources in achieving the state's energy goals at the least cost to ratepayers.

(d) (1) The integrated resource plan shall address procurement for the following:

(A) Energy efficiency and demand response resources pursuant to Section 9615.

(B) Energy storage requirements pursuant to Chapter 7.7 (commencing with Section 2835) of Part 2 of Division 1.

(C) Transportation electrification.

(D) A diversified procurement portfolio consisting of both short-term and long-term electricity, electricity-related, and demand response products.

(E) The resource adequacy requirements established pursuant to Section 9620.

(2) (A) The governing board of the local publicly owned electric utility may authorize all source procurement that includes various resource types, including demand-side resources, supply side resources, and resources that may be either demand-side resources or supply side resources, to ensure that the local publicly owned electric utility procures the optimum resource mix that meets the objectives of subdivision (b).

(B) The governing board may authorize procurement of resource types that will reduce overall greenhouse gas emissions from the electricity sector and meet the other goals specified in subdivision (b), but due to the nature of the technology or fuel source may not compete favorably in price against other resources over the time period of the integrated resource plan.

(e) A local publicly owned electric utility shall satisfy the notice and public disclosure requirements of subdivision (f) of Section 399.30 with respect to any integrated resource plan or plan update it considers.

(Amended by Stats. 2017, Ch. 389, Sec. 2. (SB 338) Effective January 1, 2018.)

Public Utilities Code - PUC

DIVISION 1. REGULATION OF PUBLIC UTILITIES [201 - 3260]

(Division 1 enacted by Stats. 1951, Ch. 764.)

PART 1. PUBLIC UTILITIES ACT [201 - 2120]

(Part 1 enacted by Stats. 1951, Ch. 764.)

CHAPTER 3. Rights and Obligations of Public Utilities [451 - 651]

(Chapter 3 enacted by Stats. 1951, Ch. 764.)

ARTICLE 1. Rates [451 - 467]

(Article 1 enacted by Stats. 1951, Ch. 764.)

454.52.

(a) (1) Beginning in 2017, and to be updated regularly thereafter, the commission shall adopt a process for each load-serving entity, as defined in Section 380, to file an integrated resource plan, and a schedule for periodic updates to the plan, to ensure that load-serving entities do the following:

(A) Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each load-serving entity that reflect the electricity sector's percentage in achieving the economywide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030.

(B) Procure at least 50 percent eligible renewable energy resources by December 31, 2030, consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3.

(C) Enable each electrical corporation to fulfill its obligation to serve its customers at just and reasonable rates.

(D) Minimize impacts on ratepayers' bills.

(E) Ensure system and local reliability.

(F) Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities.

(G) Enhance distribution systems and demand-side energy management.

(H) Minimize localized air pollutants and other greenhouse gas emissions, with early priority on disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code.

(2) (A) The commission may authorize all source procurement for electrical corporations that includes various resource types including demand-side

resources, supply side resources, and resources that may be either demand-side resources or supply side resources, taking into account the differing electrical corporations' geographic service areas, to ensure that each load-serving entity meets the goals set forth in paragraph (1).

(B) The commission may approve procurement of resource types that will reduce overall greenhouse gas emissions from the electricity sector and meet the other goals specified in paragraph (1), but due to the nature of the technology or fuel source may not compete favorably in price against other resources over the time period of the integrated resource plan.

(3) In furtherance of the requirements of paragraph (1), the commission shall consider the role of existing renewable generation, grid operational efficiencies, energy storage, and distributed energy resources, including energy efficiency, in helping to ensure each load-serving entity meets energy needs and reliability needs in hours to encompass the hour of peak demand of electricity, excluding demand met by variable renewable generation directly connected to a California balancing authority, as defined in Section 399.12, while reducing the need for new electricity generation resources and new transmission resources in achieving the state's energy goals at the least cost to ratepayers.

(b) (1) Each load-serving entity shall prepare and file an integrated resource plan consistent with paragraph (2) of subdivision (a) on a time schedule directed by the commission and subject to commission review.

(2) Each electrical corporation's plan shall follow the provisions of Section 454.5.

(3) The plan of a community choice aggregator shall be submitted to its governing board for approval and provided to the commission for certification, consistent with paragraph (5) of subdivision (a) of Section 366.2, and shall achieve the following:

(A) Economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in paragraph (1) of subdivision (a).

(B) A diversified procurement portfolio consisting of both short-term and long-term electricity and electricity-related and demand reduction products.

(C) The resource adequacy requirements established pursuant to Section 380.

(4) The plan of an electric service provider shall achieve the goals set forth in paragraph (1) of subdivision (a) through a diversified portfolio consisting of both short-term and long-term electricity, electricity-related, and demand reduction products.

(c) To the extent that additional procurement is authorized for the electrical corporation in the integrated resource plan or the procurement process authorized pursuant to Section 454.5, the commission shall ensure that the costs are allocated in a fair and equitable manner to all customers consistent with

Section 454.51, that there is no cost shifting among customers of load-serving entities, and that community choice aggregators may self-provide renewable integration resources consistent with Section 454.51.

(d) To eliminate redundancy and increase efficiency, the process adopted pursuant to subdivision (a) shall incorporate, and not duplicate, any other planning processes of the commission.

(e) This section applies to an electrical cooperative, as defined in Section 2776, only if the electrical cooperative has an annual electrical demand exceeding 700 gigawatthours, as determined based on a three-year average commencing with January 1, 2013.

(Amended by Stats. 2018, Ch. 92, Sec. 174. (SB 1289) Effective January 1, 2019).