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STAFF PAPER

Review of Riverside Public Utilities 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 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. Riverside Public Utilities submitted its *2018 Integrated Resource Plan* and supplemental information, which the City of Riverside City Council adopted on December 11, 2018, and sent to the Energy Commission for review on December 18, 2018. This staff paper presents the results of the Energy Commission staff review of the Riverside Public Utilities 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 (GHG) emission reduction targets and renewable energy procurement requirements. The Energy Commission's *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* additionally require the utilities to file an IRP with data and supporting information sufficient to demonstrate that they meet these requirements and 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 Riverside Public Utilities' (Riverside) IRP filing serves as a roadmap for a cost-effective transition away from carbon-intensive resources, such as coal, to low and zero-carbon resources that reduce the utility's GHG emissions. The Riverside IRP filing examined both current and proposed supply-side and demand-side resources over a 20 year timeframe, along with strategies for meeting a diverse set of state and regional legislative and regulatory mandates. Riverside IRP also examined longer range planning activities such as energy storage, transportation electrification, distributed resources, and engagement with disadvantaged communities.

Riverside modeled and evaluated seven resource planning scenarios to assess greenhouse gas reduction targets, renewable portfolio standard requirements, and capacity and energy replacement. Riverside plans to meet its GHG reduction targets and RPS goals with a combination of solar, wind, storage, geothermal, and some short-term spot market purchases. In 2017, Riverside had 36 percent renewable portfolio standard (RPS) eligible resources and is on track to increase to 43 percent by 2021. Riverside plans to meet the high end of the California Air Resources Board (CARB) GHG reduction target range (486,277 metric tons of carbon dioxide). One significant GHG reduction measure will be divesting from the Intermountain Power Plant in 2027, which will convert from coal to natural gas in 2025.

In reviewing the Riverside IRP to determine consistency with the requirements of PUC section 9621, Energy Commission staff relied on the four standardized reporting tables and narrative descriptions in the IRP filing, as well as analysis and verification of these materials. Staff's review of the IRP filing results in the following conclusions with respect to consistency 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 that the utility plans to meet the greenhouse-gas emission reduction requirements of PUC section 9621(b)(1), and the renewable energy procurement requirement of PUC section 9621(b)(2).

- *Meeting Planning Goals:* The values reported in standardized forms, along with the analysis and discussion provided in the IRP filing, demonstrate that the utility intends to meet planning goals related to retail rates, reliability, transmission and distribution systems, localized air pollution, and disadvantaged communities as set forth in PUC section 9621(b)(3).
- *Considering Peak Needs:* The values reported in the standardized forms, along with analysis and narrative discussion, demonstrate the utility has considered the role of existing renewable generation, grid operational efficiencies, energy storage, and distributed resources (including energy efficiency) in helping to ensure the utility's energy and reliability needs in the hours that encompass the peak hour as set forth in PUC section 9621(c).
- *Addressing Resource Procurement Types:* The IRP filing includes values reported in the standardized forms and narrative discussion that demonstrate the utility has addressed the procurements requirements for energy efficiency and demand response, energy storage, transportation electrification, portfolio diversification, and resource adequacy as set forth in PUC section 9621(d).

In addition to the provisions regarding IRPs, 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. The IRP is consistent with the PUC section 9621 requirement in that it addresses energy efficiency and demand response. Energy Commission staff observe that aggressive energy efficiency and demand response programs will be needed for utilities and other energy efficiency deliverers 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 Riverside Public Utilities, and update the targets as necessary.

CHAPTER 1: Background, Demand Forecast, and Procurement Plan

This chapter outlines the Energy Commission's review process and provides an overview of Riverside Public Utilities (Riverside) 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.

Introduction

California Public Utilities Code (PUC) section 9621 requires publicly owned utilities (POU) with an annual electrical demand exceeding 700 gigawatt hours to develop integrated resource plans (IRP). IRPs are electricity system planning documents that describe how utilities plan to meet their energy and capacity resource needs while achieving policy goals and mandates; meeting physical and operational constraints; and fulfilling other priorities such as reducing impacts on customer rates. PUC section 9621 requires the governing board of a POU to adopt an IRP and a process for updating it at least once every five years by January 1, 2019.

PUC section 9621 further requires each POU meeting the electrical demand threshold to submit its IRP and updates to the Energy Commission for review to determine if it is consistent 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 POU's IRPs.[1] PUC section 9622 requires the Energy Commission to review POU IRPs to ensure they achieve PUC section 9621 provisions (See Appendix A).

Energy Commission IRP Review Process

In conducting its review, Energy Commission staff assessed the data in the standardized tables and narrative discussions provided in the IRP filing, along with staff analysis, informal communications with Riverside's staff, and verification of data or information, as needed. In assessing whether Riverside's IRP is consistent with the requirements of PUC section 9621, staff considered the data supporting the assertions in the IRP.

Energy Commission staff also relied on staff subject matter experts to review sections of the IRP filing, including Riverside's energy and peak demand forecasts, projections

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1 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. https://efiling.energy.ca.gov/GetDocument.aspx?tn=224889.

for renewable resource additions and whether they achieved RPS requirements, energy efficiency savings projections and programs, and plans for transportation electrification.

Overview of Riverside Public Utilities

Riverside is a city-owned, not-for-profit electric and water utility in Riverside County, California as described below.

- Riverside distributes electricity to an 81.5 square mile territory that includes the City of Riverside.
- In 2017, Riverside delivered approximately 2.3 million megawatt-hours (MWh) of energy to roughly 109,300 metered customers, including 97,400 residential, 850 industrial customers, and 11,000 small and medium-sized commercial customers.
- Residential customers constitute almost 90 percent of total customer meters; however, commercial and industrial customers consume approximately two thirds of the total load.
- Riverside owns generation, sub transmission,[2] and distribution assets that deliver energy to its customers.
- Riverside has 558 megawatts (MW) of dependable capacity. It experienced its highest peak load of 640.3 MW in August 2017. Capacity shortfalls over the forecast period are met with short-term purchases.
- Riverside Public Utilities is governed by Riverside's City Council and a Board of Public Utilities. The board consists of nine community volunteers and oversees policies, operations, rates and revenues, expenditures, planning, and regulatory compliance.

Riverside's Planning Process

Although Riverside's board of public utilities and city council are ultimately responsible for developing and adopting an IRP, public and stakeholder input was part of the development process. Riverside engaged the California Independent System Operator (California ISO) and other industry stakeholders, through in-person meetings and webinars, to address technical issues like resource adequacy, distributed resources, and transmission congestion. Riverside held over 50 public community outreach meetings to address customer rate impacts and programs for low-income and disadvantaged communities.

Riverside analyzed seven portfolio scenarios, using production cost modeling, for cost and reliability impacts. Riverside used the model results to compare the scenarios for cost and reliability to determine how to reduce greenhouse gas emissions, maintain

2 Riverside's sub-transmission assets consist of 33 kV and 69 kV lines.

reliability, and meet other policy goals at least cost to their ratepayers. Riverside used the IRP process to analyze long term procurement strategies to help it meet the 2030 carbon reduction goals and quantify how much these strategies impact the utility's future cost of service. The IRP analysis and production cost model results will assist Riverside in planning for a lower carbon future in a flexible and financially responsible way. It will also allow them to begin to assess how various emerging technologies may affect GHG reductions and costs to better define future procurement actions.

Demand Forecast, Methodology, and Assumptions

The *POU IRP Guidelines* (Chapter 2.E.1) identify the need for a forecast of energy and peak demand to determine whether a POU's IRP is consistent with the requirements of PUC section 9621.[3] In addition, under the POU IRP Guidelines (Chapter 2.E.2) the POU must provide information on the methodology used in developing the demand forecast, if a POU chooses to use a forecast other than the Energy Commission's adopted demand forecast.[4] Staff reviewed the demand forecast and supporting information provided in the IRP filing and determines that it presents an adequate estimation of future energy and peak demand and meets the *POU IRP Guideline* requirements set forth above.

Riverside has a climate typical of many inland areas in California, with hot, dry summers and mild winters. This weather leads to utility loads and peaking needs that are significantly higher in the summer months. While the load profile of a winter day is generally flat, a typical summer day will experience a late afternoon peak demand that is double that of the early morning off-peak demand. In August, the utility needs about 50 percent more energy and 90 percent more capacity to meet load requirements as compared to February.

Riverside used regression based econometric models to forecast its expected hourly system loads (MW), total monthly system load (GWh), monthly system peak load (MW), and total monthly retail load (GWh) for its four customer classes. The models are statistically developed and calibrated to historical monthly load data extending back to January 2003 with the following input variables:

- *Economic Effect*: Annual per capita personal income econometric input variable for the Riverside – San Bernardino – Ontario metropolitan service area.
- *Calendar Effect*: Numbers of weekdays and holidays in each month.
- *Weather Effect*: Monthly weather indices calculated from historical average daily temperature levels. Forecasted average monthly weather indices are based on historical averages.

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

4 The most recently adopted demand forecast is for the *2017 Integrated Energy Policy Report*. Kavalec, Chris, Asish Gautam, Mike Jaske, Lynn Marshall, Nahid Movassagh, and Ravinderpal Vaid. 2018. *California Energy Demand 2018 — 2030 Revised Forecast*. California Energy Commission, Electricity Assessments Division. Publication Number: CEC-200-2018-002-CMF. http://www.energy.ca.gov/2017_energypolicy/documents/#demand.

- *Temporary Load/Peak Impacts Due to 2011-2012 Economic Incentive Program*: Indicator variables that calibrate to the observed load and peak gains and losses over the 2011-2014 time period associated with the 2011-2012 economic incentive program.
- *Cumulative Energy Efficiency Savings since 2005*: Cumulative projected monthly load and peak reduction estimates for “Baseload”, “Lighting”, and “Heating, ventilation, and air condition (HVAC)” program components.
- *Cumulative Solar PV installations since 2001*: Cumulative projected monthly load and peak reduction estimates based on installed AC capacity and monthly load scaling/peak shaping factors.
- *Incremental Electric Vehicle Loads*: Expected net EV load growth based Energy Commission Transportation Electrification Common Assumptions 3.0 model.

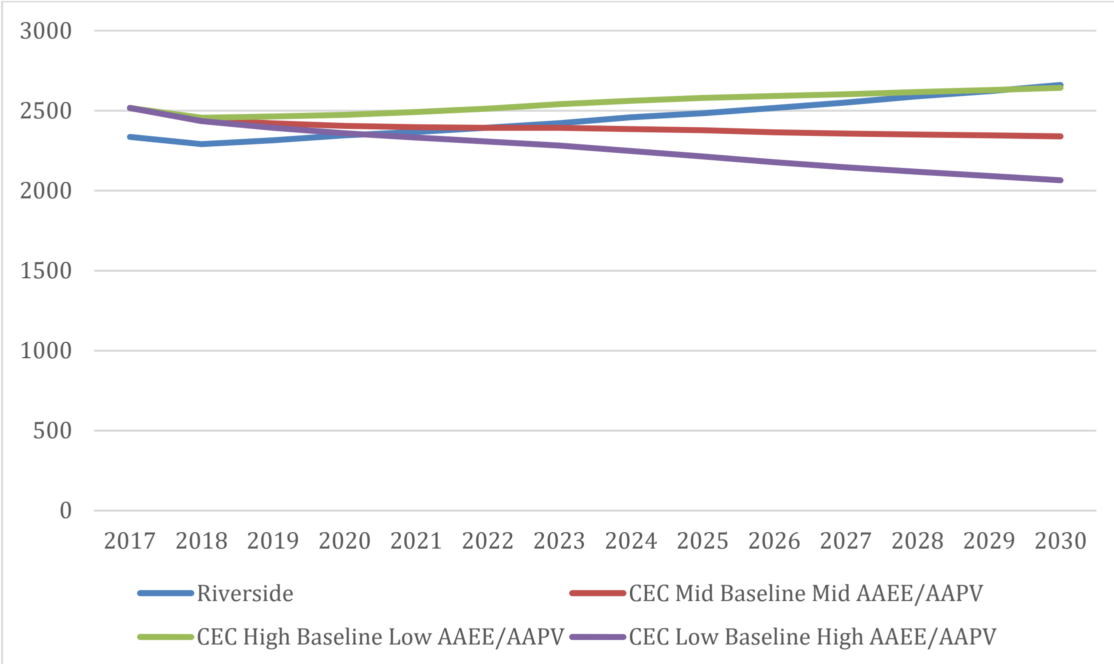
Based on the monthly system load and peak econometric models, with input variables identified above, Riverside calculated annual forecasted system loads and peaks. These forecasts assume a historical average annual per capita personal income growth rate (~ 2.9 percent/year), continued 1 percent/year energy efficiency efforts, a moderate amount of continued customer PV installations and a business-as-usual growth rate in electric vehicles.

Riverside’s forecast methodology and assumptions are adequately described. Input variables of the forecast model are explained in detail with data source and reasonable assumptions. With the significant statistical results of the two econometric models, Riverside’s demand forecast methodology is sufficient in a long-term planning context.

Energy Forecast

Riverside’s reported net system load for base year 2017 is 7.18 percent lower than the base year used by the Energy Commission in the demand forecast. The difference may be a result of Riverside using a different method to calculate system losses. It is also possible that Riverside used a different dataset for sales than the QFER data used by the Energy Commission because the reported retail sales in 2017 is 6.79 percent lower than the retail sales figure used by the Energy Commission. Riverside forecasts annual system load growth of 1 percent from 2017 to 2030. This is higher than 0.38 percent for the Energy Commission’s forecast in High Baseline Low AAEE/AAPV scenario. However, the differences in the forecasts are not so great as to have a significant impact of the development of a long-term resource plan. **Figure 1** shows a comparison of the Riverside’s energy forecast with the Energy Commission’s forecasts for Riverside.

Figure 1: Riverside and Energy Commission Energy Forecasts 2017-2030 (GWh)

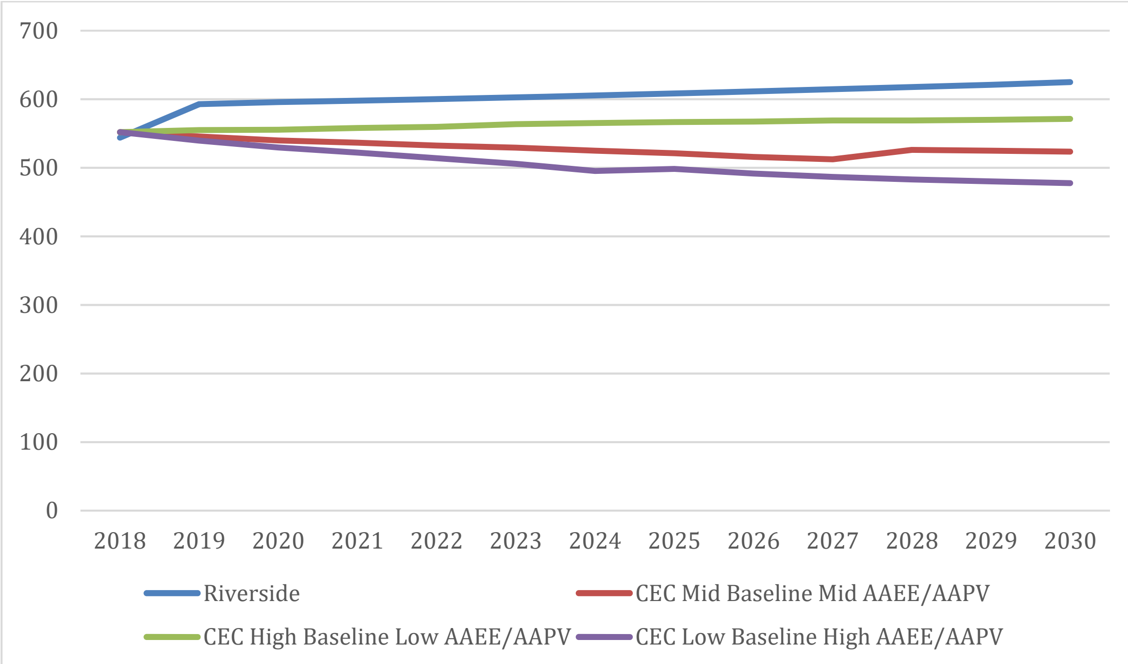


Source: California Energy Commission staff

Peak Forecast

Riverside's system peak of 2018 report in CRAT is coincident-adjusted, as determined by the Energy Commission. For 2019 and afterward, peaks are non-coincident. Riverside predicts annual system peak growth rate of 0.48 percent from 2019 to 2030. This is slightly higher than 0.26 percent for the Energy Commission's forecast in High Baseline Low AAEE/AAPV scenario. Riverside's forecast is reasonable for a long-term planning context. **Figure 2** shows a comparison of Riverside's peak forecast with the Energy Commission's peak forecast for Riverside.

Figure 2: Riverside and Energy Commission Peak Forecasts 2018-2030 (MW)



Source: California Energy Commission staff

Resource Procurement Plan

The Energy Commission's *POU IRP Guidelines* require that a POU report the mix of resources they plan to use to meet demand from 2018-2030.[5] The guidelines also require a POU to include in its IRP data and supporting information sufficient to demonstrate that the POU is meeting various targets and goals. Based on staff's review, Riverside's IRP filing meets these guideline requirements. The following discusses Riverside's existing resources, procurement strategy, and the portfolio analysis underlying the resources in 2030 identified in the standardized forms.

Existing Resources

A decade ago, Riverside's resource portfolio comprised a mix of coal, nuclear, natural gas, and geothermal resources, along with some hydroelectric and energy exchange contracts to meet peaking needs.[6] Riverside's resource portfolio has evolved over time in response to California ISO market price volatility, fuel and delivery risk tolerances, generation and distribution needs, and load and peak demand growth. Riverside's current resource mix includes coal, nuclear, hydroelectric, natural gas, geothermal, wind, and solar resources.

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

6 In energy exchange contracts Riverside buys energy that is delivered at peak times when it is most needed and the energy is returned to seller at an off-peak period.

In recent years, Riverside has decreased its reliance on nuclear and coal resources in favor of renewable resources. Before the closure of San Onofre Nuclear Generating Station in 2012, that facility had provided Riverside with 39 MW of firm base-load capacity. Riverside replaced that loss by increasing its geothermal resources and through power purchase agreements with new wind and solar facilities. In 2017, 36 percent of its load was served by renewably energy, a figure that is expected to increase to 43 percent by 2021. Riverside's existing and future renewable resources are detailed in Chapter 2, section on renewable portfolio standard planning requirements.

Riverside's base-load resources include the Intermountain Power Project (IPP), Palo Verde Nuclear Generating Station (12 MW capacity), Salton Sea number five geothermal plant (46 MW capacity), and CalEnergy geothermal portfolio (40 MW capacity). IPP is a coal-fired power plant located in Utah that Riverside has a contracted share of up to 136 MW of capacity. Riverside's contract with IPP runs through 2027. Another source of base load capacity includes the Clearwater combined-cycle natural gas plant (28 MW capacity).

Riverside's daily peaking resources include the 194 MW natural gas-powered Riverside Energy Resource Center and the 36 MW Springs Generation Facility. Riverside also receives peaking power from its allocation to Hoover Dam power (24 MW capacity).

Riverside's current renewable resources include three wind energy projects (Wintec-Pacific Solar (1.3 MW), WKN-Wagner (6 MW), and Cabazon (39 MW)) and seven solar projects (AP North Lake (20 MW), Antelope Big Sky Ranch (10 MW), Antelope DSR (25 MW), Summer Solar (10 MW), Kingbird B (14 MW), Recurrent Columbia II (11 MW), and Tequesquite (7.3 MW)), in addition to the geothermal resources mentioned above.

In 2018, Riverside's net energy load was 2,291 GWh.[7] Of that, 741 GWh was from RPS-eligible resources, 805 GWh from non-RPS eligible resources, and a net of 745 GWh was from short term and spot market purchases.

In addition to its generation resources, Riverside also has entitlement shares in several transmission assets, including The Southern Transmission System, Mead-Phoenix Transmission Project, and Mead-Adelanto Transmission Project. Riverside is currently pursuing a new project called the Riverside Transmission Reliability Project, which will provide a second point of interconnection with Southern California Edison's (SCE's) transmission facilities.

In 2025, Riverside expects to lose 72 MW of capacity due to the retirement of the IPP coal power plant. It will lose an additional 64 MW of capacity if it exits the IPP natural gas power plant in 2027. Riverside's spring's resource is also expected to be retired at the end of 2027, leading to the loss of 36 MW of local and system capacity. Riverside

7 Net energy load is total generation plus energy received from other areas, less energy delivered to other areas through interchange needed to serve load

will need to add additional local and system resources during this timeframe to replace the lost resources.

Resource Portfolio Evaluation

In developing its IRP, Riverside used production cost modelling to analyze seven planning scenarios that assessed GHG reduction targets, RPS targets, and capacity and energy replacement. The baseline scenario includes a GHG reduction of 40 percent below 1990 levels, a 50 percent RPS, and normal renewable pricing levels. The six other scenarios studied included increased levels of GHG reductions and RPS eligible resources, and varied normal or high price levels for future renewables.

Portfolio Diversification

Potential new resources that Riverside analyzed included a 44 MW solar PV plus battery storage project, extension or repowering of the 39 MW Cabazon wind facility, contracts for summer low carbon energy products, and two baseload renewable assets.

Riverside Portfolio Costs

Riverside has considered a number of fixed costs in its IRP analysis. Riverside's obligations for decommissioning the San Onofre Nuclear Generating Station are expected to be $2 million annually through the IRP forecast period. Other costs considered include:

- Transmission project costs and transmission revenue requirement costs
- Carbon allowances and revenues
- CAISO uplift fees and other power resource costs
- Personnel and operations and maintenance costs
- Debt service costs
- General fund transfer tax obligations

Riverside performed cost of service and risk forecasts for the different scenarios. For the baseline portfolio, Riverside's cost of service is forecasted to grow about 1.2 percent per year between 2020 and 2035. For scenarios with higher GHG reductions and RPS levels, the cost of service forecasts are only slightly higher than for the baseline portfolio.

Market Risks

A significant risk for Riverside is the future costs of renewable energy. The forecasts of cost of service discussed above depend strongly on future pricing for renewable energy assets. If renewable energy prices stay in line with current estimates, Riverside should be able to meet its GHG and RPS goals with relatively modest cost of service increases. However, if future renewable energy prices are much higher than current estimates, it will be difficult for Riverside to meet its goals without substantial cost increases.

Procurement Strategy

An issue Riverside discussed in its 2018 IRP is whether to participate in the conversion of IPP coal facility to natural gas. During the 2014 IRP process Riverside examined the financial aspects of IPP repowering project based on very preliminary cost factors available at the time. Since that time the California participants have mutually agreed to retire the coal units two years ahead of schedule (by June 2025) and accelerate the timeline for the repowering to natural gas. However, the costs associated with this repowering project have steadily increased, even though the final configuration for the new natural gas generation asset is still being determined. In addition, Los Angeles Department of Water and Power (LADWP) has informed the California participants that 1.2 to 1.3 billion dollars in transmission upgrades will be needed and all participants will be expected to sign 50 year contract commitments for both the generation and transmission assets.

In the 2018 IRP, Riverside staff recommended exiting the IPP repowering contract altogether. With a 50 year contract length necessary for participation in the IPP repowering and the state moving aggressively to a carbon-free grid by 2045, Riverside could be left with a stranded thermal generation asset for 20 to 25 years. Riverside also points to the risks from numerous regulatory uncertainties associated with permitting of the repowering project and natural gas pipeline to serve it.

Because Riverside has a contractual obligation for IPP output until 2027, the repowering project reduces Riverside's share of the project from 136 MW to just 65 MW from July 2025 through June 2027, after which the IPP contract will terminate. Thus, Riverside needs to determine how to replace up to 136 MW of baseload, carbon intensive coal energy with cleaner low (or zero) carbon alternatives by the middle of the next decade.

Riverside has sufficient renewable resource to meet or exceed the current SB 350 RPS requirements through 2024. Riverside's plan to meet the RPS targets are detailed in Chapter 2, section on renewable portfolio standard planning requirements. The utility will either have to procure additional renewable resources or apply previously accumulated excess procurement credits toward meeting the renewable targets. Riverside believes it reasonable to expect that to meet future carbon reductions it will continue to procure renewable resources.

Another plausible alternative late in the forecast period could be procuring near zero carbon, firm energy deliveries from the Pacific Northwest and Canada (PowerEx or Bonneville Power Administration), which are primarily hydroelectric resources that would not hamper their ability to meet GHG targets. The shift to renewable and low carbon resources will allow Riverside to reduce its reliance on natural gas in the latter years of the planning horizon.

Table 1 provides a summary of the forecasted amount of energy from different resource types in Riverside's portfolio in 2019, 2025, and 2030. Table 2 provides a summary of the capacity resources Riverside will rely on to meet peak demand and reliability requirements in the same year. **Tables A-1** and **Table A-2** in Appendix A identify the energy and capacity for individual resources for all years.

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

		2019	2025	2030
Total Net Energy for Load		**2,314,846**	**2,484,436**	**2,660,184**
Non-RPS Resources	Natural Gas	98,932	272,996	149,676
	Large Hydro	30,005	30,005	30,005
	Coal	617,478	295,065	0
	Nuclear	92,969	93,276	95,218
	Spot Purchases	539,043	627,850	889,405
	Spot Sales	(64,761)	(72,030)	(28,533)
RPS Resources	Biofuels	6,326	0	0
	Geothermal	643,764	647,973	944,285
	Small Hydro	0	0	0
	Solar PV	258,351	393,616	383,423
	Wind	92,739	92,914	92,914
	Planned Intermittent Contract	0	102,800	103,200
Total Energy Procured		**2,314,486**	**2,484,436**	**2,660,184**
Surplus/Shortfall		**0**	**0**	**0**

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2018 IRP filing

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

		2019	2025	2030
Peak Demand		**593**	**608**	**625**
Planning Reserve Margin		**89**	**91**	**94**
Peak Procurement Requirement		**682**	**700**	**719**
Non-RPS Resources	Natural Gas	258	322	222
	Large Hydro	24	24	24
	Coal	136	0	0
	Nuclear	12	12	12
RPS Resources	Biofuels	0	0	0
	Geothermal	86	86	126
	Small Hydro	0	0	0
	Solar PV	32	50	50
	Wind	10	10	10
Total Capacity Procured		**558**	**504**	**444**
Surplus/Shortfall		**(124)**	**(196)**	**(275)**

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2018 IRP filing

CHAPTER 2: Review for Consistency with Public Resources Code Section 9621

This chapter summarizes the main elements of Riverside'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 reduction targets and RPS energy procurement requirements, as well as planning goals for retail rates, reliability, transmission and distribution systems, net load, and disadvantaged communities. In addition, the IRP must address procurement of energy efficiency and demand response, energy storage, transportation electrification and portfolio diversification.

Greenhouse Gas Emission Reduction Targets

POUs are required to meet the GHG targets established by the CARB, in coordination with the Energy Commission and California Public Utilities Commission.[8] These GHG targets reflect the electricity sector's percentage in achieving the economy-wide GHG emission reductions of 40 percent below 1990 levels by 2030. Energy Commission staff reviewed the GHG emissions associated with Riverside's portfolio of resources in 2030, as identified in their IRP and standardized reporting tables. Staff also independently assessed the emission factors associated with various resources in Riverside's portfolio to ensure they are consistent when compared with other data and information available to staff.

Based on its review staff finds that Riverside plans to achieve the GHG emission target range of 275,000 to 487,000 target metric tons of carbon dioxide equivalent ($MTCO_2e$) by 2030 established by CARB. Riverside's 2017 GHG emissions were 942,576 $MTCO_2e$, and its 2030 official target is 486,277 $MTCO_2e$, (0.486 $MMTCO_2e$) which is consistent with the requirement of PUC section 9621(b)(1). In the IRP, Riverside also examined the costs associated with reaching a GHG emissions target of 385,137 $MTCO_2e$, which is consistent with the mid-point of Riverside's GHG target range established by CARB.

Since 2014, Riverside has begun to reduce its GHG emissions, with a 22 percent reduction from 2014 to 2017. The utility's GHG reduction goal is equivalent to a 51 percent reduction from 1990 levels. One of the primary ways Riverside will reduce its GHG emissions will be through replacement of energy it currently receives from the IPP with low-carbon energy purchases from the Pacific Northwest or Canada.

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

In performing its GHG emissions analysis, Riverside estimated future GHG emissions by first adding the average hourly dispatch amounts for each thermal generation plant to determine an annual value. Second, any incremental renewable energy needed to meet RPS requirements was added into the portfolio. Third, any additional resources needed to meet the forecasted retail load was assumed to be met with unspecified CAISO market purchases with a default emission factor of 0.428 metric tons of CO_2e per MWh. Other assumptions used to forecast GHG emissions included:

- The IPP coal plant retirement on June 30, 2025 and replacement with a CCNG plant with an emissions factor no higher than 0.428.
- No new tolling agreements between Riverside and any other combined cycle natural gas (CCNG) plants before 2030.[9]
- All remaining generation assets perform as expected through 2030.

Table 3 shows GHG emissions for Riverside's portfolio of resources in 2019, 2025, and 2030. Appendix B (**Table B-3**) includes a table identifying the emission intensities and total emissions for individual resources for all years.

Table 3: Greenhouse Gas Emissions from Riverside's Resources Portfolio

	Fuel Type	GHG Intensity ($MT\ CO_2e/MWh$)	Total Emissions ($MMT\ CO_2e$)		
			2019	2025	2030
Riverside Energy Resource Center	Natural gas	.5131	0.039	0.048	0.063
Clearwater	Natural gas	.5163	0.011	0.012	0.014
Springs	Natural gas	.7443	0.001	0.001	0
Intermountain Power Project	Coal	.9160	0.565	0.270	0
Intermountain Repower Project	Natural gas	.3771	0	0.058	0
Net spot market/short-term purchases		.428	0.203	0.238	0.368
Total Portfolio emissions			**0.819**	**0.628**	**0.446**

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2018 IRP filing

As part of the IRP review, staff compared the emissions intensities used by Riverside for its natural gas-fired generation facilities against historical values. **Table 4** compares projected intensities used in the IRP to values for 2013 – 2017. **Table 4** indicates that Riverside's projections regarding the emissions intensities of its natural gas-fired generation are in line with historical values.

9 A tolling agreement is an agreement in which one party pays a generator a fee to convert fuel into electric power.

Table 4: Historical (2013 – 2017) and Projected Emission Intensities (MT CO2e/MWh)

Facility	IRP Projected	2013-17 Average
Clearwater	0.5163	0.428
Springs	0.7443	0.703
Intermountain	0.916	0.913
Riverside Energy Resource Center	0.5131	0.519

Source: Quarterly Fuel and Energy Report filings, Riverside IRP

Renewable Portfolio Standard Planning Requirements

PUC section 9621(b)(2) requires that POU IRPs ensure procurement of at least 50 percent renewable portfolio standard by 2030 consistent with Article 16 (commencing with section 399.11) of Chapter 2.3. Energy Commission staff reviewed the renewable procurement standardized reporting table, the discussion in the IRP filing, and the renewable procurement plan submitted by Riverside. Energy Commission staff finds that Riverside plans to meet the RPS procurement requirements and all interim compliance periods, and is generally consistent with requirements of PUC section 9621(b)(2), as discussed below.

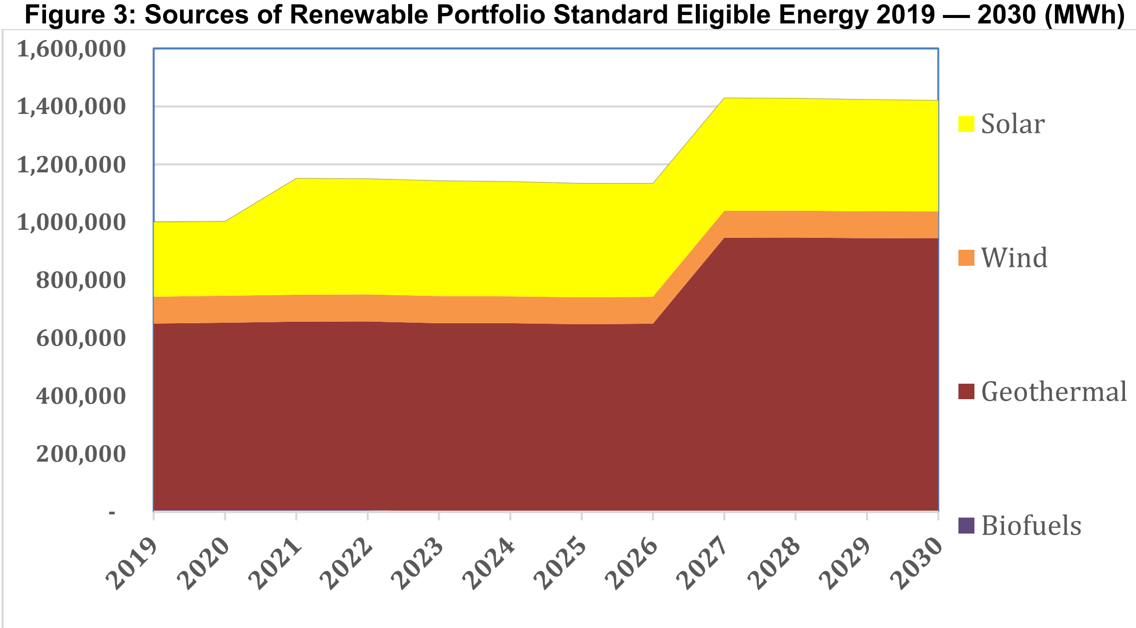
Meeting the 50 percent RPS target requires that Riverside procure an annual average of 1,187 GWh of renewable energy from 2028 to 2030. Riverside's planned resource portfolio meets the 2030, as well as the interim, renewable energy procurement requirements. In 2017, renewable energy was 36 percent of Riverside's retail sales, and the utility currently has sufficient renewable resources under contract to meet RPS requirements through 2024. As previously discussed, Riverside expects to procure additional renewables to meet RPS requirements beyond 2024. Renewable procurement will be driven by GHG reductions, as it will need higher levels of renewables than required by the RPS to meet its GHG targets. Riverside plans to reach a 57 percent RPS by 2030.

Riverside's largest sources of renewable energy are the Salton Sea number five geothermal project and CalEnergy geothermal. Geothermal energy currently accounts for over 60 percent of Riverside's renewable energy sources, while solar energy is just over 25 percent and wind energy approximately 9 percent. By 2030, Riverside plans to increase geothermal and solar energy resources significantly to meet its RPS requirements.

Riverside's RPS procurement plan reflects the post-2020 RPS compliance periods established by SB 350 and the portfolio balance requirements for those compliance periods. The RPS procurement plan also incorporates the 65 percent long-term procurement requirement and provisions for a retail sales exclusion and optional compliance measures.

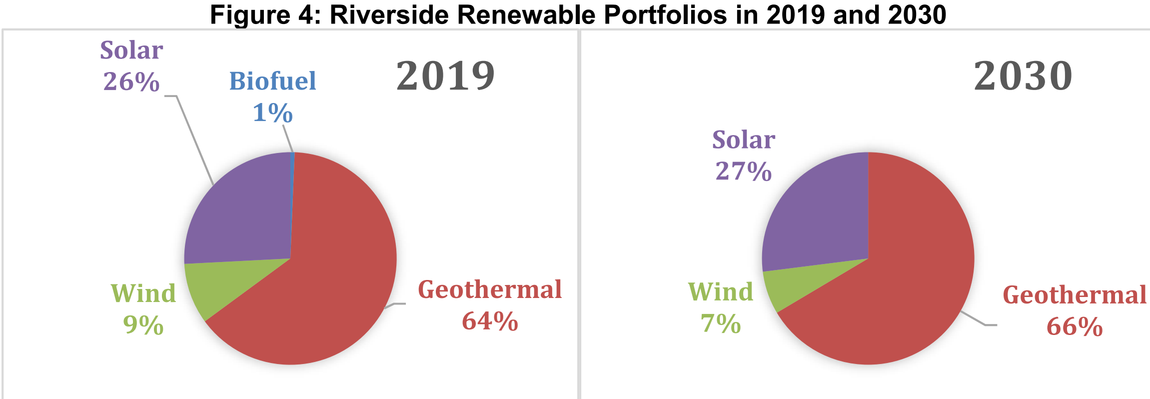
Staff's analysis of forecasted RPS compliance is based on information in the Energy Balance Table (EBT) and the RPS Procurement Table (RPT). Because RPS compliance is based on the retirement and application of RECs for compliance, staff relied on the RPT to the extent possible. However, staff relied on the EBT to obtain procurement information to estimate progress for categories not reported in the RPT. The procurement information reported in the EBT and RPT indicates procurement in excess of what Riverside contemplated in its RPS procurement plan, but resembles the scenario in the IRP in which three new RPS contracts are added to Riverside's portfolio in 2021, 2025, and 2027. **Figure 3** shows a breakdown of Riverside's RPS-eligible energy sources. **Figure 4** compares Riversides RPS portfolios in 2019 and 2030.

Figure 3: Sources of Renewable Portfolio Standard Eligible Energy 2019 — 2030 (MWh)



Source: California Energy Commission, Energy Assessments Division, based on Riverside 2018 IRP filing

Figure 4: Riverside Renewable Portfolios in 2019 and 2030



Source: California Energy Commission, Energy Assessments Division, based on Riverside Public Utilities 2018 Integrated Resource Plan filing

Retail Rates

PUC section 9621(b)(3) requires POUs to develop IRPs that enhance each POU's ability to fulfill their obligation to serve their customers at just and reasonable rates and minimize impacts on ratepayer bills. Staff reviewed the analysis and information Riverside presented in their IRP filing on the rate and bill impacts from different resource portfolios they evaluated. Energy Commission staff finds that Riverside's IRP outlines plans that will allow for just and reasonable rates and will minimize impacts on ratepayer bills.

In 2015, the City of Riverside approved the "Utility 2.0" strategic plan for Riverside Public Utilities. This document contained plans for maintaining the physical infrastructure and financial health of the utility. Since then, Riverside has also completed cost of service and rate design studies, which were used to develop a new rate proposal. Over 50 public outreach meetings were conducted related to the rate proposal. The rate proposal was revised base on community and City Council feedback and approved in May 2018, and the new rates will take effect in 2019. The proposal will result in an average annual rate increase of three percent for typical customers, which is the first electric rate increase since 2011. Riverside compared its proposed electric rates to Southern California Edison and San Diego Gas & Electric and found them to be substantially lower.[10]

Key changes in Riversides new rates include adjustments to fixed charges to better recover infrastructure-related costs, restructuring of the industrial time of use (TOU) reliability charge to better reflect the actual impacts of industrial customer's loads, and extension of the summer residential rates from three months to four months. In addition, Riverside introduced a new TOU rates for EV customers and a new program offering customers a 100 percent renewable energy rate. Riverside has also made changes to its low-income and fixed-income programs to help offset the impact of rate increases on low-income customers.

The additional revenue from rate increases will be used to finance new and upgraded infrastructure, procure higher levels of renewable energy, and meet utility operation costs.

System and Local Reliability

SB 350 requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy (RA) requirements.[11] Energy Commission staff reviewed the IRP and the capacity reporting table in the IRP filing and finds that Riverside has planned for sufficient resources to maintain a reliable electric system over the planning horizon. Riverside's selected portfolio of resources contains sufficient capacity to meet

10 Riverside's forecasted average monthly residential rate for 592 kilowatt hours per month is $106, compared with $217 for San Diego Gas & Electric and $141 for Southern California Edison.

11 Public Utilities Code section 9621(b)(3).

anticipated resource adequacy requirements in 2030. The 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

Riverside is a scheduling coordinator and a participating transmission owner with The California ISO. As such, it has turned over operation of its transmission entitlements to the California ISO. Load-serving entities within California (ISO) must provide sufficient capacity to meet their coincidence adjusted monthly peak load forecast plus a planning reserve margin. Riverside uses the default planning reserve margin in the CAISO tariff of 15 percent for its planning reserve margin. Riverside projected monthly capacity amounts for the 2018-2037 timeframe. Starting in 2019, Riverside will need to procure additional system resource adequacy to meets its forecasted system peaks and 15 percent reserve margin, especially in third quarter of each year. In 2020, Riverside's contract with Salton Sea Unit 5 geothermal will expire. Although Riverside will continue to receive this geothermal energy as part of its CalEnergy Portfolio contract, it will not be able to count it towards its resource adequacy requirements. In 2025, Riverside will lose 64 MW of capacity credit when the IPP coal plant closes and is replaced by a smaller natural gas plant.

Through 2027, Riverside plans to fill capacity shortfalls with year-ahead system and local resource adequacy purchases. By 2028, Riverside's capacity needs will become more significant, and the utility will likely need additional resources to replace retirements in their portfolio. Riverside identified several potential future resources that would help in meeting future capacity and resource adequacy requirements, including a solar plus energy storage project, a wind project, low carbon energy product purchases, and baseload renewable assets.

Local and Flexible Capacity Needs

Riverside is located in the Los Angeles Basin Local Reliability Area. Riverside estimated future local capacity requirements based on a CAISO technical study[12], but Riverside notes the difficulty in confidently forecasting its local resource adequacy requirement. Riverside's local resource adequacy requirements have been stable for the past two years.

Riverside's flexible capacity requirements from 2015-2018 have been extremely volatile. Estimates of near-term flexible capacity requirements, like local capacity, are also based on a CAISO technical study. Through 2022, Riverside has enough local and flexible capacity to satisfy its requirements, except for months in which a local resource adequacy resource is offline for scheduled maintenance. Riverside plans to purchase resource adequacy products to satisfy its requirements in those months.

12 http://www.caiso.com/Documents/Final2018LocalCapacityTechnicalReport.pdf.

Since additional wind and solar resources could increase future flexible capacity requirements, Riverside does not plan to add additional intermittent resources unless they contain a battery component. CAISO's flexible capacity requirements are expected to change in the next few years, making it difficult to forecast future requirements.

Transmission and Distribution Systems

PUC section 9621(b)(3) also requires filing POUs to adopt an IRP that ensures that the POU achieves the goal of strengthening the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities. Energy Commission staff reviewed data and information presented in Riverside's IRP filing to ensure they adequately plan to maintain and enhance their transmission and distribution systems. Staff finds Riverside has planned for enough transmission contracts to adequately deliver resources to their service area to meet the requirement as discussed below. Staff also finds that Riverside conducts adequate planning to address the adequacy of their distribution system. As such, staff finds the IRP is consistent with the transmission and distribution requirements set forth above.

Riverside's Energy Delivery Division is responsible for managing and maintaining its sub transmission and distribution facilities. Its objectives are to ensure electric service reliability, to operate and maintain the system safely, efficiently, and in compliance with requirements, and to supervise and control all activities related to energy distribution delivery.

Transmission System

Riverside's system is interconnected to the California transmission grid at Southern California Edison's (SCE's) Vista Substation. Riverside's electrical system is comprised of 15 substations linked by a network of 69 kV and 33 kV lines. The system includes 98.6 circuit miles of sub-transmission lines.

In connection with its entitlement to IPP, Riverside acquired a 10.2 percent (195 MW) entitlement in the transfer capability of the 500-kV DC bi-pole transmission line, known as the southern transmission system (STS). This line provides for the transmission of energy from, among other resources, the IPP to the California transmission grid. The STS provides approximately 2,400 MW of transfer capability, of which Riverside has a total entitlement that was increased from 195 MW to 244 MW after upgrades completed in January 2011. In addition, Riverside has a 12 MW entitlement in Southern California Public Power Authority's share of the Mead-Phoenix Transmission Project and a 118 MW entitlement to SCPPA's share of the Mead-Adelanto Transmission Project.

The proposed Riverside Transmission Reliability Project would provide Riverside a second transmission interconnection and additional transmission capacity to meet projected load growth. The project is awaiting approval from the CPUC and would entail creation of a new 220 kV transmission interconnection, construction of new SCE and Riverside substations, and expansion of Riverside's 69 kV network.

Distribution System

Riverside's overhead distribution network contains 513 miles of distribution circuits with approximately 23,000 poles. Its underground distribution network has over 817 miles of cable. Riverside reviews all requests for interconnection in accordance with Electric Rule 22.[13] Riverside is currently investigating the potential use of micro-scynchrophasors, secondary voltage regulators, and secondary static VAR compensation on its system to help resolve power quality issues on its distribution system. Riverside is planning to model its distribution system to identify circuits and substations that have reached their distributed generation penetration limits and take actions necessary to alleviate these limits.

In 2015, Riverside formed an Operational Technology Office to develop and support technologies focused on automating and improving operations. Riverside has identified a number of projects that would allow for optimized deployment of distributed generation resources. Riverside's high priority projects include an upgraded Geographic Information System and new systems for meter data management, distribution automation, and advanced distribution management. Deployment of these systems would allow for improved demand-side energy management.

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. Energy Commission staff reviewed information presented in Riverside's IRP filing to determine the extent to which they are minimizing local air pollutants with a priority on disadvantaged communities. Staff finds that Riverside has made efforts to address these issues in selecting the resources they plan to include in their portfolio consistent with the requirement set forth above.

According to the 2016 American Community Survey, over 30 percent of households in Riverside have incomes below 200 percent of the federal poverty level and over 40 percent of the Riverside's population reside in disadvantaged communities. Riverside used the California Environmental Protection Agency's (CalEPA's) CalEnviro Screen tool to identify disadvantaged communities in its service territory. Due primarily to high pollution levels, much of Riverside's service territory is considered to be disadvantaged communities. Riverside has taken a number of actions to reduce GHG and air pollutant emissions, including increasing rooftop PV installations, promoting EV use through increased EV charger installations, and conversion of over 50 percent of the city's non-emergency vehicles to alternative fuels. The Riverside Energy Resource Center,

13 Electric rule 22 describes the interconnection, operation, and metering requirements for distributed generation facilities to be connected to the distribution system.

Riverside's most important generating station, employs technologies that have reduced harmful pollutants below the levels required.

Net Energy Demand in Peak Hours

PUC section 9621(c) requires POUs to consider existing renewable generation portfolio, grid operation efficiency, energy storage, distributed energy resources, and energy reduction measures (such as energy efficiency and demand response) in an effort to reduce the need for new or additional gas-fired generation, distribution and transmission resources. Riverside's IRP includes a discussion of how they consider preferred resources can contribute to meeting peak demand when selecting resources 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.

Riverside analyzed its net energy demand in peak hours by creating net-load curves for a typical winter and summer day. The analysis showed that additional PV resources would exacerbate Riverside's "duck curve" during winter months. To avoid this problem, Riverside plans to only procure future resources, including intermittent renewables that include energy storage to serve its load.

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 system reliability section on pages 18-19.

Energy Efficiency and Demand Response Resources

Staff finds that Riverside's IRP is consistent with the requirement in PUC section 9621(d)(1)(A), as they include a discussion of energy efficiency and demand response programs they plan to implement and quantifies the amount of energy efficiency savings they plans to achieve.

Riverside has offered demand side management and energy efficiency programs for over 20 years, with significant expansion beginning in 1997 after California's electricity market restructuring. Riverside's first energy efficiency (EE) target was adopted in 2008 and has been updated every three or four years.

Riverside offers numerous demand side management and energy efficiency programs to its customers. Programs for commercial customers include efficient air conditioner rebates, energy efficient lighting rebates, energy efficient appliance rebates, shade tree rebates, weatherization rebates, energy efficiency audit programs, energy management system rebates, rebates for construction projects that exceed Title 24 requirements, and thermal energy storage incentives, among others. Residential customer programs include Energy Star appliance rebates, energy efficient air conditioner rebates, shade tree rebates, weatherization rebates, and a whole house energy efficiency rebate program.

In 2016, Riverside and other members of the California Municipal Utilities Association used Navigant Consulting to identify potential targets for energy efficiency programs. Navigant used its Electricity Resource Assessment Model to develop potential energy savings targets for 2018 through 2027. Navigant developed energy efficiency estimates for technical potential, economic potential, maximum market potential, and market potential. Riverside elected to adopt an energy efficiency savings target of one percent of forecast sales through 2030, a figure that is consistent with the maximum market potential figure identified by Navigant. **Table 5** compares Riversides' targets of energy efficiency savings for 2018 to 2027 to the target adopted by the Energy Commissions the report *Senate Bill 350: Doubling Energy Efficiency Savings by 2030*.[14] Riverside's energy efficiency savings targets are higher than the Energy Commission's doubling targets.

Table 5: Riverside Energy Efficiency Targets (GWh)

	Riverside target (GWh)	SB 350 target for Riverside (GWh)
2018	22,900	21,000
2019	23,010	21,000
2020	23,070	20,000
2021	23,110	19,000
2022	23,250	18,000
2023	23,320	18,000
2024	23,370	16,000
2025	23,450	15,000
2026	23,470	14,000
2027	23,688	13,000

Source: Riverside IRP

Energy Storage

Staff finds that Riverside'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 their system. In compliance with Assembly Bill 2514 (Skinner,

14 Riverside only provided energy efficiency savings for 2018 to 2027 because the Navigant Study did not identify specific savings amounts beyond 2027,

Chapter 469, Statutes of 2010), Riverside opened a proceeding in February 2012 to investigate energy storage and determine appropriate energy storage targets. Riverside completed its investigation in September 2014 and elected to adopt a target of zero MW energy storage because energy storage was not determined to be cost-effective at this time. In 2017, as required by legislation, Riverside re-evaluated its energy storage targets and elected to increase its target to six MW of energy storage by 2020. Of this target, Riverside expects to install a five MW Ice Bear thermal energy systems. Riverside is also planning a future solar plus storage project that would have 44 MW of solar PV along with 22 MW and 88 MWh of battery energy storage.

Starting in 2016, Riverside contracted with Ascend Analytics (Ascend) to evaluate the viability and cost-effectiveness of owning and operating energy storage in the California ISO market. Ascend modeled battery revenues for batteries operating in the California ISO market under five different use-cases. Ascends most significant findings were that higher-power, shorter-duration batteries are expected to generate significantly greater revenue than lower power, longer-duration batteries and that energy storage participation in the day-ahead ancillary services market is the most profitable use-case modeled. However, there are many uncertainties, including California ISO dispatch instructions and battery life expectancy, that make it difficult to predict the profitably of energy storage projects.

Transportation Electrification

Staff finds that Riverside's IRP is consistent with the requirement of PUC section 9621(d)(1)(C), which requires that the IRP address transportation electrification. Riverside is in the process of developing a transportation electrification strategy to address the increasing demand for EV charging infrastructure. This program, which started in mid-2018 and is expected to be complete in early 2019, will address community education, support for Riverside customers, and planning for EV growth.

Riverside currently has 45 charging locations that offer 104 Level 2 (high capacity) chargers and 37 DC fast chargers. There is also a Tesla supercharger station in downtown Riverside. To facilitate additional installations, Riverside has implemented a streamlined permitting process for residential and non-residential charging stations. The City of Riverside has also implemented EV rebates for city residents and EV time of use rates for customers that have installed EV chargers.

Riverside used the Light-Duty Plug-in Electric Vehicle (PEV) Energy and Emissions Calculator (EV Calculator) developed by the Energy Commission and the NewGen Strategies and Solutions (NewGen) Load Shapes Analysis Model (LSAM Model) to analyze the potential impacts of increasing levels of EVs. Using the EV Calculator, Riverside analyzed four scenarios for EV growth, including a business as usual scenario, a scenario based on the Governor's 2025 goal of 1.5 million EVs deployed, and two scenarios based on the 2030 goal of 5 million EVs deployed. From 2015 to 2017, Riverside's EV population almost doubled, from 1021 EVs to 2004 EVs. Under the four scenarios analyzed, Riverside’s 2030 EV population would range from 5,224 EVs deployed to 52,856 EVs deployed, and net annual GHG emission reductions in 2030 would range from 9,897 MT of CO^2 to 103,742 MT of CO^2.

Separately, NewGen analyzed various scenarios of EV population levels and charging equipment types for Riverside. A notable result of this analysis is that with larger numbers of high capacity chargers (for example. Level 2 chargers), peak demand is significantly higher than with lower penetration levels of high capacity chargers. The NewGen analysis also determined expected load profiles and revenue changes based on future EV adoption levels.

Transportation electrification has potential benefits for Riverside, but significant challenges include uncertainty of future EV adoption rates and types of EVs, the need to adjust rate tariffs to minimize impacts of future EV charging, and the rapidly changing technologies related to EVs and EV infrastructure.

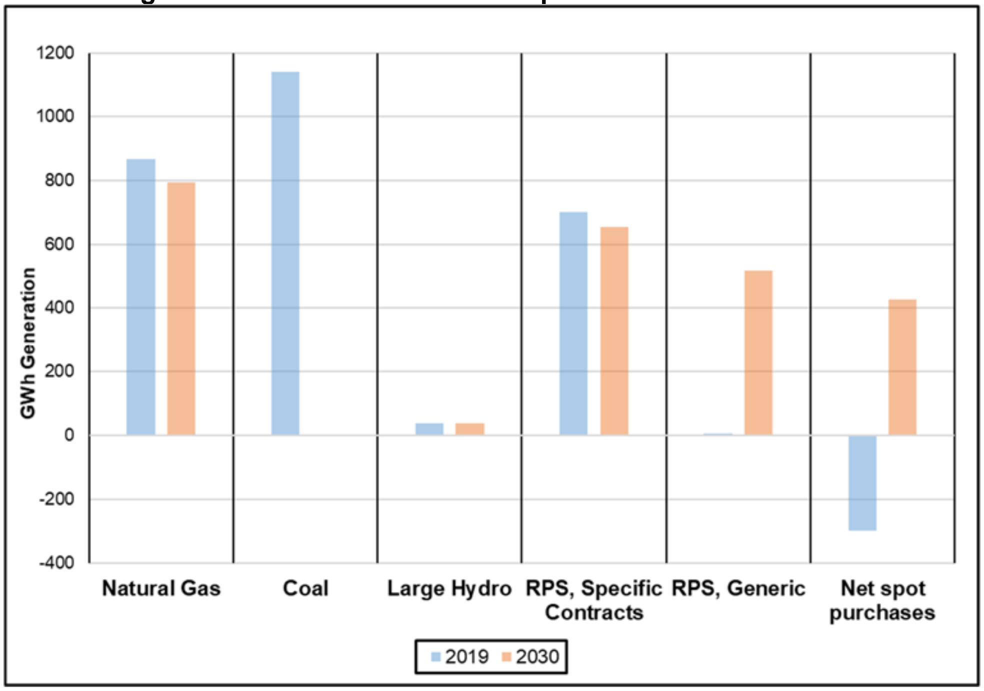
Portfolio Diversification

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 Riverside’s existing resources, their portfolio analysis, and the selection of resource additions in their IRP staff concludes that Riverside has fulfilled this requirement.

Figure 5 shows a comparison of the energy mix by resource in Riverside’s preferred portfolio in 2019 and 2030.

Riverside currently has a range of resources, including solar, wind, geothermal, natural gas, nuclear, and coal resources. As Riverside moves towards lowering GHG emissions and increase its RPS portfolio, its coal and natural gas resources will decrease, while its renewable resources will increase. The IRP discusses the need to procure resources that best fit Riverside’s resource needs and analyzes the costs associated with various types of resources.

Figure 5: Riverside Portfolio Comparison for 2019 and 2030



Source: California Energy Commission, Energy Assessments Division, based on Riverside 2018 IRP filing Energy Balance Table

Appendix A

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 economy wide 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.)

Appendix B

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

		Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Net Energy for Load			2,314,846	2,345,840	2,366,855	2,393,686	2,422,473	2,458,738	2,484,436	2,516,884	2,550,641	2,589,565	2,622,243	2,660,184
Non-RPS Resources	**Riverside ERC**	Natural Gas	76,364	77,783	83,972	89,170	92,747	94,595	94,200	99,383	105,651	113,404	116,405	122,717
	Clearwater	Natural Gas	21,208	21,598	22,769	23,973	24,414	24,087	24,125	25,084	25,760	27,003	27,127	27,549
	Springs	Natural Gas	1,360	1,393	1,430	1,487	1,638	1,641	1,754	1,656	1,950	0	0	0
	IPP	Coal	617,478	633,051	638,397	633,720	622,311	661,499	295,065	0	0	0	0	0
	IPP Repower	Natural Gas	0	0	0	0	0	0	152,887	297,764	143,993	0	0	0
	Palo Verde	Nuclear	92,969	93,048	92,691	92,542	93,255	93,101	93,276	92,599	95,043	93,089	93,523	95,218
	Hoover	Large Hydro.	30,005	30,002	30,005	30,005	30,005	30,002	30,005	30,005	30,005	30,002	30,005	30,005
	Summer Ultra Low Carbon		0	0	0	0	0	0	102,800	104,000	104,000	103,200	102,000	103,200
RPS resources	**Salton Sea 5**	Geothermal	322,932	120,810	0	0	0	0	0	0	0	0	0	0
	Salton Sea 5 Incr.	Geothermal	11,983	4,486	0	0	0	0	0	0	0	0	0	0
	CalEnergy	Geothermal	308,850	521,640	650,317	651,369	649,688	651,245	647,973	649,466	648,531	648,911	647,811	647,675
	Wintec	Wind	0	0	0	0	0	0	0	0	0	0	0	0
	WKN	Wind	21,519	21,519	21,519	21,519	22,862	21,519	21,519	21,519	21,519	21,519	21,519	21,519
	AP Northlake	Solar PV	49,348	48,993	48,638	48,282	47,927	47,571	47,216	46,860	46,505	46,150	45,794	45,439
	Antelope Big Sky	Solar PV	24,286	24,164	24,043	23,923	23,803	23,684	23,566	23,448	23,331	23,214	23,098	22,983
	Summer Solar	Solar PV	24,286	24,164	24,043	23,923	23,803	23,684	23,566	23,448	23,331	23,214	23,098	22,983
	Kingbird B	Solar PV	41,233	41,026	40,817	40,609	40,400	40,193	39,984	39,776	39,567	39,360	39,151	38,943
	Columbia II	Solar PV	32,938	32,773	32,609	32,446	32,284	32,123	31,962	31,802	31,643	31,485	31,328	31,171
	Cabazon	Wind	71,220	71,395	71,220	71,220	71,220	71,395	0	0	0	0	0	0
	Tequesquite	Solar PV	15,752	15,705	15,595	15,517	15,440	15,394	15,286	15,209	15,133	15,088	14,982	14,907
	Antelope DSR 1	Solar PV	70,507	70,155	69,804	69,455	69,108	68,762	68,418	68,077	67,736	67,397	67,060	66,725
	ARP Loyalton	Biofuels	6,326	6,346	6,323	6,320	1,565	0	0	0	0	0	0	0
	Solar + Storage	Solar PV	0	0	146,345	145,661	144,975	144,591	143,618	142,949	142,277	141,902	140,937	140,272
	Baseload Res.	Geothermal	0	0	0	0	0	0	0	0	298,064	298,295	297,144	296,610
	Cabazon Repower	Wind	0	0	0	0	0	0	71,395	71,395	71,395	71,395	71,395	71,395
Total Energy		N/A	2,314,846	2,345,840	2,366,855	2,393,686	2,422,473	2,458,738	2,484,436	2,516,884	2,550,641	2,589,565	2,622,243	2,660,184
Surplus/Shortfall		N/A	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2019 IRP filing Energy Balance Table

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

		Technology	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Peak Demand			593	596	598	600	603	606	608	611	615	618	621	625
Planning Reserve Margin			89	89	90	90	90	91	91	92	92	93	93	94
Peak Procurement Requirement			682	685	688	690	693	696	700	703	707	711	715	719
Non-RPS Resources	**Riverside ERC**	Natural gas	194	194	194	194	194	194	194	194	194	194	194	194
Non-RPS Resources	**Clearwater**	Natural gas	28	28	28	28	28	28	28	28	28	28	28	28
Non-RPS Resources	**Springs**	Natural gas	36	36	36	36	36	36	36	36	36	0	0	0
Non-RPS Resources	**IPP**	Coal	136	136	136	136	136	136	0	0	0	0	0	0
Non-RPS Resources	**IPP Repower**	Natural gas	0	0	0	0	0	0	64	64	0	0	0	0
Non-RPS Resources	**Palo Verde**	Nuclear	12	12	12	12	12	12	12	12	12	12	12	12
Non-RPS Resources	**Hoover**	Large hydroelectric	24	24	24	24	24	24	24	24	24	24	24	24
Non-RPS Resources	**Summer Ultra Low Carbon Power Purchase**		0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**Salton Sea 5**	Geothermal	46	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**Salton Sea 5 Incremental**	Geothermal	0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**CalEnergy**	Geothermal	40	86	86	86	86	86	86	86	86	86	86	86
RPS resources	**Wintec**	Wind	0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**WKN**	Wind	0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**AP Northlake**	Solar PV	0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**Antelope Big Sky**	Solar PV	4	4	4	4	4	4	4	4	4	4	4	4
RPS resources	**Summer Solar**	Solar PV	4	4	4	4	4	4	4	4	4	4	4	4
RPS resources	**Kingbird B**	Solar PV	6	6	6	6	6	6	6	6	6	6	6	6
RPS resources	**Columbia II**	Solar PV	5	5	5	5	5	5	5	5	5	5	5	5
RPS resources	**Cabazon**	Wind	10	10	10	10	10	10	0	0	0	0	0	0
RPS resources	**Tequesquite**	Solar PV	3	3	3	3	3	3	3	3	3	3	3	3
RPS resources	**Antelope DSR 1**	Solar PV	10	10	10	10	10	10	10	10	10	10	10	10
RPS resources	**ARP Loyalton**	Biofuel	0	0	0	0	0	0	0	0	0	0	0	0
RPS resources	**Cabazon Repower**	Wind	0	0	0	0	0	0	10	10	10	10	10	10
RPS resources	**Solar + Storage**	Solar PV	0	0	18	18	18	18	18	18	18	18	18	18
RPS resources	**Baseload Resource**	Geothermal	0	0	0	0	0	0	0	0	40	40	40	40
Total Capacity Procured			**558**	**558**	**558**	**558**	**558**	**558**	**476**	**476**	**412**	**376**	**376**	**376**
Surplus/Shortfall			**(124)**	**(127)**	**(112)**	**(114)**	**(117)**	**(120)**	**(196)**	**(199)**	**(227)**	**(267)**	**(271)**	**(275)**

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2019 IRP filing Capacity Resource Accounting Table

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

	Fuel Type	GHG Intensity (MT CO_2e/ MWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
	NG	0.5131	39,166	39,928	43,101	45,774	47,598	48,534	48,336	50,989	54,198	58,179	59,703	
Clearwater	NG	0.5163	10,954	11,171	11,769	12,384	12,605	12,445	12,453	12,942	13,287	13,934	13,994	14,215
	NG	0.7443	1,012	1,037	1,064	1,107	1,219	1,222	1,305	1,233	1,451	0	0	
Intermountain Power Project	Coal	0.9160	565,595	579,859	584,756	580,472	570,021	605,917	270,272	0	0	0	0	0
	NG													
Net spot market/short-term purchases		0.428	202,993	207,918	148,224	159,449	177,632	177,043	237,891	313,486	263,309	340,234	355,183	368,453

Source: California Energy Commission, Energy Assessments Division, based on Riverside 2019 IRP filing Greenhouse Gas Emissions Accounting Table

RESOLUTION NO: 19-0814-6

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION FINDING RIVERSIDE PUBLIC UTILITIES INTEGRATED RESOURCE PLAN CONSISTENT WITH PUBLIC UTILITIES CODE SECTION 9621

WHEREAS, Public Utilities Code Sections 9621 and 9622 require specified local publicly owned electric utilities to adopt Integrated Resource Plans at least once every five years and submit them to the California Energy Commission; and

WHEREAS, Public Utilities Code Section 9622 requires that the California Energy Commission review the local publicly owned electric utilities' Integrated Resource Plans for consistency with the requirements of Section 9621, and to provide recommendations to correct deficiencies; and

WHEREAS, on December 18, 2018, Riverside Public Utilities (Riverside) submitted an Integrated Resource Plan and supporting documentation (the IRP Filing); and

WHEREAS, on January 3, 2019, the Energy Commission notified Riverside that the IRP Filing was complete, as described in the Publicly Owned Utilities' Integrated Resource Plan Guidelines adopted by the Energy Commission; and

WHEREAS, the Energy Commission posted the IRP Filing on its website for public comment and accepted comments for at least 30 days and did not receive any public comment; and

WHEREAS, on April 17, 2019, the Energy Commission Executive Director signed a letter informing the City of Anaheim that he had determined the IRP Filing is consistent with the requirements of Public Utilities Code Section 9621, which was posted on the Energy Commission website along with a supporting staff paper on April 17, 2019 for a 45 day comment period; and

WHEREAS, the Energy Commission received one comment from Anaheim clarifying the base year it used for energy efficiency estimates in the IRP Filing, in response to which the Energy Commission updated the staff report to reflect the appropriate base year for energy efficiency estimates; and

THEREFORE BE IT RESOLVED, that the Energy Commission adopts the determination of the Executive Director, that the IRP Filing is consistent with the requirements of Public Utilities Code Section 9621.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on August 14, 2019.

AYE: [List of Commissioners]
NAY: [List of Commissioners]
ABSENT: [List of Commissioners]
ABSTAIN: [List of Commissioners]

Cody Goldthrite
Secretariat