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California Energy Commission

STAFF REPORT

Review of Roseville Electric Utility'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. Roseville Electric Utility submitted its *Integrated Resource Plan Report 2018* and supplemental information, which the Roseville City Council adopted on June 20, 2018, to the Energy Commission for review April 11, 2019. This staff paper presents the results of the Energy Commission staff review of the Roseville Electric Utility 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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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 *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* require those 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 Energy Commission must review the IRPs to ensure consistency with the requirements of PUC Section 9621.

The Roseville Electric Utility (Roseville) IRP filing identifies key challenges the utility faces from 2018 through 2030 and outlines a suite of resource planning and risk management strategies to address them. Roseville needs to identify low carbon resources to meet a potential deficit in peak capacity throughout the planning period, acquire additional renewable resources to achieve Renewables Portfolio Standard (RPS) procurement requirements after 2024, and add flexible capacity needed in 2025 and beyond to integrate renewable resources. The utility must also identify strategies to mitigate future environmental cost risks such as potential increases in GHG emission prices under the cap and trade program. In addition, Roseville must mitigate the potential risk of limited trade opportunities in the future as its current and potential trading partners join the Western Energy Imbalance Market.

To meet these challenges, Roseville examined both current and proposed supply-side and demand-side resources that allow it to keep electricity rates affordable and ensure reliable service for its customers. Roseville's preferred plan involves purchasing short-term capacity resources to meet peak demand shortfalls, diversifying its renewable portfolio with additional solar and wind resources, acquiring transmission to access carbon-free resources from the Pacific Northwest, and adding flexible resources including energy storage to integrate intermittent renewables. In addition to achieving RPS procurement requirements in 2030, the preferred plan will enable Roseville to meet its 2030 greenhouse gas emissions targets, as established by the California Air Resources Board.

In reviewing Roseville's 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, 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 discussion 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 requirements of PUC Section 9621(b)(2).
- *Meeting Planning Goals:* The values reported in standardized tables, 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 tables, 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 ensure the utility's energy and reliability needs in the peak hours as set forth in PUC Section 9621(c).
- *Addressing Resource Procurement Types:* The IRP filing includes values reported in the standardized tables and narrative discussion that demonstrate the utility has 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).

The IRP is consistent with the PUC Section 9621 requirement to address energy efficiency and demand response. In addition to the IRP provisions, Senate Bill 350 (de León, Chapter 547, Statutes of 2015) requires the Energy Commission 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 other 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 Energy Commission will report on progress in achieving the doubling targets, including those for Roseville, and update the targets as necessary.

CHAPTER 1:
Background, Demand Forecast, and Procurement

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 (IRPs). 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 effects 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 POUs meeting the demand threshold to submit an IRP and updates to the California Energy Commission for review to determine consistency with the requirements of PUC Section 9621. If the Energy Commission determines an IRP is inconsistent with these requirements, the Energy Commission shall provide recommendations to correct the deficiencies. The Energy Commission adopted the *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* (*POU IRP Guidelines*) to govern the submission of the POUs IRPs.[2] PUC Section 9622 requires the Energy Commission to review POU IRPs to ensure they achieve PUC Section 9621 provisions (see **Attachment I**).

This chapter outlines the Energy Commission's review process and provides an overview of Roseville Electric Utility (Roseville) 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.

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

Energy Commission IRP Review Process

On April 11, 2019, Roseville submitted its IRP and supporting documentation as outlined in the *POU IRP Guidelines* to the Energy Commission for review.[3] Staff's review occurred in two stages. First, staff performed a completeness review to ensure the IRP 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 Roseville 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, and whether they achieved Renewables Portfolio Standard (RPS) procurement requirements, energy efficiency savings projections and programs, and plans for transportation electrification.

Overview of Roseville Electric Utility

Roseville is a community-owned, not-for-profit electric utility in Placer County, as described below.

- Roseville delivers nearly 1.2 million megawatt-hours (MWh) of energy to roughly 57,000 residential and business customers within a 43 square mile service territory.
- The utility owns and operates its own distribution systems while its bulk transmission needs are provided by contracts with the Western Area Power Authority (WAPA) and Transmission Authority of Northern California (TANC).
- The Roseville service territory is in the area managed by the Balancing Authority of Northern California (BANC) and constitutes roughly 7 percent of its load.
- Roseville has 314 megawatts (MW) of peak dependable generation capacity that served a peak demand of 355 MW that occurred in June 2017.

3 The *POU IRP Guidelines* define an *IRP filing* to include the IRP adopted by the governing board, along with standardized tables and other supporting information required to review the IRP for consistency with SB 350.

- The utility expects new customer growth of 0.4 percent annually with overall energy requirements declining due to energy efficiency and zero net energy home programs.
- The elected City Council of Roseville has ultimate decision-making authority for the utility, with input from the Roseville Public Utilities Commission (RPUC).

Roseville's Planning Process

Roseville's City Council is ultimately responsible for adopting an IRP. The RPUC is a seven-member body that studies and advises the City Council on utility issues including planning, rates, and public information. Roseville's staff presented the IRP to the RPUC for public review on April 24, 2018. Some of the key issues discussed at the meeting were IRP requirements and recommendations, renewable technologies and cost, and energy storage technologies. The RPUC unanimously recommended adoption of the IRP, which the City Council approved on June 20, 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.[4] 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 a POU uses a forecast other than the Energy Commission's adopted demand forecast.[5] The demand forecast and the 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

Roseville projects 0.4 percent annual growth in customers to 2030, but annual declines in retail sales and energy (net energy for load) over the same period of 0.73 percent and 0.67 percent, respectively.[6] The declines are due to forecasted energy efficiency savings for both residential and commercial sectors, the implementation of the 2019 Building Energy Efficiency Standards and the

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

5 The most recently adopted demand forecast is for the *2018 Integrated Energy Policy Forecast Update.*

6 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.

requirement for solar on new homes in 2020, and other deployment of distributed solar.[7] At the same time, Roseville expects peak demand to rise slightly over the forecast period from 340 MW in 2019 to 350 MW in 2030.

Roseville used multivariate time series regression to forecast system energy, peak demand, and retail energy sales to customer classes. The residential and small general service (or commercial) classes are forecast using an end-use model. An econometric regression model is used for larger customers.

The customer growth forecast is a key driver in projecting Roseville's future load. The population growth forecast informs residential customer counts and estimates of growth in non-residential accounts based on knowledge of upcoming projects, commercial development forecasts, and available land inventory. Climate is also a factor in determining electrical load, with Roseville experiencing its highest demand in the summer to power air conditioning units. The forecast also considers projected growth in residential and commercial distributed solar, transportation electrification, and both committed and uncommitted energy efficiency programs. The following summarizes some of the key data sources used in developing the load forecast:

- *Historical Retail Sales.* Historical profiles of Roseville customers that outline energy use, energy losses, energy efficiency, and onsite generation (rooftop solar).
- *Customer Growth.* Customer growth data gathered from the Development Services Department, Economic Development Department, and various city plans.
- *Economic Effect.* Unemployment data from the State of California Employment Development Department. Considered current unemployment rate and outside forecasts of unemployment.
- *Energy Efficiency.* All committed energy efficiency programs from SB 1037[8] annual reporting requirements. Roseville's City Council adopted requirements from AB 2021[9] in 2015.

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7 Roseville forecasts annual distributed solar installation of just under 3 MW in 2020 and 2021, declining to 2 MW annually through 2030.

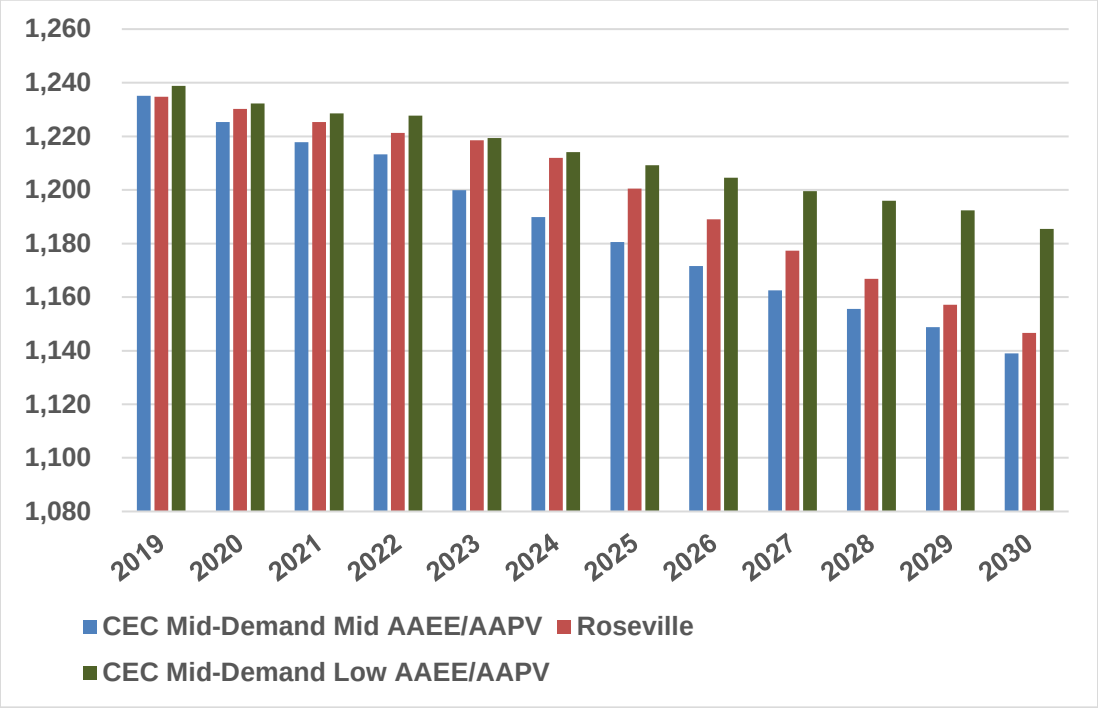
8 Senate Bill 1037 (Kehoe, Chapter 366, Statutes of 2005) requires that all POUs, regardless of size, report investments in energy efficiency programs annually to their customers and to the Energy Commission.

9 Assembly Bill 2021 (Levine, Chapter 734, Statutes of 2006) requires the Energy Commission to develop statewide energy efficiency potential estimates and savings targets and report them as part of its Integrated Energy Policy Report (IEPR) proceeding.

- *Transportation Electrification.* Transportation electrification as derived from the Energy Commission's *2017 Integrated Energy Policy Report (2017 IEPR)* mid-case scenario.
- *Distributed Generation.* Current and forecasted installations of solar photovoltaic (PV) systems in both the residential and commercial sectors.

A comparison of Roseville's energy forecast with the Energy Commission's forecasts for Roseville is presented in **Figure 1**.[10]

Figure 1: Roseville and Energy Commission Energy Demand Forecasts



Sources: California Energy Commission, based on 2018 Roseville IRP filing and California Energy Commission 2019 Demand Forecast.

Roseville's energy forecast falls between the two Energy Commission energy forecasts. The Mid-Demand Mid AAEE/AAPV forecast is slightly lower than Roseville's forecast, with a difference of less than one percent in 2030.[11] The Mid-Demand Mid AAEE/AAPV forecast and Roseville's forecasts include additional achievable energy efficiency (AAEE) and additional achievable photovoltaic

10 The Energy Commission forecast is *California Energy Demand Updated Forecast 2018-2030 (CEDU 2018)*, adopted February 20, 2019.

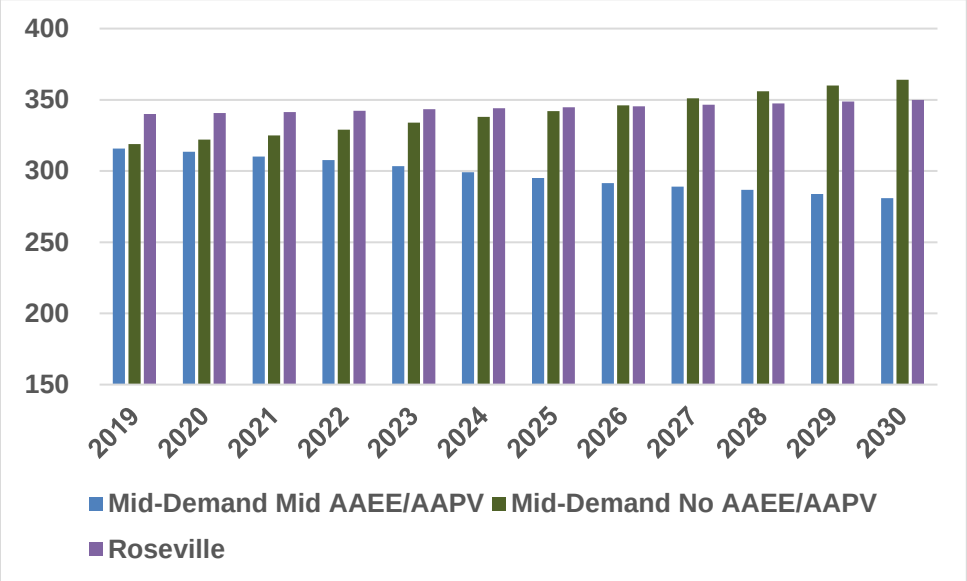
11 The Energy Commission produced seven different demand forecast for load-serving entities/balancing authorities for the *2018 Integrated Energy Policy Report* that reflect varying demand conditions combined with varying amounts of energy efficiency and solar photovoltaic. AAEE refers to additional achievable energy efficiency and AAPV refers to additional achievable photovoltaic (PV).

(AAPV).[12] For more information regarding Roseville's annual energy demand, see the energy balance table in **Appendix B**.

While Roseville estimates a steady decline in energy demand through 2030, Roseville forecasts peak demand to increase over this same period. Peak demand is projected to increase by 10 MW in total over the forecast period, or 0.26 percent per year. This is attributable, in part, to a shift in the hour in which the peak occurs from 5:00 to 6:00 pm to 6:00 to 7:00 pm. In the earlier hour, distributed solar output is roughly 30 percent of nameplate capacity (8 MW in 2019), but in the later hour, solar does not produce energy.

A comparison of Roseville's annual peak demand forecast for 2019 to 2030 and that of the Energy Commission can be found in **Figure 2**. Roseville does not factor AAEE savings into its peak load forecast. Roseville's forecast is fairly consistent with the Energy Commission's Mid-Demand No-AAEE/AAPV forecast, although the Energy Commission's forecast is slightly lower in the early years and slightly higher in the later years of the forecast. The Mid-Demand Mid AAEE/AAPV is substantially lower than Roseville's forecast, which is expected since it does include the savings from AAEE.

Figure 2: Roseville and Energy Commission Peak Forecasts 2019-2030 (MW)



Sources: California Energy Commission, based on Roseville 2018 IRP filing and California Energy Commission 2019 Demand Forecast

12 Terms and definitions can be found in Appendix A.

Resource Procurement Plan

The *POU IRP Guidelines* require that POUs report the mix of resources they plan to use to meet demand from 2018 to 2030. 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 Roseville's IRP meets the 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 tables.

Existing Resources

Roseville has a diverse portfolio of resources including gas-fired generation, large hydroelectric, renewable resources, and market purchases. The utility currently has about 300 MW of peak dependable capacity, including short-term capacity purchases. Roseville's portfolio of resources produced just under 1,200 GWh of energy in 2018 to meet its customer load.

Roseville's existing resources include:

- Three natural gas-fired facilities:
  - The utility-owned Roseville Energy Park provides 155 MW of dependable peak capacity. As a newer (2007) combined cycle power plant connected to the distribution system, the resource provides local reliability and serves as an intermediate load resource.
  - Roseville Power Plant 2 has a pair of 24-MW utility-owned combustion turbines they operate as peaker units. The units are restricted to a combined annual operation of 900 hours.
  - CT Project 2 (CT2) is a 50-MW steam-injected gas turbine owned by the Northern California Power Agency (NCPA). Roseville is entitled to 36 percent of its output or 18 MW of capacity and approximately 6 MW of ramping capacity, but it is rarely called on. Roseville plans to use CT2 in this fashion throughout the forecast period.
- And two predominantly large hydroelectric contracts:
  - A long-term contract with the WAPA calls for 54 MW peak capacity and 155 GWh of energy from the federal Central Valley Project. The existing contract runs through 2024 and Roseville assumes it will be extended beyond 2030.[13]
  - An ownership share of 31 MW of peak capacity and 72 GWh of energy from NCPA's 253-MW Calaveras project in average water years.

13 A small amount of the WAPA hydro qualifies as RPS-eligible small hydro.

Roseville also has several long-term RPS contracts with counterparties providing wind, solar, and geothermal energy. Roseville has a roughly 8 percent share of NCPA's geothermal plants that are expected to decline from 9 MW of capacity and 61 GWh of energy in 2018 to 6 MW of capacity and 44 GWh of energy in 2030 as declines in the steam field gradually reduce the capacity and energy from the project. In addition, Roseville has power purchase agreements for renewable energy with Silicon Valley Power, Lost Hills Solar, Avangrid Renewables, and Powerex Corp. totaling 356 GWH of energy in 2018. These existing contracts expire between 2022 and 2025 and are expected to provide enough energy to meet RPS procurement requirements through 2024. Roseville's renewable resources are discussed further in Renewables Portfolio Standard Planning Requirements on pages 15 to 17.

Resource Portfolio Evaluation

Roseville's IRP evaluated resource portfolios to identify the appropriate renewable resource mix for 2025 and beyond, as well as the optimal resources and energy procurement strategies to provide a cost-effective, emissions-limited portfolio. Roseville used various economic analyses and methodologies to assess alternative scenarios with different combinations of supply and demand resources and test sensitivities to key assumptions to achieve an economically optimal resource plan.[14]

Roseville employed a multi-step process to evaluate potential resources including the following:

- Examining the planning framework and risks associated with the current business and regulatory environment.
- Assessing resource needs based on forecasts developed for load growth, load shapes,[15] power plant conditions, contract terms, and operational constraints.
- Evaluating conventional, renewable, and long-term market power purchases to understand how each resource might help the utility meet customer needs, regulatory requirements, and policy goals.

14 Roseville relied on Black and Veatch to perform forecasting and modeling in support of the IRP.

15 A load shape is a graphical display that represents the changes in electricity load (or energy demand) over time, typically throughout the day. For example, load typically is low overnight, but beginning in the morning when people start their day and go to work, loads increase. Loads generally peak in the afternoon, as air conditioners and other equipment are used, then load declines overnight as customers retire for the night.

- Developing resource portfolios to identify preferred portfolios based on their ability to meet GHG emission reduction targets, renewable energy procurement requirements, resource needs, and other planning data.
- Conducting detailed evaluation of preferred resource portfolios through scenario and risk analysis to test performance under a range of regulatory and market conditions.
- Selecting a *preferred plan* that reliably served demand at a reasonable long-term cost while complying with regulatory requirements, accounting for inherent risks and allowing flexibility to respond to future changes.

Providing for increased flexibility is a key challenge for Roseville. The IRP evaluates three options for adding flexible capacity to its portfolio that provide ramping to mitigate the increased variations in intra-hour load.[16]

- **Operating Roseville Energy Park.** This is the costliest option, requiring the power plant to be operated at sub-optimal levels of output and possibly increasing its GHG emissions to levels above the California Air Resources Board (CARB) mandated 2030 target.
- **Deploying 10-MW internal combustion engines.** These can be turned on and off as needed, resulting in a smaller increase in emissions than operating Roseville Energy Park and are the lowest-cost option. They constitute a 30-year investment, however, that could be stranded if GHG emissions targets are lowered in the future.
- **Battery storage.** Lithium-ion battery storage can provide the flexibility needed to integrate large quantities of solar generation. Roseville finds it to be a higher-cost source of flexible capacity than internal combustion engines, but it results in substantially lower GHG emissions and thus less exposure to environmental compliance risk. It is also more likely that battery storage costs will drop over the next several years. Roseville plans to evaluate a scalable energy storage pilot project to integrate new renewable resources.

Portfolio Costs and Risks

Roseville evaluated portfolio costs and found that direct environmental costs such as increased RPS and GHG costs were the largest contributing factor to rising portfolio costs over the forecast period. Other contributing factors were resource intermittency, increasing peak demand, and natural gas transportation

16 *Ramping needs* are the required minute-to-minute and hour-to-hour changes in output from power plants whose output can be controlled (or dispatched) in both and upward and downward direction (natural gas-fired and hydroelectric facilities in the Roseville portfolio). These needs increase as solar and wind generation are added.

costs. For Roseville's preferred plan, their costs are projected to increase by about 2.75 percent nominally per year between 2018 and 2030.

Roseville identified key risks to future portfolio costs including environmental compliance, transmission costs, and liquidity risks. Environmental compliance in the form of RPS and GHG allowance prices is projected to be the largest cost risk to the preferred plan. Roseville tested a high environmental compliance scenario and found that costs would increase by 16 percent in 2021 and 10 percent in 2026. Investments in carbon-free resources such as hydroelectric energy from the Pacific Northwest will help shield Roseville's customers from GHG compliance cost risks. Roseville plans to make additional investments in renewable resources to limit its exposure to the high cost carbon market.

Transmission costs risks involve the potential change to the cost structure of transmission due to privatization, which poses a risk to future costs. Local liquidity of the renewable resource market may dwindle as more parties join the Western Energy Imbalance Market (EIM). To mitigate cost risks, Roseville will evaluate opportunities offered by the EIM and potentially join in order to offset decreasing real-time market purchase options.

Procurement Strategy

Roseville's procurement strategy addresses three primary issues: meeting peak demand needs with carbon-limited resources, procuring necessary renewable resources to meet RPS procurement requirements, and addressing renewable integration needs. Roseville's preferred portfolio includes the use of natural gas generation to meet reliability and peak needs. The utility plans to continue using the Roseville Energy Park for reliability needs and operating reserves. The plant is also capable of ramping quickly to facilitate renewable integration. The Roseville Power Plant 2 provides power during peak hours and supports local reliability requirements. Roseville is working on a study to identify cost effective upgrades that would improve the reliability of this plant. CT2 is a peaking power plant that is nearing the end of its debt service. NCPA is currently evaluating whether to repower, upgrade or decommission the plant.

Even with continued use of natural gas generation, Roseville falls short of meeting its peak load and reserve margin requirements by about 74 MW starting in 2019 and increasing to almost 90 MW throughout the forecast period.[17] Roseville determined that purchasing short-term (1 year or less) to mid-term (1 to 5 years) capacity is the lowest cost option to meet this peak load and reserve margin requirements. To facilitate access to capacity markets, Roseville plans to

17 It is physically possible to increase the output from natural gas plants. However, relying on natural gas facilities to meet all of its capacity needs would result in additional GHG emissions, which Roseville is trying to limit to meet GHG targets.

procure additional transmission. For example, Roseville entered into a 5-year transmission contract with PacifiCorp in March of 2018 and may consider other transmission options. To help address peak load requirements, Roseville also plans to evaluate its demand response (DR) program and upgrade it where possible. For more discussion on demand response, see Energy Efficiency and Demand Response Resources on page 24.

Large hydroelectric resources, which are assumed to remain constant over the planning period, have the benefit of providing carbon-free energy to Roseville's portfolio. The utility plans to renew its contract for WAPA federal hydropower and to maintain its contracts with NCPA for the Calaveras hydro facility as long as rates remain competitive. Calaveras is a very flexible resource with fast start and fast ramping capability that can meet Roseville's ancillary service requirements. However, since the unit is physically located in the California Independent System Operator's (CAISO) balancing authority, it cannot be used to meet Roseville's system flexibility needs.

Roseville has a diverse portfolio of contracted renewable resources consisting of geothermal, small hydro, solar, and wind resources that are located within CAISO balancing authority or are firmed and shaped imports from out of state.[18] Existing renewable contracts are projected to be sufficient to comply with RPS procurement requirements through the 40 percent target by 2024. The utility evaluated several types of renewable resources to meet RPS requirements beyond 2024 including additional geothermal, biomass, wind, and solar technologies, and determined that wind was the lowest cost option. However, Roseville selected a more diversified renewable portfolio to hedge against cost exposure and the changing market environment. Roseville plans to procure new renewables consisting of 50 percent wind and 50 percent solar to fulfil its RPS obligations through 2030. Existing geothermal and small hydroelectric resources will maintain their roles within Roseville's renewable portfolio.

Solar installations (both solar rooftop and utility scale solar) and wind resources within the Roseville service area will require flexible resources to account for hour-to-hour and minute-to-minute net load variations.[19] As discussed in the Resource Portfolio Evaluation section, the flexible resource options Roseville

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18 Firmed and shaped resources are renewable energy purchased from a third party where the delivery of the energy is shifted from when it is generated to a time that it has more value to the purchaser. For example, energy produced in the middle of the night from a wind resource in the Pacific Northwest has less value to the purchaser because they have low loads at night. It becomes more valuable if delivered during the day.

19 Net energy for load, or net load, is the total amount of energy that a utility or load serving entity 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.

analyzed were increasing Roseville Energy Park's flexible capabilities, internal combustion engines, and lithium-ion storage batteries. Roseville found that batteries have the potential for further cost improvements and offer many options for designing supply and demand-side programs. Roseville will move forward with a battery storage pilot program to evaluate its performance as a flexible resource. Based on the result of the pilot, Roseville may invest in additional battery storage in the future.

Table 1 shows how Roseville's generation portfolio will evolve over the forecast period. Planned purchases of wind and solar energy are expected to begin in 2025 and by 2026 will have replaced existing RPS-eligible resources whose contracts are expiring, allowing Roseville to meet increasing RPS procurement requirements through 2030. (See Renewables Portfolio Standard Planning Requirements on page 16.) Renewable energy also allows for a reduction in spot market purchases, from roughly 34 percent in 2019 to 11 percent of total energy requirements in 2030. As a result, Roseville can continue to use the Roseville Energy Park, at slightly reduced levels from 2019, to meet reliability and load-following requirements and still meet its GHG emission reduction target in 2030. (See Greenhouse Gas Emission Reduction Targets on page 15.)

Table 1: Roseville, Energy Sources by Type 2019 - 2030 (MWh)[20]

	2019	2025	2030
Total net energy for load	**1,234,717**	**1,200,474**	**1,146,631**
Natural Gas	273,550	248,730	248,980
Large Hydro	217,600	217,600	217,600
Short-term/Spot purchases/Unspecified	419,005	250,711	125,500
Total - Non-RPS energy	**910,155**	**717,041**	**592,080**
Geothermal Contract	59,438	49,225	44,253
Wind Contracts	212,788	75,000	0
Mixed Renewable Contracts	50,000	0	0
Other RPS Contracts	2,336	1,528	1,528
New Wind	0	179,250	254,690
New Solar	0	178,430	254,080
Total - RPS energy	**324,562**	**483,433**	**554,551**
Total energy procured	**1,234,717**	**1,200,474**	**1,146,631**

Source: California Energy Commission, based on Roseville 2018 IRP filing

For more detail regarding Roseville's generation and procurement of net energy for load from 2019 to 2030, see the energy balance table in **Appendix B**.

20 The figure does not include energy from existing small RPS contracts, which total less than 0.2 percent of total energy procured.

Table 2 displays Roseville's capacity resources to meet peak demand and reliability requirements for years 2019, 2025 and 2030. As shown in the table, Roseville projects a capacity resource shortfall through 2030 that it intends to meet with short-term capacity purchases.

Table 2: Roseville, Capacity Resources by (MW)

	2019	2025	2030
Peak Demand	340	345	350
Planning Reserve Margin	51	51	52
Peak Procurement Requirement	389	394	400
Natural Gas	221	221	221
Large Hydroelectric	85	85	85
Total - Non-RPS energy	**306**	**306**	**306**
Geothermal	8.4	6.5	5.4
Small hydroelectric	0.3	0.3	0.0
Solar PV	0.0	0.0	0.0
Generic RPS resources	0.0	35.0	51.0
Total - RPS energy	**8.7**	**41.8**	**56.4**
Total Capacity Procured	**314**	**348**	**362**
Surplus/Shortfall	**-74**	**-46**	**-38**

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

CHAPTER 2:
Review for Consistency with PUC Section 9621 Requirements

This chapter summarizes the main elements of Roseville'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 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 CARB, in coordination with the Energy Commission and California Public Utilities Commission.[21] These GHG targets reflect the electricity sector's percentage in achieving economy-wide GHG emission reductions of 40 percent from 1990 levels by 2030. Energy Commission staff reviewed the GHG emissions associated with Roseville'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 Roseville's portfolio to ensure consistency with other data and information available to staff.

Staff finds that Roseville's plans to achieve the CARB established GHG emission reduction target range of 136 to 240 thousand metric tons of carbon dioxide equivalent (MT CO_2e). As shown in **Table 3**, Roseville's resource portfolio results in roughly 161 MT CO_2e, which is near the lower end of the range and consistent with the requirement of PUC Section 9621(b)(1).

Roseville's portfolio GHG emissions were estimated by multiplying the expected output from the utility's three natural gas-fired generation facilities by their GHG emissions intensity measured in metric tons of carbon dioxide equivalent per megawatt-hour (mT CO_2e/MWh). Spot market and short-term purchases were assigned an emission intensity of 0.428 mT CO_2e/MWh, which is consistent with CARB's GHG emissions values associated with energy from unspecified sources in its Mandatory Reporting Regulation for the cap and trade program.

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

Table 3: Greenhouse Gas Emissions From Roseville's Resource Portfolio

	Fuel Type	GHG Intensity (mT CO2e/MWh)	Total Emissions (MT CO2e) 2019	Total Emissions (MT CO2e) 2025	Total Emissions (MT CO2e) 2030
Roseville Energy Park	natural gas	0.43	117	107	107
Roseville Power Plant 2	natural gas	0.8	<1	<1	<1
Steam Injected Gas Turbine	natural gas	0.481	<1	<1	<1
Spot market purchases	unspecified	0.428	179	107	54
Total Portfolio emissions	**NA**	**NA**	**297**	**214**	**161**

Source: California Energy Commission, based on Roseville 2018 IRP filing

Staff compared the emissions intensity projected by the utility for the Roseville Energy Park (0.430 mT CO_2e/MWh) against the 2013 to 2018 historical values reported in the utility's Quarterly Fuel and Energy Reports (QFER), and finds the projected value is consistent with the emission intensity over that period (418 mT CO_2e/MWh). Roseville Power Plant 2 and Steam Injected Gas Turbines are intended to help ensure reliability and will seldom be used except when needed during peaking hours. As a result, GHG emissions from these resources will be negligible.

Table 3 illustrates Roseville's planned resource portfolio emissions for 2019, 2025, and 2030. Roseville's GHG Emissions Reporting Table, which identifies the emission intensities and annual emissions for individual resources for 2017 to 2030, can be found in **Appendix B**.

Renewables Portfolio Standard Planning Requirements

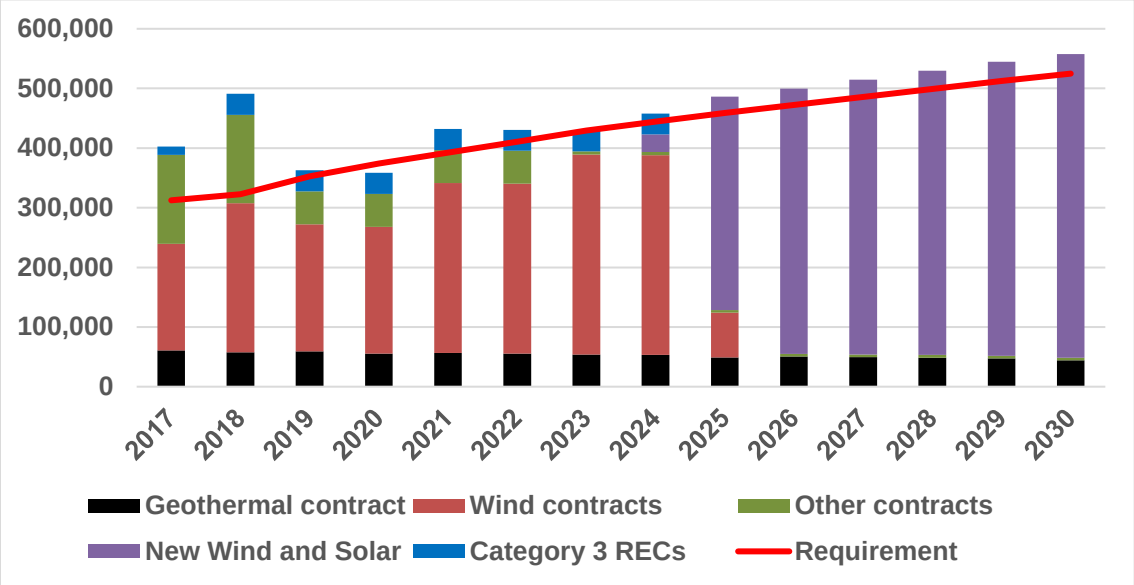
PUC Section 9621(b)(2) requires that POU IRPs ensure procurement of at least 50 percent renewable energy resources by 2030, consistent with Public Utilities Code Article 16 (commencing with Section 399.11) of Chapter 2.3 of Part 1 of Division 1.[22] Staff reviewed the renewable procurement table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that

22 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 energy 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 these updates are filed.

Roseville's plans are consistent with the RPS procurement requirements in 2030 and all interim compliance periods and are consistent with requirements of PUC Section 9621(b)(2).

Roseville's RPS-eligible energy procurement equaled 34 and 41 percent of retail sales in 2017 and 2018, respectively. Roseville's IRP was developed assuming that it would meet a 50 percent RPS in 2030, as well as interim compliance periods. This would require a minimum procurement of 524,000 MWh of RPS-eligible renewable energy in 2030, shown as the red line in **Figure 3**. Roseville plans to exceed this minimum amount of RPS-eligible renewables in 2030 and has proposed the City Council adopt an updated renewable procurement plan.

Figure 3: Roseville, Sources of Renewable Energy Credits (MWh)



Source: California Energy Commission, based on Roseville 2018 IRP filing

Roseville plans to meet the 40 percent RPS target through 2024 with existing resources. In 2025, the majority of Roseville's renewable resource contracts will end. New renewable needs begin in compliance period 2025 to 2027. Banked renewable energy credits (RECs) will be applied in 2025. Even with the applied RECs, Roseville will need to procure additional resources to meet its RPS requirement.

The utility uses the purchase of Portfolio Content Category 3 RECs during the third and fourth compliance periods (2017 to 2020 and 2021 to 2024).[23] Roseville also procures RPS-eligible energy beyond the amounts needed to meet the RPS, which are added to its bank of RECs. The bank contains more than

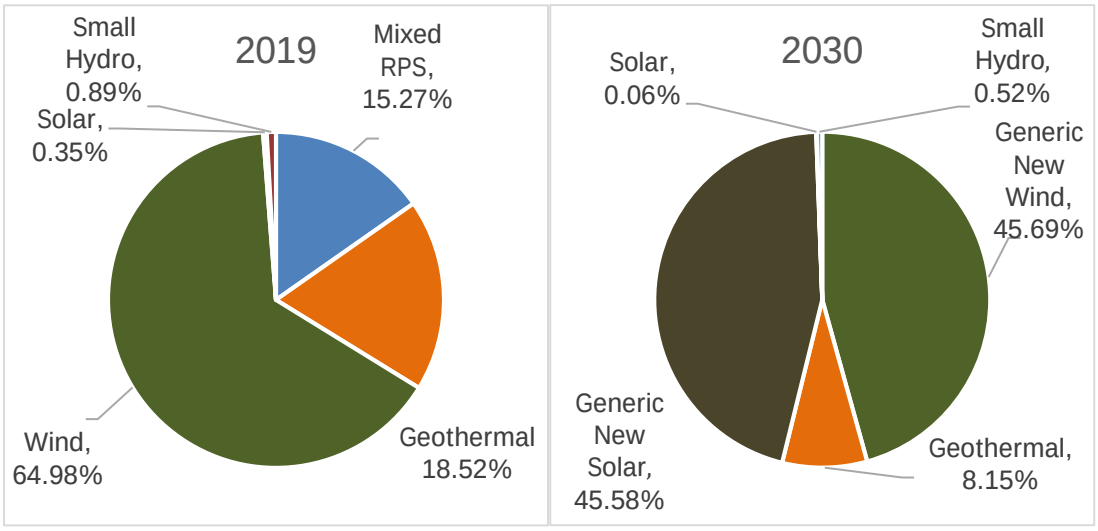
23 Portfolio Content Category 3 RPS renewables consist of unbundled RECs or purchases of energy from an RPS eligible facility in which the REC is sold to the purchaser with no energy procured or delivered.

200,000 RECs at the beginning of the third compliance period in 2017. Excess procurement in 2017 and 2018 adds more than 231,000 RECs to the bank at the end of the third period and another 49,000 RECs at the end of the fourth period.

In the fifth and sixth compliance periods, Roseville does not utilize Portfolio Content Category 3 RECs to meet procurement requirements, nor does it withdraw RECs from its bank. Instead, RPS requirements in these periods are largely met with renewable energy procured during these periods. New wind and solar resources replace the three large contracts that expire in 2022, 2024, and 2025. In 2027, an additional 62,700 MWh would be added to the bank, bringing the balance to more than 550,000 RECs by the end of 2030.[24] This is roughly equal to the additional RPS-eligible renewable energy that would need to be purchased to comply with the 60 percent RPS in 2030 (and interim requirements) established in Senate Bill 100 (De León, Chapter 312, Statutes of 2018).

Figure 4 below shows that Roseville's renewable portfolio consists of 65 percent wind and 19 percent geothermal in 2019, then shifts to 46 percent wind and 46 percent solar in 2030. For detailed information regarding Roseville's procurement of energy and RECs to meet the RPS see the energy balance table and RPS procurement table in **Appendix B**.

Figure 4: Roseville Renewables Portfolio Standard Renewable Portfolios



Source: California Energy Commission, based on Roseville 2018 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

24 There is also a 95,000 MWh surplus at the end of the final compliance period, the disposition of which is not discussed by the utility in the IRP.

and minimize impacts to ratepayer bills. Staff reviewed the analysis and information Roseville presented on the rate and bill impacts from different resource portfolios it evaluated and finds the IRP is consistent with PUC Section 9621(b)(3).

Roseville notes that affordable rates are a key component of its mission. The preferred plan developed by the utility reliably serves customer demand and balances low retail rates with reductions in cost risks. This includes environmental compliance cost risk, transmission cost risk, and risks associated with declining liquidity in bilateral contract markets.

Roseville projects costs will increase through 2030, primarily due to increasing environmental regulations and renewable integration costs. At the same time, Roseville has experienced a decrease in retail energy sales from growth in residential rooftop solar. The utility expects further sales declines through 2030 as new homes incorporate solar as required by the Energy Commission's 2019 Building Energy Efficiency Standards that go into effect January 1, 2020. The preferred portfolio results in an estimated nominal annual growth in the power supply component of retail rates of 3.45 percent from 2018 to 2030. Nominal total cost increases over the period are forecast at 2.75 percent annually. There is upward pressure on retail rates stemming from the combination of rising costs and falling retail sales.

System and Local Reliability

Senate Bill 350 (de León, Chapter 547, Statutes of 2015) (SB 350) requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.[25] Staff reviewed Roseville's capacity reporting table and discussion and finds that Roseville has planned for sufficient resources to maintain a reliable electric system. In addition, Roseville'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

Roseville is a member of the Balancing Authority of Northern California (BANC), which is responsible for continuously balancing supply and demand for electricity within its area and between other balancing authorities.[26] Balancing authorities

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

26 BANC is a Joint Powers Authority consisting of the Sacramento Municipal Utility District, Modesto Irrigation District, Roseville Electric, Redding Electric Utility, the City of Shasta Lake, and the Trinity Public Utilities District.

must also meet technical and operating standards established by the Western Electricity Coordinating Council (WECC) to ensure reliability.[27] Even though Roseville is a member of BANC, it still must provide for its own reserve energy requirements to cover unforeseen events, including a share of generating plants and transmission lines. Roseville plans to meet a 15 percent planning reserve margin throughout the planning period.

Roseville does not own bulk transmission, which are high voltage lines above 69 kilovolts. However, it does have contract rights to use the bulk transmission owned by WAPA and the TANC, and regularly purchases short-term transmission to deliver generation to serve Roseville's load. WAPA operates as a contract-based sub-balancing authority within BANC and co-manages Roseville's transmission needs. Roseville owns about 300 MW of dependable peak generating capacity and imports all of its remaining needs over WAPA's transmission system.[28]

Local and Flexible Capacity Needs

Roseville does not have any transmission-constrained areas that require local generation. However, the utility faces the possible need for increased flexibility as it adds variable energy resources (utility scale solar and wind) to its portfolio in 2025 and 2026 and as its customers increase the amount of distributed solar on Roseville's system. The utility expects to meet one- and three-hour ramping needs with existing resources, including gas-fired generation. Increases in variation of intra-hour loads could be costly, as the utility's operations agreement with WAPA requires that it pay 150 percent of the cost of replacement energy whenever WAPA provides it with 10 MW or more of energy over an hour period.

Transmission and Distribution Systems

PUC Section 9621(b)(3) also 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. The Energy Commission determined that Roseville's IRP adequately plans to maintain and enhance its transmission and distribution systems. Roseville has planned for enough transmission capacity to deliver resources to its service area to meet the requirement as discussed below. In addition, the utility conducts planning 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.

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27 WECC establishes reserve criteria to ensure reliability in the event of contingencies such as equipment failures and natural disasters.

28 Under the Network Integrated Transmission Service agreement that expires on December 31, 2024.

Transmission System

Roseville is a member of the TANC and is entitled to 29 MW of capacity on the California-Oregon Transmission Project, which links the utility to resources in Southern Oregon and other areas of the Pacific Northwest. It also has the rights to 300 MW of import and export capacity due to its funding of the Roseville Elverta transmission line. In January 2018, Roseville entered into a renewable five-year transmission services contract with PacifiCorp, providing 50 MW of additional firm transmission capacity from the Pacific Northwest. This provides the utility access to additional firm energy and capacity. Any load not met by owned or contracted resources is served by imported electricity through the Network Integrated Transmission Service (NITS) agreement, which expires in December 31, 2024.

There are no transmission level concerns for Roseville's assets during the forecast period and as previously described other entities, including BANC, are responsible for operating and planning for adequate bulk transmission to ensure reliability.

Distribution System

Roseville's 60-kilovolt distribution system connects to WAPA's higher voltage transmission system at two receiving stations. The majority of Roseville's distribution lines are underground. As a result, the frequency and duration of distribution-level outages are well below industry averages.

Roseville performs an annual distribution planning study. The most recent study concluded that due to the design of Roseville's distribution feeders, the addition of distributed solar will not adversely affect distribution feeders until penetration levels reach 40 to 50 percent.

In 2015, Roseville conducted a feasibility study to learn what benefits can be gained by utilizing advanced metering infrastructure (AMI) within its distribution system. AMI was found to be instrumental in integrating and leveraging benefits from electric vehicles, distributed solar, energy efficiency and demand response programs. Ultimately, this will allow Roseville's distribution system to offer products such as peak load reduction and flexible capacity. Roseville plans to develop a strategy to ensure these products are readily available. New technologies also provide an opportunity to create a portfolio of demand-side management strategies centered on AMI. Roseville will complete AMI deployment by early 2020, which will allow the utility to quantify distribution, resource, and operations planning needs. This will allow Roseville to design more effective demand-side management strategies and rates that provide for better customer participation and benefits, as well as lower-cost grid and environmental benefits.

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 Roseville's IRP filing to determine the extent to which they are minimizing local air pollutants with a priority placed on disadvantaged communities. Staff finds Roseville has made efforts to address these issues in selecting the resources to include in its portfolio consistent with the requirement.

Roseville did not find any disadvantaged communities as defined by the California Environmental Protection Agency's Communities Environmental Health Screening Tool within its service territory, but acknowledges that they do serve low-income customers. Roseville offers numerous programs to reduce the energy bills of its low-income customers. These include rebate programs for shade trees, fans, sunscreen and window replacement, energy efficiency workshops, consumption audits, and information guides for saving energy.

The portfolio selected by Roseville minimizes local pollution in several ways. Using battery storage instead of the natural gas-fired generation to meet flexibility needs reduces portfolio emissions to levels well below the upper end of the GHG emissions target. In addition, relying on short-term market purchases of energy and capacity, increasing demand response to meet peak needs, and increasing transmission access to the Pacific Northwest all reduce local pollution from natural gas-fired generation.

Net Energy Demand in Peak Hours

PUC Section 9621(c) requires POUs to consider existing renewable generation, grid operation efficiency, energy storage, distributed energy resources, and energy reduction measures (such as energy efficiency and demand response) to reduce the need for new or additional gas-fired generation, distribution and transmission resources. Roseville's IRP includes a discussion of how preferred resources contribute to meeting peak demand and how that affects resource selection for its portfolio. This is consistent with the requirement that filing POUs address how they can meet peak hour demand with renewable and other preferred resources.

Roseville utilized a modeling framework to determine its average ramping needs during net energy peak hours. As more renewables are integrated into its system, Roseville estimates that evening ramps will grow by 9 percent from 110 MW in 2017 to 120 MW in 2030.

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 below. The resource adequacy

provisions of this code Section are discussed in the System and Local Reliability section on pages 19 to 20.

Energy Efficiency and Demand Response Resources

Staff finds that the Roseville 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.

Roseville has made energy efficiency a priority, achieving energy efficiency savings of 17,500 MWh in 2016 and 15,000 MWh in 2017. The utility's existing programs are concentrated in the residential and commercial sectors, with most of Roseville's energy efficiency savings coming from improved lighting technology.

Roseville adopted energy efficiency goals for energy efficiency savings over ten years on March 15, 2017. These targets are Roseville's annual potential energy efficiency savings that are included in their demand forecast as committed energy efficiency savings on a cumulative basis. Roseville also identified potential savings that are incremental to committed savings from future updates of building codes, appliance standards, and new utility programs, referred to as additional achievable energy efficiency (AAEE). The utility anticipates achieving these targets by continuing existing programs, expanding residential behavioral program, and employing additional measures such as smart thermostats and retrofitting streetlights with LEDs. Roseville projects that these efforts will result in annual savings of 0.76 percent of forecasted retail sales. **Table 4** shows how Roseville's projections for AAEE savings, which slightly exceed SB 350 energy efficiency doubling targets set by the Energy Commission.

Roseville's demand response program includes an air conditioning cycling program that utilizes smart thermostat technology and has 3,700 customer participants. While this provides 2.1 MW of peak interruptible load, Roseville believes there is market potential for an additional 5 to 10 MW that could be captured using newer smart technologies, and is preparing a business case for a transition of the program to newer devices.

Table 4: Roseville Energy Efficiency Estimates and SB 350 Targets (GWh)

	AAEE (GWh)	SB 350 targets (GWh)
2018	49	42
2019	58	51
2020	67	60
2021	77	70
2022	87	80
2023	97	90
2024	106	99
2025	114	108
2026	122	116
2027	130	124
2028	138	132
2029	146	139
2030	154	

Source: California Energy Commission, based on Roseville 2018 IRP filing

Energy Storages

Staff finds Roseville's IRP is consistent with the requirement in PUC Section 9621(d)(1)(B) to address procurement of energy storage as it discusses the potential role of energy storage on its system.

Assembly Bill 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 appropriate. Roseville did not find energy storage to be cost-effective and did not establish a target. However, Roseville is considering battery storage as a resource in the future.

Transportation Electrification

Staff finds that the Roseville IRP is consistent with the requirement of PUC Section 9621(d)(1)(C) as it addresses transportation electrification, primarily for light-duty electric vehicles (LDEV). Roseville assumed that its service territory will maintain its 2015 share of statewide LDEV deployment (0.28 percent) through the planning horizon and that 1.8 million LDEVs will be on the road in California in 2030. This results in roughly 5,500 LDEV in Roseville's service territory.

Roseville used baseline assumptions from the Energy Commission's Light Duty Plug-In Electric Vehicle Energy and Emissions Calculator to evaluate LDEV use

and performance in its integrated resource planning.[29] As a result, Roseville's net load would increase by 18,000 MWh in 2030 due to LDEV deployment. Roseville estimates that the GHG emissions reductions due to the displacement of gasoline-fueled vehicles would be 13 MT CO_2e but that the incremental load would lead to an annual increase in GHG emissions of more than 7 MT CO_2e. Staff believe that Roseville's estimate of GHG emissions is high. If, pursuant to the RPS, 50 percent of the incremental load is met with renewable energy and the remainder with short-term and spot market purchases, the emissions increase would be less than 4 MT CO_2e.

Currently, Roseville does not provide incentives for purchasing LDEVs. The utility does note that the ongoing deployment of AMI may enable the design of charging rates that benefit customers by reducing variability in the utility's load profile. Roseville intends to develop a business plan that addresses how electric vehicle penetration and charging will affect the utility, its distribution grid, and generation resources.

Portfolio Diversification

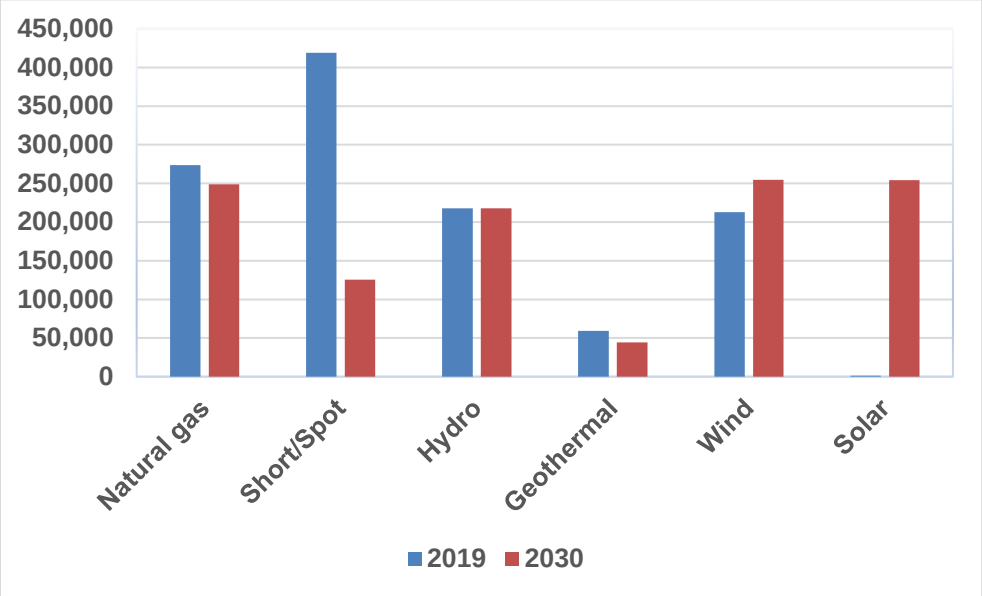
PUC Section 9621(d)(1)(D) requires that POUs address the procurement of a diversified portfolio of resources consisting of both short-term and long-term electricity, electricity related, and demand response products. Based on staff's review of Roseville's existing resources, its portfolio analysis, and the selection of resource additions in its IRP, staff concludes that the utility has fulfilled this requirement.

Figure 5 shows a comparison of the energy mix of Roseville's portfolio in 2019 and 2030. Roseville's portfolio retains its diversity through 2030, while adding solar technology and preserving opportunities to procure resources outside the BANC balancing area.

Roseville plans to continue to rely on short-term resources to meet the variable component of its capacity needs, which fluctuates with hydro conditions, and plant maintenance needs. This allows it to take advantage of market opportunities such as the current excess of generation capacity in California. Roseville intends to reduce short-term and spot market energy purchases with a combination of wind and solar resources, further diversifying its renewable portfolio. These resources can be procured under contracts of different lengths. The procurement of additional transmission capacity allows for further geographic diversification of its portfolio. Additionally, Roseville is adding demand response to its portfolio.

29 Energy Commission's Light Duty Plug-In Electric Vehicle Energy and Emissions Calculator

Figure 5: Roseville Portfolio Comparison for 2019 and 2030 (MWh)



Source: California Energy Commission, based on Roseville 2018 IRP filing

ACRONYMS

Acronym	Term
AAEE	additional achievable energy efficiency
AAPV	additional achievable photovoltaic
AMI	advanced metering infrastructure
BANC	Balancing Authority of Northern California
CARB	California Air Resources Board
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
GHG	greenhouse gas
GWh	gigawatt-hour
IEPR	*Integrated Energy Policy Report*
IRP	integrated resource plan
LDEV	light-duty plug-in electric vehicle
mT	metric ton
MT	Thousand metric tons
MW	megawatt
MWh	megawatt-hour
NCPA	Northern California Power Authority
POU	publicly owned utility
PUC	Public Utilities Code
REC	renewable energy credit
RPS	Renewables Portfolio Standard
SB 350	Senate Bill 350 (de León, Chapter 547, Statutes of 2015)
TANC	Transmission Agency of Northern California

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.

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.

Capacity factor: Annual output of a power plant expressed as a percentage of the amount of energy it would produce if operated at maximum output every hour of the year.

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 both 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 their compliance obligation in the next compliance period. Excess balance can include excess energy procurement, historic carryover, or purchased RECs that have not been retired.

Flexible capacity: Generation capacity whose output levels can be changed quickly enough to reliably respond to real-time changes in electricity demand.

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.

Heat rate: The efficiency with which a power plant converts thermal energy into electricity, usually measured in British thermal units per kilowatt-hour.

Integrated resource plan (IRP): A plan adopted by the governing board of a POU pursuant to PUC Section 9621.

IRP filing: An IRP adopted by the filing POU's governing board that is electronically submitted to the Energy Commission, along with the standardized tables and supporting information, by the filing POU or authorized representative.

Load following (generator): A power plant whose output is increased and decreased over the course of a day in response to changes in electricity demand.

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 but are not limited to, battery-electric and plug-in hybrid vehicles.

Ramping capacity: see **Flexible capacity.**

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 utility or other load-serving entity to procure energy from renewable resources in amounts equal to or greater than a specified share of total energy procured or, in the case of California, of retail sales.

Retail sales: Electricity consumption after accounting for behind-the-meter onsite generation including storage charge and discharge. It indicates the net energy delivered by a utility or other load-serving entity through the meter to the

end-use customer, and thus excludes any generation or procurement in satisfaction of firm wholesale commitments (for example, sales to other utilities or into spot markets).

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 Energy Commission. These tables include information and data necessary to help staff determine if the IRP is consistent with PUC Section 9621. The four standardized tables are Capacity Resource Accounting Table, 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, but not limited to, 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:
Standardized Tables

Table B- 1: Roseville Energy Resources, 2019 – 2030 (MWh)

	Tech	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Net Energy for Load		**1,234,717**	**1,230,254**	**1,225,322**	**1,221,213**	**1,218,502**	**1,211,902**	**1,200,474**	**1,188,967**	**1,177,336**	**1,166,799**	**1,157,183**	**1,146,631**
Non-RPS Resources													
Roseville Energy Park	Natural Gas	**272980**	**268960**	**275440**	**285230**	**299980**	**282780**	**248680**	**126570**	**213140**	**270500**	**256460**	**248750**
Roseville Power Plant 2	Natural Gas	**350**	**230**	**270**	**180**	**230**	**230**	**50**	**90**	**0**	**0**	**50**	**140**
WAPA large hydro	Large Hydro	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**	**153892**
Calaveras	Large Hydro	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**	**60,800**
Steam-Injected Gas Turbine	Natural Gas	**220**	**140**	**110**	**60**	**130**	**70**	**0**	**0**	**0**	**0**	**40**	**90**
Short-term/ Spot purchases:	Un-specified	**419,005**	**422,869**	**337,936**	**325,403**	**309,125**	**291,285**	**250,711**	**348,007**	**234,886**	**152,107**	**141,224**	**125,500**
RPS resources													

	Tech	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
New Spicer	Hydro	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**	**1800**
Geo 1 and Geo 2	Geo thermal	**59,438**	**55,337**	**56,644**	**55,420**	**54,125**	**53,061**	**49,225**	**50,632**	**49,552**	**48,644**	**47,501**	**44,253**
GeoSolar 1 & 2	Solar PV	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**
HydroSolar	Solar PV	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Geo OSL	Geo thermal	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**
Western	Hydro	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**	**1,108**
SVP	Mixed	**50000**	**50000**	**50000**	**50000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Lost Hills	Solar PV	**505**	**501**	**497**	**495**	**490**	**486**	**0**	**0**	**0**	**0**	**0**	**0**
Blackwell	Solar PV	**303**	**301**	**298**	**297**	**294**	**292**	**0**	**0**	**0**	**0**	**0**	**0**
Avangrid	Wind	**137,788**	**137,788**	**210,000**	**210,000**	**260,000**	**260,000**	**0**	**0**	**0**	**0**	**0**	**0**
Powerex	Wind	**75000**	**75000**	**75000**	**75000**	**75000**	**75000**	**75000**	**0**	**0**	**0**	**0**	**0**
Generic Wind Additions	Wind	**0**	**0**	**0**	**0**	**0**	**5,780**	**179,250**	**223,150**	**230,960**	**239,100**	**247,070**	**254,690**
Generic Solar Additions	Solar	**0**	**0**	**0**	**0**	**0**	**23790**	**178430**	**221390**	**229670**	**237320**	**245710**	**254080**

	Tech	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Energy	N/A	**1,234,717**	**1,230,254**	**1,225,322**	**1,221,213**	**1,218,502**	**1,211,902**	**1,200,474**	**1,188,967**	**1,177,336**	**1,166,799**	**1,157,183**	**1,146,631**
Surplus/ Shortfall	N/A	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: Energy Commission staff, based on Roseville IRP filing.

Table B- 2: Roseville Capacity Resource Accounting Table (MW)

		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Peak demand		340	341	341	342	343	344	345	346	346	348	349	350
Demand response		(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)
Planning reserve margin		51	51	51	51	51	51	51	52	52	52	52	52
Total peak demand		**389**	**389**	**390**	**391**	**393**	**393**	**394**	**395**	**396**	**397**	**399**	**400**
Supply Resources	**Technology**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Non-RPS Resources													
Roseville Energy Park	Natural gas	155	155	155	155	155	155	155	155	155	155	155	155
Roseville Power Plant 2	Natural gas	48	48	48	48	48	48	48	48	48	48	48	48
Steam-injected gas turbine	Natural gas	18	18	18	18	18	18	18	18	18	18	18	18
WAPA large hydro	Large hydro	54	54	54	54	54	54	54	54	54	54	54	54
Calaveras	Large hydro	31	31	31	31	31	31	31	31	31	31	31	31

		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RPS Resources													
New Spicer Meadows	Small hydro	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Geo 1-2	Geothermal	8.4	8.1	6.9	6.8	6.6	6.5	6.0	6.3	6.1	6.0	5.9	5.4
Generic wind additions	Wind	0	0	0	0	0	0	9	11	12	12	12	13
Generic solar additions	Solar	0	0	0	0	0	4	26	33	34	35	37	38
Total capacity		**314**	**314**	**313**	**313**	**313**	**316**	**347**	**357**	**358**	**359**	**361**	**362**
Shortfall/ short-term capacity purchases		74	75	77	78	80	77	47	38	38	38	38	38

Source: Energy Commission staff, based on Roseville IRP filing.

Table B- 3: Roseville GHG Emission Accounting Table (MMT CO2e)

Generation Resource	Emissions Intensity	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Roseville Energy Park	0.430	0.117	0.116	0.118	0.123	0.129	0.122	0.107	0.054	0.092	0.116	0.110	0.107
Roseville Power Plant 2	0.800	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000	0.000	<0.001	<0.001
Steam-Injected Gas Turbine	0.4810	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000	0.000	0.000	0.000	<0.001	<0.001
Emissions from specific resources		**0.118**	**0.116**	**0.119**	**0.123**	**0.129**	**0.122**	**0.107**	**0.054**	**0.092**	**0.116**	**0.110**	**0.107**
Spot/short-term purchases	0.428	0.179	0.181	0.145	0.139	0.132	0.125	0.107	0.149	0.101	0.065	0.060	0.054
Total unadjusted GHG emissions		**0.297**	**0.297**	**0.263**	**0.262**	**0.262**	**0.246**	**0.214**	**0.203**	**0.192**	**0.181**	**0.171**	**0.161**
Emissions Adjustments													
Undelivered RPS energy		0	0	0	0	0	0	0	0	0	0	0	0
Firm Sales Obligations		0	0	0	0	0	0	0	0	0	0	0	0
Adjusted emissions		**0.297**	**0.297**	**0.263**	**0.262**	**0.262**	**0.246**	**0.214**	**0.203**	**0.192**	**0.181**	**0.171**	**0.161**

Source: Energy Commission staff, based on Roseville IRP filing.

Table B- 4: RPS Procurement Table, 2019 – 2030 (GWh/REC)

	Compliance Period 3				Compliance Period 4				Compliance Period 5			Compliance Period 6		
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Annual retail sales	1,157.2	1,112.2	1,137.9	1,133.2	1,128.5	1,125.0	1,123.0	1,111.6	1,101.2	1,089.7	1,079.1	1,069.7	1,060.8	1,049.7
Soft target (%)	27.00%	29.00%	31.00%	33.00%	34.75%	36.50%	38.25%	40.00%	41.67%	43.33%	45.00%	46.67%	48.33%	50.00%
Required procure-ment	1361.7				1677.0				1416.6			1536.8		
Bundled RECs	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
RPS eligible energy procured	388.6	455.6	327.5	323.4	396.9	395.6	394.3	422.8	486.3	499.6	514.6	529.5	544.7	557.5
Total procure-ment in period	1,495.0				1,609.7				1,500.6			1,631.7		
Energy applied to obligation	1,263.3				1,560.0				1,437.9			1,631.7		
Change in excess balance	231.7				49.7				62.7			0		
Net purchases of bundled RECs	0				0				0			0		

	Compliance Period 3				Compliance Period 4				Compliance Period 5			Compliance Period 6		
End of period excess balance/ carryover*	439.9				489.7				552.4			552.4		
Unbundled RECs	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Net purchases of Category 3 RECs	13.8	35.4	35.4	35.4	35.0	35.0	35.0	35.0	0	0	0	0	0	0
REC purchases applied to obligation	13.8	35.4	35.4	35.4	35.0	35.0	35.0	35.0	0	0	0	0	0	0
Total for compliance period	120.0				140.0				0			0		
Annual net change in REC balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net change in REC balance during period	0				0				0			0		
End of period Category 3 balance**	0.0				0.0				0.0			0.0		

Total RECs	Compliance Period 3 Compliance Period 3	Compliance Period 4 Compliance Period 4	Compliance Period 5 Compliance Period 5	Compliance Period 6 Compliance Period 6
Total RECs applied to period obligation	1,383.3	1,700.0	**1,437.9**	**1,631.7**
Over/under procure-ment for period	21.6	23.0	21.2	94.9

Source: Energy Commission staff, based on Roseville IRP filing.

* Excess balance at the end of the Compliance Period 2 is 202.2 GWh/RECs

** Balance at the end of Compliance Period 2 was 0.0 GWh/RECs

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.)