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STAFF PAPER

Review of Turlock Irrigation District's 2018–2030 Integrated Resource Plan

Paul Deaver

Melissa Jones

Dave Vidaver

Mark Kootstra

Supply Analysis

Energy Assessments Division

California Energy Commission

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Galen Lemei

Micah Wofford

Noel Crisostomo

Wendell Krell

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. Turlock Irrigation District submitted its *Integrated Resource Plan 2018–2030* and standardized reporting tables, which the Turlock Board of Directors adopted on December 4, 2018, and submitted to the California Energy Commission for review on April 25, 2019. This staff paper presents the results of the California Energy Commission staff review of the Turlock Irrigation District 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

California 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* requires 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 CEC must review the IRPs to ensure consistency with the requirements of PUC Section 9621.

The Turlock Irrigation District (Turlock) IRP outlines the utility's roadmap for serving its customers' long-term needs and meeting Senate Bill 350 (De León, Chapter 547, Statutes of 2015) and other requirements while minimizing cost and risk. In addition to serving its electric customers, Turlock is a balancing authority and has an obligation to meet firm wholesale sales to the Merced Irrigation District and ensure the reliability of its electricity grid. The utility has a resource portfolio of owned generation and power purchase agreements ranging from 5 to 25 years. Turlock's electricity mix includes natural gas, large hydroelectric, and renewable resources, such as geothermal, solar, small hydroelectric, and biomass. It also engages in market energy purchases from several power markets and other wholesale electric providers, including neighboring utilities, and market sales.

Turlock's IRP shows the utility plans to meet a 60 percent Renewables Portfolio Standard by 2030 and reduce its greenhouse gas emissions in 2030 to a level 5 percent below the California Air Resources Board's established target. Turlock recently eliminated coal from its resource mix with the expiration of its power purchase agreement with the Boardman Coal Plant in Oregon. Decreasing its reliance on natural gas generation over the planning horizon, along with investing in energy efficiency, will further reduce its greenhouse gas emissions.

Turlock's long-term strategy to meet renewable energy procurement requirements consists primarily of cost-effective investments in solar resources. Turlock also anticipates customer-owned solar generation in its service area to more than double by 2030. To evaluate how best to increase renewable resources in its portfolio, Turlock modeled the addition of about 200 megawatts of solar capacity in two alternative locations; one in its service territory and the other in the California Independent System Operator's grid. Turlock selected the location outside its service territory to avoid the potential adverse effects increased solar generation may have on its ability to balance loads and maintain reliable operation. Turlock will use its natural gas-fired plants, along with potential investments in cost-effective energy storage, to provide reliability, peak capacity, and additional flexibility for integrating renewable generation.

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

- *Achieving Greenhouse Gas Emissions Targets and Renewables Portfolio Standard Requirements:* The values reported in the standardized forms, along with the narrative discussion in the IRP filing, demonstrate the utility plans to meet the 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 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 ensure the utility's energy and reliability needs during peak hours as set forth in PUC Section 9621(c).
- *Addressing Resource Procurement Types:* The IRP filing includes values reported in the standardized forms and narrative discussion that demonstrate the utility addressed the procurement requirements for energy efficiency and demand response, energy storage, transportation electrification, portfolio diversification, and resource adequacy as set forth in PUC Section 9621(d).

This IRP is consistent with the requirements of PUC Section 9621. In addition to the IRP provisions, SB 350 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 Turlock, and update the targets, if necessary.

CHAPTER 1:
Background, Demand Forecast, and Procurement

Introduction

California Public Utilities Code (PUC) Section 9621 requires publicly owned utilities (POUs) 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 (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 POUs IRPs.[2] PUC Section 9622 requires the CEC to review POU IRPs to ensure they achieve PUC Section 9621 provisions. (See **Attachment I**)

This chapter outlines the CEC's review process and provides an overview of Turlock Irrigation District (Turlock) 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 25, 2019, Turlock submitted its IRP and standardized reporting tables to the CEC for review as outlined in the *POU IRP Guidelines*.[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

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

2 California Energy Commission. 2018. *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines.* Revised Second Edition. Publication Number CEC-200-2018-004-CMF. https://efiling.energy.ca.gov/GetDocument.aspx?tn=224889.

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.

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 Turlock 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) requirements, energy efficiency savings projections and programs, and plans for transportation electrification.

Overview of Turlock Irrigation District

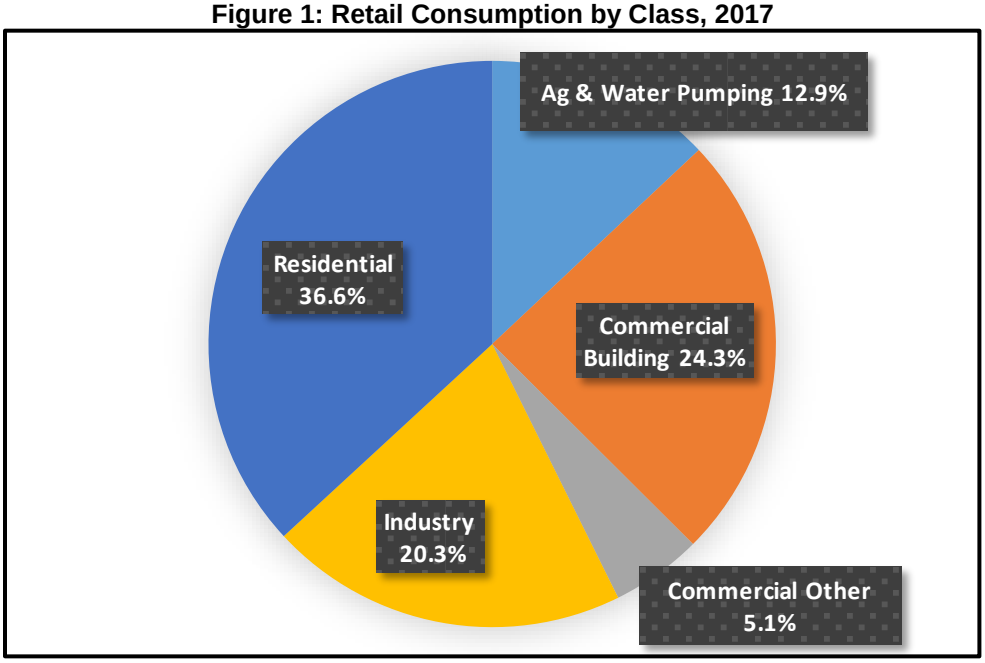
Turlock is a vertically integrated, publicly owned, not-for-profit irrigation water and electric utility that operates in Stanislaus, Tuolumne, and Merced Counties, as described below.[4]

- In addition to delivering irrigation water to nearly 150,000 acres of farmland, Turlock serves more than 100,000 customer accounts within a 662-square-mile area.
- The composition of its customers is illustrated in **Figure 1**. Turlock's retail customers consume more than 2,100 gigawatt-hours (GWh) of energy annually.
- Turlock operates under the provisions of the California Water Code as a special district and is governed by a five-member, locally elected board of directors.
- The utility is one of California's five balancing authorities and, as such, is responsible for meeting grid reliability standards established by the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC). NERC and WECC are reliability coordinators; they develop and enforce planning and operating requirements to maintain the reliability of electric systems.
- Turlock owns 379 miles of transmission lines, about 2,200 miles of distribution lines, and 29 substations. It also has rights to 237 MW of bulk transmission capacity on the California–Oregon Transmission Project (COTP).
- The utility interconnects to five neighboring electricity systems (Pacific Gas and Electric Company, Hetch Hetchy Power,[5] the Western Area Power Administration, the Modesto Irrigation District, and the Merced Irrigation District (MeID).

4 A "vertically integrated utility" is a utility that owns all levels of the supply chain: generation, transmission, and distribution assets.

5 "Hetch Hetchy Power" is also referred to as the San Francisco Public Utilities Commission.

Figure 1: Retail Consumption by Class, 2017



Source: California Energy Commission, based on data Turlock submitted to the California Energy Commission

Turlock's Planning Process

Turlock developed its IRP to:

- Provide safe and reliable electricity service.
- Maintain stable, just, reasonable, and affordable rates.
- Cost-effectively meet applicable Turlock, state, federal, WECC, and NERC policies, mandates, rules, and regulations.
- Maintain a diversified and flexible supply portfolio to minimize risk while providing opportunities to capitalize on the changing electric industry landscape.
- Promote the standard of living within its service territory by supporting the state's climate goals.

Although Turlock's board of directors is ultimately responsible for developing and adopting an IRP, public input played an integral part. Turlock interacted with its customers to include their perspective on Turlock's energy future in its IRP. In August 2018, Turlock conducted two town hall meetings and made available a customer survey on the IRP process. Some of the key issues discussed at the town hall meetings:

- Renewable energy
- Greenhouse gas reductions
- Natural gas use for reliability
- Support for disadvantaged communities
- Utility-customer partnership programs

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. 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.[6] 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, Method and Assumptions

In developing its demand forecast, Turlock modeled three scenarios (base, high growth, and low growth) to reflect varying economic and demographic growth expectations. Turlock developed peak demand forecasts under *one day in five years* (1-in-5), *one day in 10 years* (1-in-10), and *one day in 100 years* (1-in-100) temperature scenarios but discusses only the base forecast (1-in-10).[7] The forecasts reflect the effects of future distributed generation (mostly solar photovoltaic [PV] additions), projected electric vehicle (EV) growth, anticipated load reductions from energy efficiency programs, and the *2019 Building Energy Efficiency Standards* that require solar on new homes.[8] The forecasts also take into account the expected addition of several large customers within a few years.[9] **Figure 2** compares forecasts by Turlock and the CEC of the utility's annual net energy for load requirements.[10]

After incorporating assumptions regarding customer PV, energy efficiency, and transportation electrification, Turlock projects energy demand to grow at 0.4 percent per year through 2030 to nearly 2,300 GWh. This growth rate is lower than has been observed historically. The utility's projection lies between the CEC's Mid Demand, No additional achievable energy efficiency (AAEE)/ additional achievable photovoltaic (AAPV) case and Mid Demand, Mid AAEE/AAPV case.[11] Load growth for 2018 and 2019

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6 The most recent adopted demand forecast is for the *2018 Integrated Energy Policy Forecast Update*. https://www.energy.ca.gov/2018_energypolicy/documents/.

7 A "1-in-10 peak demand" is the highest demand that can be expected to occur 10 percent of the time and reflects adverse weather conditions. Some utilities use a 1-in-2 peak demand, which is the demand expected to occur 50 percent of the time under normal weather conditions. A 1-in-5 peak demand is the highest demand that can be expected to occur 20 percent of the time and reflects somewhat adverse weather conditions. A 1-in-100 peak reflects an extreme case that would be expected to occur 1 percent of the time.

8 See https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency

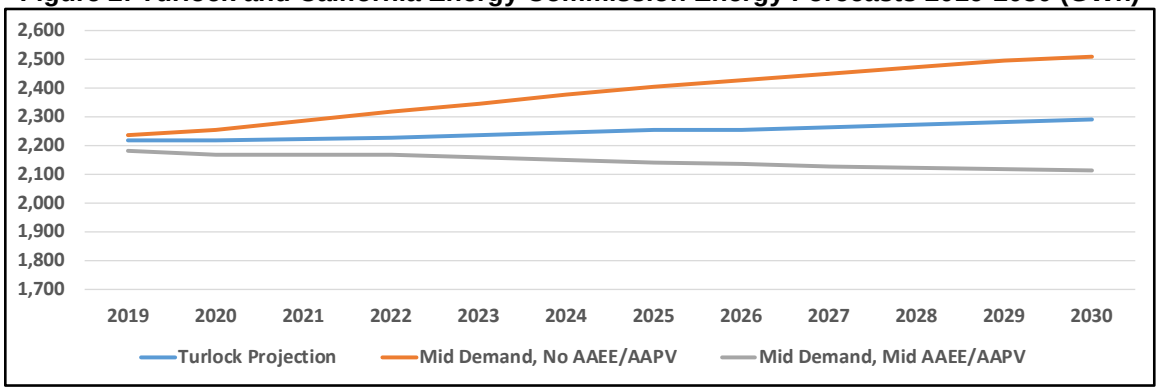
9 Turlock Irrigation District, *Integrated Resource Plan 2018-2030.* pp. 27–28.

10 For 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. The Energy Commission's *California Energy Demand Updated Forecast 2018-2030 (CEDU 2018)* was adopted February 20, 2019. It is available at https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=18-IEPR-04.

11 The Energy Commission produced seven demand forecasts for load-serving entities/balancing authorities for the *2018 Integrated Energy Policy Report Update*. They reflect varying demand conditions combined with varying amounts of energy efficiency and solar photovoltaic. Staff compared Turlock's forecast with the mid

is expected to be higher than growth for the remainder of the planning horizon due to the addition of several new industrial customers.

Figure 2: Turlock and California Energy Commission Energy Forecasts 2019-2030 (GWh)

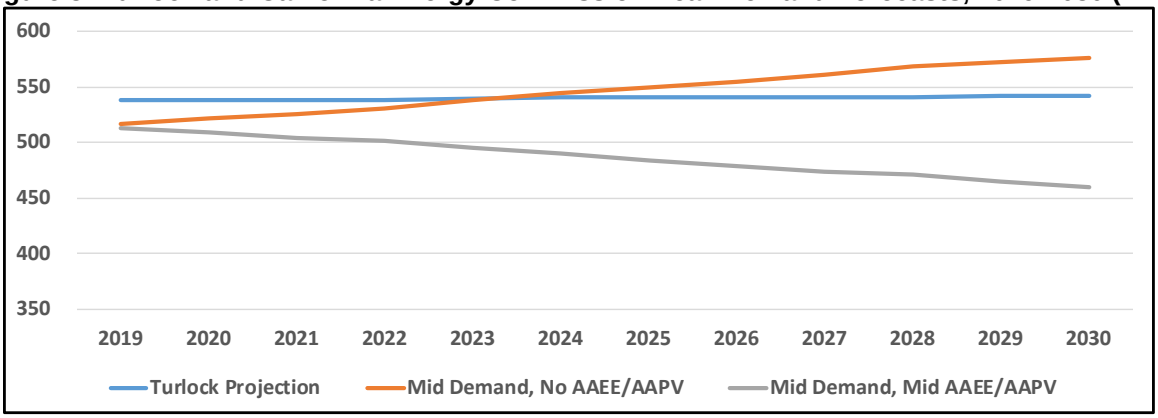


Source: California Energy Commission, based on Turlock IRP filing

Distributed solar PV in Turlock's service territory grew by 47 percent annually between 2012 and 2017, from 5 to 35 MW. The utility projects continued solar capacity growth of 7.5 percent per year from 35 MW in 2017 to 87 MW in 2030. Energy produced by these resources is expected to increase from 67 GWh in 2019 to 145 GWh in 2030, which equals about 6.6 percent of forecasted energy load in 2030.

Figure 3 presents the peak demand forecast for Turlock for 2019 to 2030 and compares it to CEC forecasts.[12]

Figure 3: Turlock and California Energy Commission Peak Demand Forecasts, 2019-2030 (MW)



Source: California Energy Commission, based on Turlock IRP filing

Turlock's and the CEC's forecasts do not include needed capacity reserves (an amount equal to 15 percent of peak demand) or energy that must be provided to MeID during

demand, no AAEE/AAPV case and the Mid Demand, Mid AAEE/AAPV case. AAEE refers to additional achievable energy efficiency, and AAPV refers to additional achievable photovoltaic.

12 The peak demand forecast includes retail consumption and losses (energy that is dissipated as heat during the movement of energy across the transmission grid and distribution systems).

the hours of peak demand. These additional values are discussed in later sections of the paper and can be found in the Capacity Resource Accounting Table filed by the utility (**Appendix B**).

During the outer years of the planning horizon, the Turlock forecast is lower than the CEC's Mid Demand, No AAEE/AAPV forecast, but higher than the CEC's Mid Demand, Mid AAEE/ AAPV forecast. The CEC embeds committed energy efficiency savings in its forecast, while Turlock's forecast embeds committed energy efficiency and AAEE.[13] The disparity in the treatment of energy efficiency savings could explain some of the differences between the forecasts.

Turlock projects that distributed PV over the planning horizon will reduce its peak demand from 12 MW in 2017 to 41 MW in 2030.

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.[14] The 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 Turlock's IRP filing meets those 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 forms.

Existing Resources

Turlock has a diversified set of generation resources, including fossil-fueled power plants, large hydroelectric facilities, and renewable resources that it either owns or has under contracts that range from 5 to nearly 20 years. Turlock had a contract that expired December 31, 2018, for 59 MW of generation from the Boardman Coal Plant in Oregon.

Turlock owns four natural gas-fired generation plants totaling 522 MW. The 250 MW Walnut Energy Center came on-line in 2006 and provides baseload and ancillary services.[15] Turlock's Almond I power plant, with 48 MW of capacity, came on-line in 1996. The Almond II power plant, with 174 MW of capacity, came on-line in 2012. These plants generate and provide ancillary services when loads are high and wholesale purchases would be more expensive. The 50 MW Walnut Power Plant, which came on-

13 "Committed energy efficiency savings" are those from adopted and funded policies, standards, and programs. "AAEE" refers to 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.

14 *POU IRP Guidelines*, Chapter 2.F., p. 6.

15 Ancillary services are the specialty services and functions provided by the electric grid that facilitate and support the continuous flow of electricity so that supply will continually meet demand. Examples include a power plant's excess generation that helps meet unexpected demand fluctuations.

line in 1986 and is the least efficient of Turlock's natural gas plants, provides nonspinning reserves and generates only when load and wholesale prices are very high.

Turlock owns 139 MW of the dispatchable capacity from the 203 MW Don Pedro large hydroelectric facility, a 137-MW share of the Tuolumne Wind Project near Goldendale, Washington, 7 MW of the NCPA geothermal power plants, and four small run-of-river hydroelectric plants totaling 15 MW.[16]

Turlock has three long-term renewable power purchase agreements:

- 4 MW of Western Area Power Administration's (WAPA's) run-of-river hydroelectric facility that expires in 2024 and is expected to be renewed
- 54 MW from the Rosamond West Solar 2 project that expires in 2037
- Less than 1 MW from the Loyalton Biomass project that expires in 2023 and is not expected to be renewed[17]

Resource Portfolio Evaluation

Turlock expects to meet its capacity needs during the planning period with existing resources. The utility's procurement strategy is focused largely on procuring enough renewable energy to meet the state's 60 percent RPS and GHG emission reduction targets in 2030 while maintaining reliability and stable, affordable rates. Based on current cost projections, Turlock expects to procure solar resources in 2024 and 2029 to meet its RPS mandates, although changes in market conditions and the tax treatment of renewable resources may result in earlier procurement and potentially different technology choices.

Turlock modeled the addition of 224 MW of solar in its service area, 112 MW in 2024, and 112 MW in 2029, and 200 MW of solar resources in the California Independent System Operator (California ISO) balancing authority area, 100 MW in 2024, and 100 MW in 2029.

The integration of more than 200 MW of solar into Turlock's portfolio creates concerns regarding overgeneration, ramping needs, and sufficient flexible resources.[18] If required to absorb solar energy as it is generated, Turlock will experience midday overgeneration,

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[16] A run-of-river hydroelectric plant harvests the energy from flowing water to generate electricity in the absence of a large dam and reservoir—which is how they differ from conventional impoundment hydroelectric plant.

17 Senate Bill 859 (Committee on Budget and Fiscal Review, Chapter 368, Statutes of 2014) requires Turlock to procure 1.3 MW of existing bioenergy projects that commenced operation before June 1, 2013, for at least five years. At least 80 percent of the feedstock must come from by-products of sustainable forestry management. Turlock has procured 0.8 MW and is contracting for the remaining obligation.

[18] Overgeneration is when power plants generate more electricity than there is demand for. Ramping needs occur when large amounts of solar generation start to decrease in the evening hours, and require power plants that can quickly generate electricity to meet demand. Having sufficient flexible resources means having the ability to quickly produce power to meet ramping needs. Flexible resources are generally natural gas plants, battery energy storage, or hydroelectric plants, that can quickly generate electricity and change their output.

with peak net load around 6:00 p.m. and substantial evening ramps. Selling surplus, midday solar energy into spot markets will be costly, given projected low prices for such energy. The Turlock IRP considers the potential benefits of using multihour energy storage, modeling the addition of 50 MW of storage with each of the solar additions. Energy could be stored until it is needed in the early evening to meet load, or the surplus energy could be sold in early evening hours when market prices are higher. Energy storage could also be used for ancillary services, reducing the need to use the utility's natural gas plants and reducing GHG emissions from the plants on a total and per-MWh basis. The revenue from potential sales of energy and ancillary services, coupled with the expected decline in storage cost are likely to make storage a cost-effective option for integrating renewable energy.

The standardized tables submitted by Turlock assume that the new solar resources will be in the California ISO area, and that a substantial share of their output will not be delivered to its customer load but instead will be sold into the market without the accompanying renewable energy credits (RECs).[19]

Procurement Strategy

Turlock plans to meet future energy needs with its existing natural gas resources, a large hydroelectric plant and contract, existing geothermal, wind and solar contracts, and spot-market energy purchases. The solar resource additions discussed in the previous section will supplant the need for natural gas-fired generation and spot-market purchases as the utility moves to meet the RPS procurement requirements and GHG emission reduction target.

Turlock expects energy from its natural gas resources to decrease by more than 30 percent between 2019 and 2030. As the utility is also a balancing authority, it plans to continue to use its natural gas resources to maintain a reliable system and meet its balancing authority obligations. Over the planning period, energy from solar resources will increase, while wind, geothermal, and hydroelectric resources will maintain the same output level. Biomass (power plants that run on landfill gas, wood waste, and other agriculture waste) will drop to zero in 2023. As noted above, Turlock plans to use energy storage to optimize the dispatch of and reduce GHG emissions from its natural gas resources.

Table 1 summarizes the energy generated from Turlock's supply resources and procured from the market to meet demand requirements in 2019, 2025, and 2030. Turlock procures energy to meet its own load as well as other obligations, such as wholesale obligations to the MeID. The utility purchases renewable energy that it does not take delivery of but instead sells into the spot market while retaining the RECs to meet RPS requirements. These energy resources are not considered part of the portfolio

19 Undelivered RPS energy is projected to increase from 538 GWh in 2019 to 1,133 GWh in 2030. See the **Energy Balance Table (B-1)** in **Appendix B**.

of resources to meet Turlock's load, so they are subtracted from the total energy procured in **Table 1** to arrive at the net energy for Turlock's load and total energy delivered to Turlock's load.

Table 2 illustrates how Turlock will meet its capacity needs, and shows similar trends to its energy resources. Although Turlock considers the procurement of energy storage resources in 2024 and 2029, it did not include them as capacity resources in the standardized reporting tables. **Tables B-1** and **B-2** in **Appendix B** identify all of Turlock's energy and capacity resources for 2019 through 2030.

Table 1: Turlock Energy Resources by Type for 2019, 2025, and 2030 (MWh)

		2019	2025	2030
Total Energy Procured		**3,306,282**	**3,543,618**	**3,877,980**
Undelivered renewable energy		(537,901)	(820,718)	(1,112,966)
MeID sales obligation		(552,698)	(470,409)	(473,710)
Net energy for Turlock load		**2,215,683**	**2,252,491**	**2,291,304**
Non-RPS	Natural gas	1,333,147	1,110,603	885,635
	Large hydro	336,266	330,005	372,071
	Spot-market purchases	1,109,115	1,263,074	1,446,416
	Spot-market sales	(140,664)	(105,563)	(62,507)
RPS Resources	Biomass	10,058	0	0
	Geothermal	46,831	41,420	40,039
	Small hydro	83,687	83,360	83,360
	Solar	157,788	450,713	742,911
	Wind	370,054	370,005	370,054
Total energy delivered to Turlock load		**2,215,683**	**2,252,491**	**2,291,304**
Surplus/(Shortfall)		**0**	**0**	**0**

Source: California Energy Commission, based on Turlock IRP filing

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

		2019	2025	2030
Peak Demand		538	541	542
Planning Reserve Margin		81	81	81
Wholesale Obligations		129	113	114
Peak Procurement Requirement		748	735	737
Non-RPS	**Natural gas**	498	449	449
	Market purchases	129	113	114
	Large hydroelectric	122	138	138
RPS Resources	Small hydro	11	11	11
	Geothermal	6	5	5
	Solar	23	65	109
Total Capacity Procured		**788**	**781**	**825**
Surplus/(Shortfall)		**40**	**47**	**88**

Source: California Energy Commission, based on Turlock IRP filing

CHAPTER 2:
Review for Consistency With PUC Section 9621 Requirements

This chapter summarizes the main elements of Turlock'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 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 GHG emission reduction targets established by the California Air Resources Board (CARB), in coordination with the CEC and the California Public Utilities Commission.[20] These GHG emission reduction targets reflect the electricity sector's percentage in achieving the economywide GHG emission reductions of 40 percent from 1990 levels by 2030. Staff reviewed the GHG emissions associated with Turlock'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 Turlock's portfolio to ensure consistency with other data available to staff.

Based on this review, staff finds that Turlock plans to achieve the CARB-established GHG emission reduction target range of 189,000 to 333,000 metric tons of carbon dioxide equivalent (189 to 333 MT CO_2e).[21] Turlock's resource portfolio is 5 percent below the upper end of the GHG emission reduction target range in 2030, at roughly 316 MT CO_2e, which is consistent with the requirement of PUC Section 9621(b)(1). The expiration of Turlock's contract with the Boardman Coal Plant reduced Turlock's carbon footprint significantly beginning in 2019. Other GHG emissions reductions are from decreased reliance on natural gas from 2019 to 2030.

Table 3 compares the emissions intensities, measured as metric tons of carbon dioxide equivalent per megawatt-hour (mT CO_2e/MWh), for Turlock-owned natural gas-fired

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

21 The term "mT" means metric tons, MT means thousands of metric tons, and MMT means millions of metric tons. See the acronyms list at the end of this document. A metric ton is a unit of mass that equals 1,000 Kilograms, or about 2,205 pounds.

generation with historical values from the utility's filing in the CEC's Quarterly Fuel and Energy Report (QFER).[22]

Table 3: Historical and Projected Emission Intensities for Turlock Power Plants (mT CO_2-e /MWh)

Power Plant	2013	2014	2015	2016	2017	Projected
Almond 1 & 2	0.562	0.567	0.57	0.574	0.567	0.608
Walnut Energy Center	0.415	0.414	0.413	0.415	0.416	0.438

Sources: California Energy Commission Quarterly Fuel and Energy Reports and Turlock IRP Filing

The emission intensities used by Turlock for the Walnut Energy Center and Almond plants are slightly higher than the associated historical values, which could be a result of changes in the operation of the units—for example, increased cycling, or ramping of the plant up and down, to integrate renewable generation. The Walnut Power Plant (a combustion turbine) is not included in the table as it rarely generates electricity and instead provides reserve capacity for Turlock. The utility is considering taking the Walnut Power Plant offline in 2021.

In estimating GHG emissions associated with generating and purchasing energy to meet the needs of Turlock's retail customers, portfolio emissions accounting must consider that the utility also generates energy for wholesale sales to MeID and for sale in spot markets. The GHG emissions associated with these sales are attributable to the buyers of the energy and do not count against Turlock's GHG emission reduction target. Because these sales are unspecified power, the emission intensity of 0.428 mT CO_2e is assigned to them and deducted from the total GHG emissions projected by the utility.

Table 4 illustrates the utility's procurement of energy from Turlock's natural gas-fired plants (with the exception of the Walnut Power Plant), spot market purchases, its firm sales obligation to MeID, and the procurement of renewable energy that is sold as unspecified power into spot markets.[23]

In 2030, Turlock projects generating 886 GWh from specific natural gas plants and purchasing 1,446 GWh from spot markets, a total of 2,332 GWh. Only a share of this is to meet Turlock's retail loads; 474 GWh are to meet a firm wholesale sales obligation to the MeID, 63 GWh are projected to be sold into spot markets, and 1,113 GWh are needed to replace renewable energy that is generated or paid for by the utility but not delivered to its retail load. A total of 1,650 GWh of energy with associated emissions is attributed to entities other than Turlock, including MeID. The total amount of emissions associated with the remaining 683 GWh of energy is attributed to Turlock's resource portfolio to meet its loads, as shown in **Table 4**.

22 https://www.energy.ca.gov/almanac/electricity_data/web_qfer/.

23 "Unspecified power" refers to electricity that is not traceable to a specific generating facility, such as electricity traded through open market transactions. Unspecified sources of power are typically a mix of resource types and may include renewables.

Table 4: Allocating GHG-Emitting Resources to Turlock and Other Loads (GWh)

Energy Source	2019	2025	2030
Walnut Energy Center and Almond 1 & 2	1,333	1,111	886
Spot-market purchases	1,109	1,263	1,446
Subtotal	**2,442**	**2,374**	**2,332**
Energy not delivered to load			
Net energy for MeID loads	(553)	(470)	(474)
Spot-market sales	(141)	(106)	(63)
Undelivered RPS energy	(538)	(821)	(1113)
Energy to Meet Turlock Loads	**1,211**	**977**	**683**

Source: California Energy Commission, based on Turlock IRP filing

Determining the amount of emissions in a resource portfolio requires making assumptions about the emission intensities of the different resources types, as shown in **Table 3**. Turlock's firm wholesale and spot-market sales, as well as energy needed to replace renewable energy not delivered to load, are assumed to have an emissions intensity of 0.428 metric tons of carbon dioxide equivalent per megawatt hour (mT CO_2eMWh). This is consistent with CARB's emissions intensity for unspecified energy. Similarly, staff assumes that the firm sales to MeID have an emissions intensity of 0.428 mT CO2e per MWh, as the buyer is not entitled to energy from any specific resource in Turlock's portfolio, and it is, therefore, an unspecified purchase. Finally, it is assumed that any energy generated or purchased to replace renewable energy not delivered to load has an emissions intensity of 0.428 mT CO_2e/MWh, as staff has no information indicating the use of specific resources to replace the undelivered energy.

Table 5 presents the resulting allocation of emissions to Turlock's portfolio in 2019, 2025, and 2030. The utility will have GHG emissions of 316 MT CO_2e in 2030. This amount represents a 40 percent reduction from its GHG emissions in 2019 and is about 5 percent below the high end of the GHG emission reduction target established by CARB for Turlock. Data for all years from 2019 to 2030 are presented in the GHG Emissions Accounting Table in **Appendix B**.

Table 5: Turlock GHG Emissions (MT CO_2e)

Emission Sources	2019	2025	2030
Walnut Energy Center	546	466	382
Almond	38	26	21
Spot-market purchases	475	507	619
Subtotal	**1,058**	**999**	**1,022**
Net energy for MeID loads	(237)	(202)	(203)
Spot-market sales	(60)	(64)	(27)
Undelivered RPS energy	(230)	(352)	(476)
Total	**531**	**381**	**316**

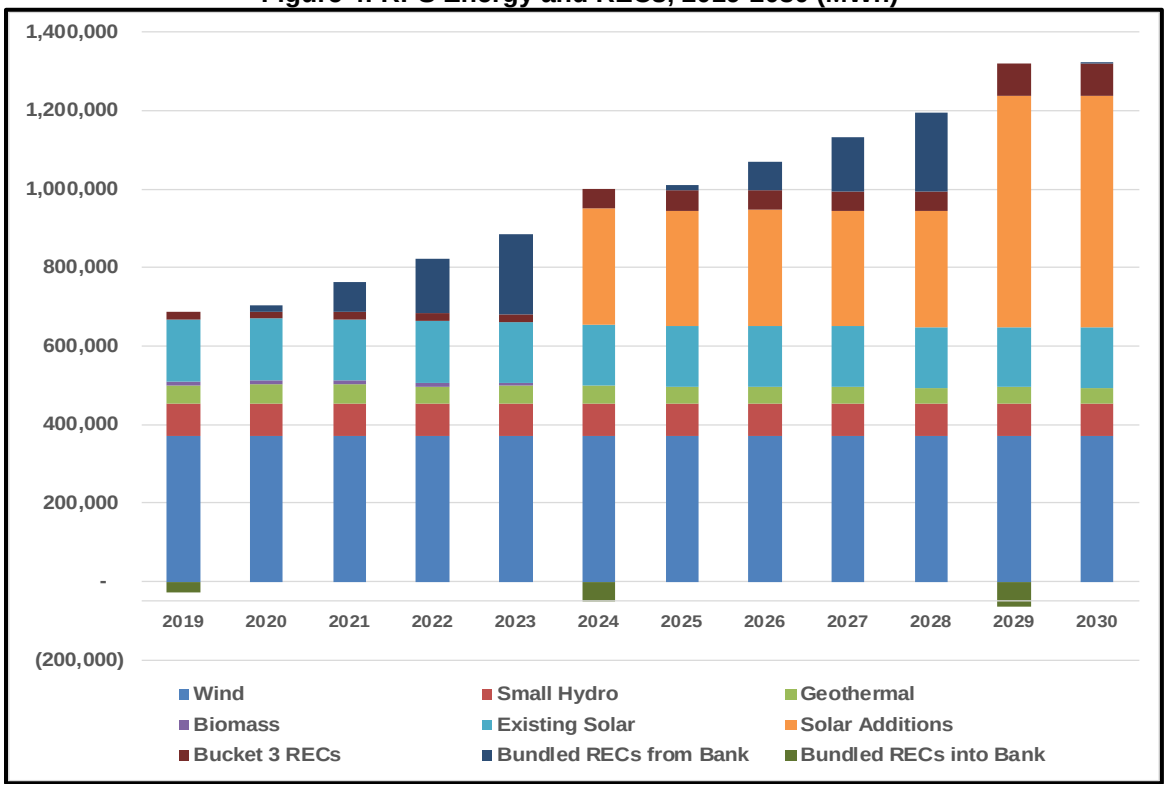
Source: California Energy Commission, based on Turlock IRP filing

Renewables Portfolio Standard Planning Requirements

PUC Section 9621(b)(2) requires that POU IRPs ensure procurement of at least 50 percent renewable energy resources by 2030, consistent with Article 16 (commencing with Section 399.11), Chapter 2.3.[24] Staff reviewed the renewable procurement standardized reporting table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that Turlock'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).

Turlock plans to meet a 60 percent RPS by 2030, with at least 65 percent coming from owned renewable resources or renewable resources under contracts of 10 years or more. **Figure 4** illustrates how Turlock anticipates meeting the 60 percent RPS for 2030 and associated interim requirements.

Figure 4: RPS Energy and RECs, 2019-2030 (MWh)



Source: California Energy Commission, based on Turlock IRP filing

Current projections show Turlock producing more RECs than required in 2018 and 2019. Turlock added to its bank of RECs in 2018 and anticipates adding 27,000 MWh of

24 PUC Section 9621(b) requires the governing boards 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 required to plan only for the 50 percent RPS target in its IRP. Future POU IRPs will need to meet RPS requirements in effect when those updates are filed.

RECs in 2019, shown as a negative entry in **Figure 4**. Turlock anticipates that the use of RECs will allow it to meet RPS requirements through 2023 without procuring renewable energy beyond existing utility-owned generation and resources currently under contract.

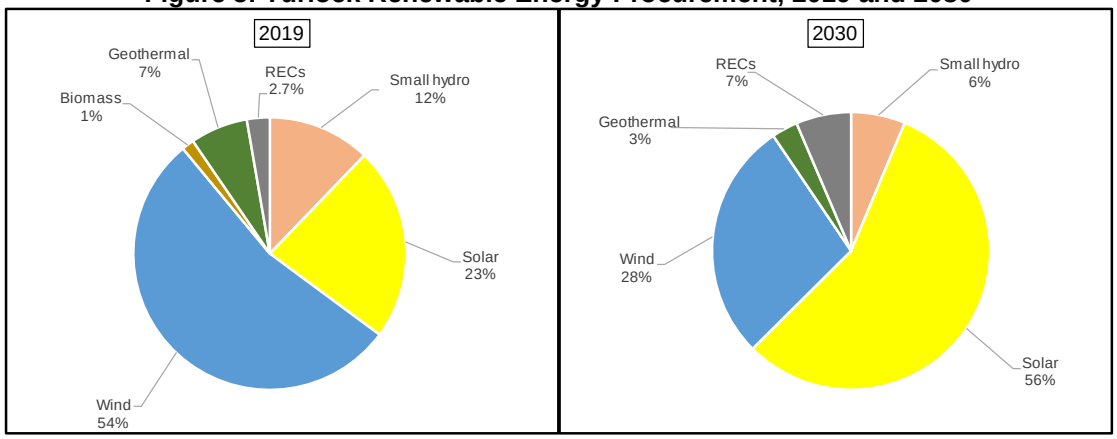
Beginning in 2020, Turlock intends to rely on banked bundled RECs from previous years to meet a share of procurement requirements in 2020 and during the 2021 to 2024 compliance period.[25] Turlock anticipates depleting the banked surplus of RECs by 2025 and needing to procure more renewable generation after that. To continue complying with the RPS during the planning period, Turlock would need to add about 300,000 MWh per year of new renewable resources in 2024 and another roughly 300,000 MWh in 2029. Although additional procurement is not needed until 2025, planning to acquire additional renewable resources in 2024 allows for forecast errors, potential delays in procurement, and flexibility in procurement timing based on market dynamics.

In planning to meet a 60 percent 2030 RPS, Turlock modeled a new contract with a 100-MW solar facility beginning in 2024 and a second contract with a similar resource in 2029. In the initial years (2024 and 2029), these resources generate surplus bundled RECs that can be banked. In the compliance period 2025 to 2028, Turlock again relies on banked bundled RECs to meet a share of its RPS obligation. In 2030, energy procurement equals the RPS procurement obligation and RECs are neither deposited into nor withdrawn from the bank.

Figure 5 illustrates how the composition of Turlock's renewable energy changes from 2019 to 2030. Turlock's renewable portfolio shifts from 55 percent wind and 24 percent solar in 2019 to 30 percent wind and 60 percent solar in 2030. Small hydro decreases from 13 percent in 2019 to 7 percent in 2030, while geothermal decreases from 7 percent in 2019 to 3 percent in 2030. By 2030, biomass is eliminated from Turlock's renewable portfolio.

25 Bundled RECs are electricity purchases from an RPS-eligible renewable plant, where the RECs are not separated from the corresponding energy that is purchased. In contrast, unbundled RECs are purchases of electricity from an RPS-eligible plant in which the RECs are sold to the purchaser with no energy procured or delivered.

Figure 5: Turlock Renewable Energy Procurement, 2019 and 2030



Source: California Energy Commission, based on Turlock 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 finds that Turlock's IRP is consistent with PUC Section 9621(b)(3).

Turlock's mission statement, contained in its *2017 Strategic Plan*, states that the utility will provide competitively priced electric service while being good stewards of its resources and providing a high level of customer satisfaction. Turlock's board of directors sets rates in a local, transparent process. Rates are set to ensure strong financial standing and align with the costs of service, which helps keep rates competitive and stable. Turlock did not provide rate projections as part of its IRP filing. However, the choice of adding solar resources to meet the 2030 RPS procurement requirement and GHG emission reduction targets was based on Turlock's assessment that solar power would be the most cost-effective renewable resource.

Turlock's advanced metering infrastructure rollout is nearing completion and will enable the utility to tailor programs and evaluate rate incentives to align with grid and supply conditions for the benefit of customers.

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.[26] Staff reviewed Turlock's capacity reporting table and discussion and finds Turlock has planned for sufficient resources to maintain a reliable electric system. Turlock'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

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

reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Section 9621(d)(1)(E).

System Reliability

As a balancing authority, Turlock must meet several reliability standards established by NERC and WECC. WECC specifies the quantity and types of contingency reserve that must be maintained to ensure electric system reliability under normal and abnormal conditions. Turlock's modeling for its IRP shows that during the planning period, it will be able to provide the required amount of contingency reserve using existing electric resources.

Turlock has a board-approved resource adequacy policy that requires procurement of sufficient capacity to meet 105 percent of forecasted peak demand for May to September by June 1 of the preceding year and 115 percent of the forecasted peak for these months 60 days before the start of the month. Turlock will meet or exceed a 15 percent planning reserve margin through its existing resources, planned renewable additions, and, when necessary, market purchases of capacity,[27] as illustrated in the Capacity Resource Accounting Table (**Table B-2**).

In meeting the planning reserve margin requirement, Turlock also ensures that it will have sufficient operating reserves to meet reliability standards imposed on it by the WECC, when combined with its participation in the Northwest Power Pool Reserve Sharing Group. These operating reserves allow it to cost-effectively meet reliability standards with fewer capacity resources, relying on the capacity resources of other members for a share of its needs.

Local Capacity Needs

Turlock's IRP considers the possible need for local generation capacity. In its normal operating configuration, Turlock has no load-constrained areas within its electric system and does not require local dispatchable generation, or local capacity, to provide operating reserves and the associated energy under high-load conditions. Turlock expects the system to serve anticipated load growth until 2030 without a need to increase internal local generating capacity intended to address transmission constraints.

Flexible Capacity Needs

Turlock anticipates that increases in solar generation, both customer-owned and utility-scale, will increase average hourly ramping requirements, in turn requiring more flexibility from its resource portfolio. The projected growth in customer-owned solar over the planning horizon yields manageable changes in upward and downward ramps.[28] These increases can be handled by existing resources, such as the Almond

27 Market purchases are needed only to meet reserve requirements when the Walnut Energy Center or Don Pedro are unavailable due to maintenance. (IRP, p. 46)

28 Upward ramps occur in the late afternoon and early evening as solar output drops faster than loads decline, requiring other generation resources to increase output ("ramp up"). Downward ramps occur in the

units that can change output by 150 MW in 10 minutes. Further analysis is required to determine if increases in minute-to-minute load variation due to customer solar, estimated at 5 MW/minute, require additional flexibility.[29]

When generic utility-scale solar resources are added to Turlock's portfolio, as indicated in 2024 and 2029, the impact on ramps in 2030 is much larger. For example, average three-hour downward ramps in the morning range from 140 to 170 MW during March to November. The need for three-hour upward ramps in the evening exceeds 150 MW from January to October and 200 MW during March to May.[30] Further analysis is required, but it is likely that additional resources (energy storage, for example) will be needed to provide sufficient flexibility to successfully integrate this additional solar capacity. (See the **Resource Portfolio Evaluation** section, pages 9 and 10.)

Transmission and Distribution Systems

PUC Section 9621(b)(3) requires filing POUs to adopt an IRP that achieves the goal of strengthening the diversity, sustainability, and resilience of the bulk transmission and distribution systems and local communities. Staff determined that Turlock's IRP adequately plans to maintain and enhance its transmission and distribution systems. Staff finds Turlock has planned for enough transmission to deliver resources to its service area, and 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.

Turlock is interconnected to five other utility systems and has rights to 237 MW of transmission capacity on the California–Oregon Transmission Project, giving it access to power markets in the Pacific Northwest.[31] In 2016, Turlock invested in software that provides continuous real-time contingency analysis capabilities. In 2017, it invested $11.4 million in new distribution facilities and line upgrades to support potential new industrial loads and reduce loads on a substation.

At present, Turlock expects the existing system to serve anticipated load growth through 2030 without adding internal generation capacity to accommodate transmission and distribution constraints, growth in EV loads, and distributed generation. Distribution system upgrades over the planning horizon could include replacing equipment that has reached its useful end of life, system voltage control improvements, system capacity improvements, and system load balancing improvements.

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mid- to late morning as solar output increases faster than loads, requiring other generation resources to reduce output.

29 *IRP*, p. 33.

30 *IRP*, pp. 61–62.

31 Turlock interconnects to five neighboring electricity systems including Pacific Gas and Electric, Hetch Hetchy Power, the Western Area Power Administration, and the Modesto and Merced Irrigation Districts.

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 information presented in Turlock's IRP filing to determine the extent to which it is minimizing local air pollutants with a priority for disadvantaged communities. Staff finds that Turlock has made efforts to address these issues in selecting the resources it plans to include in its portfolio consistent with the requirement.

A majority of Turlock's service territory is classified as either *low-income* or *disadvantaged*.[32] As a result, the utility places an emphasis on maintaining low rates. Turlock has several programs in place or soon to be launched that target low-income customers:

- The Turlock CARES Program provides rate and demand charge discounts to low-income customers.
- The Turlock Weatherization Program is a free, direct-install program for low-income customers that installs a wide variety of energy efficiency measures in homes. Turlock also offers a similar program for low-income mobile home residents.
- Higher incentives for EV purchases and charger installation by low-income customers.

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 and distribution and transmission resources. Turlock's IRP discusses how these factors contribute to meeting net demand in peak hours. This plan is consistent with the requirement that filing POUs address how they can meet peak-hour demand with renewable and other preferred resources.

In determining its peak capacity needs, Turlock considers the impact of energy efficiency, EV load, and customer-owned solar resources. Based on its modeling results, Turlock's existing thermal and hydroelectric resources, supplemented by short-term capacity or firm power purchases, are able to meet its demand during peak hours, maintain sufficient capacity reserves, and meet reliability requirements. The utility does not plan to procure additional resources to meet peak demand needs, only additional renewable resources to meet its RPS requirements.

32 As defined in Assembly Bill 1550 (Gomez, Chapter 369, Statutes of 2016) and Senate Bill 535 (de León, Chapter 830, Statutes of 2012).

Turlock is analyzing how energy storage resources can help integrate intermittent solar resources, balance its system, and reduce and optimize thermal generation to help meet its demand needs during peak hours. Turlock may consider beginning with a small-scale energy storage system in the near term to gain a better understanding of how to maximize the benefits of an energy storage system before procuring a larger energy storage project later. Although Turlock does not have any event-based demand response resources, it continues to consider and evaluate how these resources can help meet its peak demand needs.

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 sections. The resource adequacy provisions of this code section are discussed in **System Reliability** section, pages 19 and 20.

Energy Efficiency and Demand Response Resources

Staff finds that Turlock'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 and quantifies the amount of energy efficiency savings the utility plans to achieve, also referred to as AAEE. Turlock's AAEE, along with the CEC's SB 350 targets for doubling energy efficiency, are presented in **Table 6**.

Table 6: Turlock Energy Efficiency Savings and SB 350 Target (GWh)

	AAEE (GWh)	SB 350 Targets (GWh)
2018	49.33	40
2019	64.33	49
2020	79.27	59
2021	93.44	69
2022	107.14	79
2023	119.67	89
2024	131.31	99
2025	142.33	108
2026	152.81	116
2027	162.79	124
2028	172.27	132
2029	181.32	140
2030	190.01	

Sources: California Energy Commission, based on Turlock IRP filing

Most of Turlock's energy efficiency programs have been in place since 2001, with a cost to date of more than $18 million. By 2030, Turlock expects to achieve 190 GWh of cumulative energy savings from its efficiency programs while exceeding the SB 350

energy efficiency doubling targets in each year of the planning period.[33] Cumulative energy efficiency savings represent roughly 7 percent of Turlock's forecasted net energy for load in 2030.

Some of Turlock's current energy efficiency programs include:

- A nonresidential lighting program that provides rebates to businesses that replace their existing lights with more efficient light-emitting diodes (LEDs).
- A commercial direct-install program that replaces a business' inefficient lighting with LEDs at little or no cost to the business.
- A home energy analysis program that provides the customer information on his or her monthly energy usage, a Web portal to customize energy use, and energy-saving tips.

To continue and expand its current energy efficiency programs, Turlock develops 10-year forecasts of energy efficiency savings, which it updates every four years.

Although Turlock does not offer event-based demand response programs to its customers, it does encourage customer load-shifting behavior through time-of-use rates. Recently, the utility started installing a new customer information system and data management software that will create a foundation for future load flexibility programs, such as demand response. Along with these new systems, Turlock plans to continue its research on potential future customer programs that will save energy and benefit its ratepayers.

Energy Storage

Staff finds that the Turlock IRP is consistent with the requirement in PUC Section 9621(d)(1)(B) to address procurement of energy storage as it discussed the potential role of energy storage in its system. Assembly Bill 2514 (Skinner, Chapter 469, Statutes of 2010) also requires POUs to evaluate the potential of energy storage systems as a resource and establish procurement targets, if appropriate. On September 23, 2014, Turlock reported that energy storage was not a cost-effective resource for development before the end of either 2016 or 2021. On September 26, 2017, Turlock again found that it was not cost-effective for development by the end of 2021.

The Turlock IRP contains a detailed discussion of the potential need for and role of energy storage if new solar resources are procured to meet the RPS and 2030 GHG emission reduction target. It finds that the addition of 200 MW of solar capacity by 2029 will likely require the addition of new, flexible resources to the utility's portfolio to manage increased ramps. (See Resource Portfolio Evaluation and Flexible Capacity

33 The Turlock IRP forecasts savings of 114 GWh by 2030; this value differs from the value in Table 11, as Table 11 assumes a base year of 2015 to be consistent with the SB 350 doubling target. This difference does not affect Turlock's ability to achieve and exceed the energy efficiency doubling targets.

Needs.) Turlock's plans related to energy storage are also discussed in Net-Energy Demand in Peak Hours.

Transportation Electrification

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

Turlock assumed that LDEV growth in its service territory would be consistent with its 2015 share of statewide LDEVs as the latter grows to 5 million vehicles by 2030.[34] Using utility estimates of the carbon intensity of electric generation needed to meet LDEV load and various default assumptions set forth in the CEC's LDEV Energy and Emission Calculator,[35] the utility projected the deployment of 6,600 vehicles, requiring the provision of 28 GWh (1.3 percent of total load) for charging. Associated emissions were 12 MT CO_2e, with net GHG emissions reductions estimated at 8 MT CO_2e.

The Turlock board of directors approved the utility's EV program on October 2, 2018. The program began on January 1, 2019, and provides:

- Customer incentives for EV purchases and residential and multifamily residential Level 2 chargers, with higher rebates for low-income customers.
- Partnerships with government entities, school districts, and large customers to encourage fleet electrification and charging station development.
- A Turlock utility EV fleet and employee charging.
- An EV rate that promotes vehicle electrification and recharging during off-peak hours.

Portfolio Diversification

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

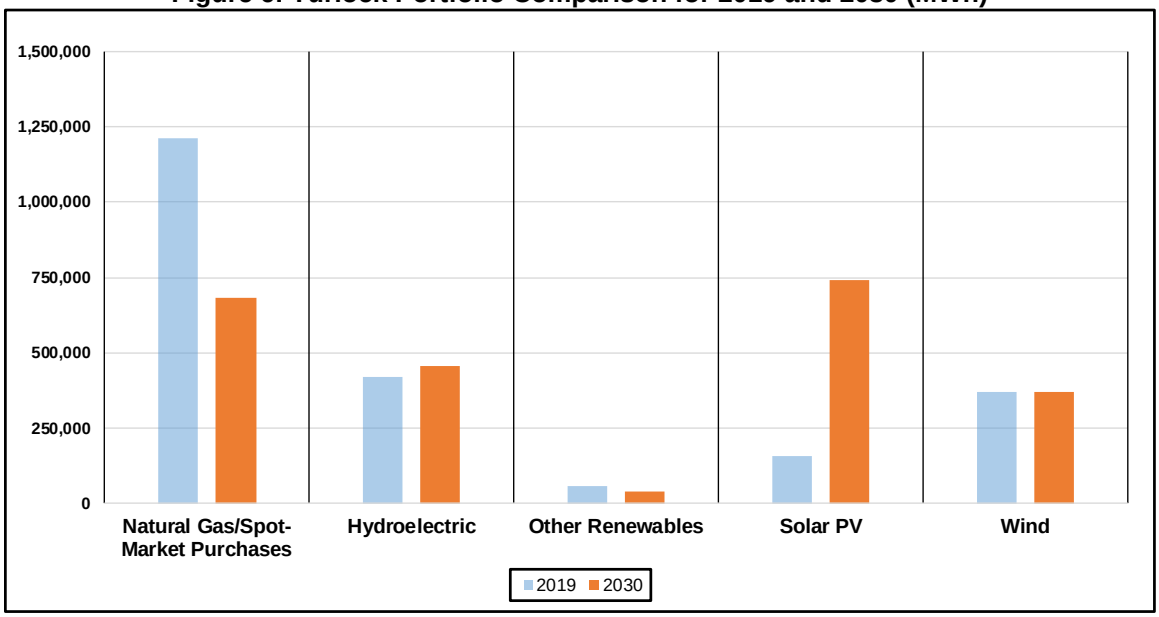
Figure 6 presents a comparison of the energy mix by fuel type in Turlock's portfolio in 2019 and 2030.

34 Executive Order B-48-18, signed January 26, 2018.

35 These assumptions are related to EV fleet composition, the operation and characteristics of electric and gasoline-powered vehicles, and the carbon content of gasoline. The Energy Commission's LDEV Energy and Emission Calculator is available at https://ww2.energy.ca.gov/sb350/IRPs/index.html.

Figure 6 shows Turlock's portfolio transitions from natural gas to solar to meet the GHG emissions reduction target and RPS in 2030.[36] The renewable portfolio is diversified by fuel type (including solar, wind, and geothermal resources), and ownership or contract length, since the utility owns the Tuolumne Wind Project and small hydro plants and can choose any contract length for future solar additions. The natural gas component of the portfolio includes only existing utility-owned generation, leaving the utility flexibility in procuring additional resources to meet future energy and capacity needs.

Figure 6: Turlock Portfolio Comparison for 2019 and 2030 (MWh)



Source: California Energy Commission, based on Turlock IRP filing

36 The values for utility-owned, natural gas-fired generation and spot-market purchases exclude generation to meet the utility's sales obligation to MeID and replace renewable energy that is not delivered to load. See Greenhouse Gas Emission Reduction Targets for a discussion.

ACRONYMS

Acronym	Term
AAEE	Additional achievable energy efficiency
AAPV	Additional achievable photovoltaic
CARB	California Air Resources Board
California ISO	California Independent System Operator
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPUC	California Public Utilities Commission
GHG	Greenhouse gas
GWh	Gigawatt-hour
IEPR	*Integrated Energy Policy Report*
IRP	Integrated resource plan
LDEV	Light-duty electric vehicle
MeID	Merced Irrigation District
mT	Metric ton
MT	Thousands of metric tons
MMT	Millions of metric tons
MW	Megawatt
MWh	Megawatt-hour
POU	Publicly owned utility
PRC	Public Resources Code
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.

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 systemwide 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 be 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 end-use customer and, thus, excludes any generation or procurement in satisfaction of firm wholesale commitments (for example, firm and spot-market sales).

Scenario: A set of assumptions about future conditions used in power system modeling performed to support generation or transmission planning.

Sensitivity: A technique that determines how 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 Balance Table, All Years (MWh)

			2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	Retail sales		2,129,252	2,131,030	2,133,560	2,139,409	2,147,236	2,158,050	2,164,624	2,168,214	2,174,883	2,182,588	2,192,305	2,201,923
	Net energy for load		2,215,683	2,217,533	2,220,166	2,226,252	2,234,397	2,245,650	2,252,491	2,256,227	2,263,166	2,271,184	2,281,296	2,291,304
	Firm sales obligations		552,698	556,737	560,513	501,641	475,371	472,967	470,409	468,078	465,390	464,122	469,024	473,710
	Total net energy requirement		**2,768,381**	**2,774,270**	**2,780,679**	**2,727,893**	**2,709,768**	**2,718,617**	**2,722,900**	**2,724,305**	**2,728,556**	**2,735,306**	**2,750,320**	**2,765,014**
	Supply Resources	**Technology**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Non-RPS resources	Walnut Energy Center	Natural Gas	1,270,751	1,227,756	1,239,006	1,223,875	1,200,409	1,142,388	1,068,205	980,320	891,417	867,831	859,296	851,261
Non-RPS resources	Walnut CT	Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0
Non-RPS resources	Almond 1 & 2	Natural Gas	62,396	67,565	81,543	55,844	55,644	47,927	42,398	41,998	37,904	32,658	32,389	34,373
Non-RPS resources	Don Pedro	Large Hydro	325,940	321,461	319,086	338,893	356,028	355,019	319,679	345,699	361,746	361,746	361,746	361,746
Non-RPS resources	WAPA contract	Large Hydro	10,326	10,326	10,326	10,326	10,326	10,326	10,326	10,326	10,326	10,326	10,326	10,326
Non-RPS resources	Spot/Short-term purchases	Unspecified	1,109,115	1,164,223	1,156,692	1,160,159	1,196,482	1,183,760	1,263,074	1,295,671	1,364,183	1,396,876	1,419,428	1,446,416
Non-RPS resources	**Energy - non-RPS resources**		2,778,527	2,791,331	2,806,653	2,789,097	2,818,888	2,739,420	2,703,682	2,674,014	2,665,575	2,669,437	2,683,184	2,704,122
RPS resources	Tuolumne Wind Project	Wind	370,054	370,082	370,074	370,150	370,119	370,054	370,005	370,082	370,074	370,119	370,133	370,054
RPS resources	Small Hydro	Small Hydro	55,278	55,248	55,072	55,124	55,005	55,283	55,248	55,072	55,124	55,058	55,278	55,248
RPS resources	Minihydros	Small Hydro	28,409	28,475	28,408	28,024	28,058	28,046	28,111	28,044	28,024	28,060	28,044	28,111
RPS resources	NCPA Geothermal	Geothermal	46,831	47,928	47,349	44,016	45,625	44,929	41,420	43,244	42,503	39,747	41,089	40,039
RPS resources	SunPower PPA	Solar PV	157,788	157,500	157,293	156,963	156,647	156,422	156,178	155,631	154,594	154,337	154,096	153,841
RPS resources	Biomass contract	Biofuels	10,058	10,086	10,058	10,058	5,698	0	0	0	0	0	0	0
RPS resources	**Energy - existing RPS resources**		**668,419**	**669,320**	**668,253**	**664,336**	**661,152**	**654,735**	**650,963**	**652,074**	**650,318**	**647,321**	**648,640**	**647,294**
RPS resources	Generic Solar Additions	Solar PV	0	0	0	0	0	295,387	294,535	294,535	294,535	295,387	589,070	589,070
RPS resources	**Total RPS-eligible energy**		**668,419**	**669,320**	**668,253**	**664,336**	**661,152**	**950,122**	**945,499**	**946,609**	**944,853**	**942,708**	**1,237,710**	**1,236,364**
	Total procured energy		**3,446,946**	**3,460,651**	**3,474,906**	**3,453,433**	**3,480,040**	**3,689,542**	**3,649,181**	**3,620,623**	**3,610,429**	**3,612,144**	**3,920,894**	**3,940,487**
	Spot/Short-term sales		(140,664)	(148,713)	(156,802)	(188,368)	(237,808)	(149,061)	(105,563)	(76,070)	(62,670)	(56,996)	(57,275)	(62,507)
	Undelivered RPS energy		(537,901)	(537,668)	(537,425)	(537,172)	(532,464)	(821,863)	(820,718)	(820,248)	(819,203)	(819,843)	(1,113,299)	(1,112,966)
	Total delivered energy		**2,768,381**	**2,774,270**	**2,780,679**	**2,727,893**	**2,709,768**	**2,718,617**	**2,722,900**	**2,724,305**	**2,728,556**	**2,735,306**	**2,750,320**	**2,765,014**

Source: California Energy Commission, based on Turlock IRP filing

Table B-2: Turlock Capacity Resource Accounting Table, 2019–2030, (MW)

		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Peak Demand		538	538	538	539	539	540	541	540	541	541	541	542
Planning reserve margin		81	81	81	81	81	81	81	81	81	81	81	81
Firm sales obligations		129	131	132	114	114	113	113	113	113	112	113	114
Peak capacity requirement		**748**	**750**	**751**	**733**	**734**	**734**	**735**	**734**	**734**	**734**	**735**	**737**
Existing Generation	**Technology**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Walnut Energy Center	Natural Gas	247	247	247	247	247	247	247	247	247	247	247	247
Walnut CT	Natural Gas	49	49	0	0	0	0	0	0	0	0	0	0
Almond 1 & 2	Natural Gas	202	202	202	202	202	202	202	202	202	202	202	202
Don Pedro	Large hydro	122	122	122	127	132	138	138	138	138	138	138	138
WAPA contract	Large hydro	0	0	0	0	0	0	0	0	0	0	0	0
Tuolumne Wind Project	Wind	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro	Small hydro	11	11	11	11	11	11	11	11	11	11	11	11
Minihydros	Small hydro	0	0	0	0	0	0	0	0	0	0	0	0
NCPA Geothermal	Geothermal	6	6	5	5	5	5	5	5	5	5	5	5
SunPower PPA	Solar PV	23	23	23	23	23	23	23	23	23	23	23	23
Biomass	Biofuels	0	0	0	0	0	0	0	0	0	0	0	0
Existing capacity contracts													
Capacity from MeID	Unspecified	129	131	132	114	114	113	113	113	113	112	113	114
Generic RPS additions													
Generic solar	Solar PV	0	0	0	0	0	42	42	43	43	43	86	86
Total capacity		**788**	**790**	**743**	**729**	**734**	**781**	**781**	**781**	**781**	**780**	**824**	**825**
Surplus/shortfall		**40**	**40**	**(9)**	**(4)**	**0**	**46**	**47**	**47**	**47**	**46**	**89**	**88**

Source: California Energy Commission, based on Turlock IRP filing

Table B-3: Turlock GHG Emissions Accounting Table, 2019–2030 (GWh)

Emission Sources	Emissions Intensity (mt CO2-e/MWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Walnut Energy Center	0.437	0.5456	0.5317	0.5365	0.5282	0.5188	0.4957	0.4660	0.4322	0.3976	0.3887	0.3852	0.3820
Walnut CT	0.726	-	-	-	-	-	-	-	-	-	-	-	-
Almond 1 & 2	0.608	0.0377	0.0407	0.0477	0.0340	0.0341	0.0294	0.0262	0.0260	0.0235	0.0201	0.0198	0.0210
Total GHG emissions from generation		**0.5833**	**0.5724**	**0.5842**	**0.5622**	**0.5529**	**0.5251**	**0.4923**	**0.4582**	**0.4210**	**0.4088**	**0.4050**	**0.4030**
Net spot market/short-term purchases:	0.428	0.4145	0.4346	0.4280	0.4159	0.4103	0.4429	0.4954	0.5220	0.5570	0.5735	0.5830	0.5923
Total GHG emissions		**0.9978**	**1.0070**	**1.0121**	**0.9781**	**0.9632**	**0.9679**	**0.9877**	**0.9802**	**0.9781**	**0.9823**	**0.9880**	**0.9954**
Emission Adjustments													
Undelivered RPS energy (MWh)		537,901	537,668	537,425	537,172	532,464	821,863	820,718	820,248	819,203	819,843	1,113,299	1,112,966
Firm Sales Obligations (MWh)		552,698	556,737	560,513	501,641	475,371	472,967	470,409	468,078	465,390	464,122	469,024	473,710
Total energy for emissions adjustment (MWh)		**1,090,599**	**1,094,405**	**1,097,938**	**1,038,813**	**1,007,835**	**1,294,830**	**1,291,127**	**1,288,326**	**1,284,593**	**1,283,965**	**1,582,323**	**1,586,676**
Emissions intensity (mt CO_2-e/MWh)		0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280	0.4280
Emissions adjustment		0.4668	0.4684	0.4699	0.4446	0.4314	0.5542	0.5526	0.5514	0.5498	0.5495	0.6772	0.6791
Adjusted Portfolio emissions		**0.5310**	**0.5386**	**0.5422**	**0.5335**	**0.5318**	**0.4137**	**0.4351**	**0.4288**	**0.4283**	**0.4327**	**0.3108**	**0.3163**
Impact of Transportation Electrification													
Transportation sector reductions		0.0037	0.0049	0.0062	0.0076	0.0092	0.0108	0.0125	0.0142	0.0159	0.0177	0.0194	0.0211
Increase due to generation		0.0020	0.0027	0.0034	0.0043	0.0052	0.0061	0.0071	0.0081	0.0092	0.0102	0.0113	0.0124

Source: California Energy Commission, based on Turlock IRP filing

Table B-4: Turlock RPS Procurement Table (GWh)

	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	2,097	2,097	2,129	2,131	2,133.6	2,139.4	2,147.2	2,158.1	2,164.6	2,168.2	2,174.9	2,182.6	2,192.3	2,201.9
Soft target (%)	27.00%	29.00%	31.00%	33.00%	35.75%	38.50%	41.25%	44.00%	46.67%	49.33%	52.00%	54.67%	57.33%	60.00%
Required procurement	2537.5				3421.7				3210.7			3771.2		
Bundled RECs	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
RPS-eligible energy procured	569.6	667.2	668.4	669.3	668.3	664.3	661.2	950.1	945.5	946.6	944.9	942.7	1,237.7	1,236.4
Total procurement in period	2,574.5				2,943.9				2,837.0			3,416.8		
Energy applied to obligation	2,451.5				2,893.1				2,837.0			3,353.4		
Banked RECs applied to obligation	15.3				423.2				223.8			202.7		
Change in excess balance	107.8				(372.4)				(223.8)			(139)		
Net purchases of bundled RECs	0				0				0			0		
End of period excess balance/carryover*	876.9				504.4				280.7			141.3		
Unbundled RECs	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Net purchases of Category 3 RECs	0.0	0.0	0.9	18.6	18.6	18.6	18.0	50.2	50	50	50	50	83	83
REC purchases applied to obligation	15.3	18.1	18.6	18.6	18.6	18.6	18.0	50.2	50	50	50	50	83	83
Total for compliance period	70.7				105.4				150			215		
Annual net change in REC balance	(15)	(18)	(18)	0	0	0	0	0	0	0	0	0	0	0
Net change in REC balance during period	(51.1)				0				0			0		
End of period Category 3 balance**	0				0				0			0		
Total RECs	**Compliance Period 3**				**Compliance Period 4**				**Compliance Period 5**			**Compliance Period 6**		
Total RECs applied to period obligation	2,537.5				3,421.7				**3,210.7**			**3,771.2**		
Over/under procurement for period	0				0				0			0		

Source: Energy Commission staff, based on Turlock 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 gigawatt hours, 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 economy-wide 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 gigawatt-hours, 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.)