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STAFF REPORT

Review of Imperial Irrigation District 2024 Integrated Resource Plan

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California Energy Commission

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ABSTRACT

Senate Bill 350 (De León, Chapter 547, Statutes of 2015), established Public Utilities Code Section 9622, which 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. Imperial Irrigation District submitted its *2024 Integrated Resource Plan* and supplemental information for review on April 29, 2024. This staff paper presents the results of the Energy Commission staff review of the *Imperial Irrigation District 2024 Integrated Resource Plan*.

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

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EXECUTIVE SUMMARY

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

The *Imperial Irrigation District 2024 Integrated Resource Plan* serves as a comprehensive roadmap for guiding and informing the strategy for achieving ambitious green energy targets while maintaining reliable, affordable power for customers. To achieve this roadmap, Imperial Irrigation District focuses its plan on energy and capacity resource needs, policy goals, and physical and operational constraints.

Imperial Irrigation District planning goals are highlighted in three phases of modeling. The first phase establishes the capacity needs and the value of incremental generation to the system. This provides the inputs used in the capacity expansion model to ensure adequate new capacity is built to maintain a reliable system. The first phase also determines the effective load carrying capacity for intermittent resources. The second phase focuses on maintaining reliability. If any portfolio does not meet the reliability standards, a second iteration of capacity expansion and reliability must be performed, or the portfolio would not be considered. The final phase is production cost modeling. The outcome provides a demonstration of the portfolio's compliance with the Renewables Portfolio Standard, clean energy, and emissions requirement as well as rates and total system costs.

In reviewing the *Imperial Irrigation District 2024 Integrated Resource Plan* and determining consistency with the requirements of Public Utilities Code Section 9621, California Energy Commission staff relied on the four standardized reporting tables and narrative descriptions in the integrated resource plan filing, as well as analysis and verification of the materials submitted. Staff presents the following conclusions in accordance with the requirements:

- *Achieving Greenhouse Gas Emissions Targets and Renewables Portfolio Standard Requirements:* The utility plans to meet the greenhouse gas emission reduction requirements of Public Utilities Code Section 9621(b)(1), and the renewable energy procurement requirement of Public Utilities Code Section 9621(b)(2). Imperial Irrigation District plans on reducing greenhouse gas emissions by using customer side programs and procuring additional renewable energy resources. Further, greenhouse gas emission reductions can be realized through strategically located deployment of distributed energy resources on its electric system. This will allow Imperial Irrigation

District to incorporate additional levels of renewable energy, while lowering overall emissions and reliably serving projected load.

- *Meeting Planning Goals:* The utility intends to meet planning goals related to retail rates, reliability, transmission, and distribution systems as set forth in Public Utilities Code Section 9621(b)(3). Imperial Irrigation District forecasts their on-peak retail rates to decrease until the late 2030's as they procure the least cost resources, solar and energy storage, to meet their needs. Retail rates will then start to slightly increase as 2045 approaches with the addition of green hydrogen resources but then decrease as the technology becomes more available. Imperial Irrigation District's Transmission Planning assessment found the need to upgrade both the transmission and distribution networks as Coachella and Imperial Valley have many capacity issues. These network upgrades will increase reliability within the congested areas.
- *Considering Peak Needs:* The utility uses efficient, low-cost hydroelectric facilities, steam-generation facilities, as well as several natural gas turbines to ensure the utility's energy and reliability needs are met during peak hours as set forth in Public Utilities Code Section 9621(c). Imperial Irrigation District uses California Energy Commission's demand forecast for their peak electrical demand. In 2023, Imperial Irrigation District's peak electrical demand was 1,152 megawatts, which makes it the sixth-largest utility in California. The 2023 peak demand increased 5.7 percent over the 2022 peak demand of 1,090 megawatts. Retail sales are concentrated in the residential and commercial sectors with a small percentage of sales within the industrial sector.
- *Addressing Resource Procurement Types:* 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 Public Utilities Code Section 9621(d). Imperial Irrigation District's implementation of energy efficiency and demand response has realized 35 gigawatt-hours of verified net savings with an additional 27 gigawatt-hours of anticipated savings by 2030. The first year that new resources are planned to be added to Imperial Irrigation District's portfolio is 2027. The Imperial Irrigation District plans for approximately 100 megawatts of in-state wind, 70 megawatts of solar, 250 megawatts of 4-hour storage capacity, and 110 MW of reciprocating internal combustion engine thermal units. These new resources, especially the storage and thermal generation capacity, will help Imperial Irrigation District establish an adequate resource portfolio. Imperial Irrigation District also has transportation rate design, currently limited to residential customers, but may include commercial customers in the future. Electric vehicle programs are also available to further incentivize adoption of electric vehicles.

CHAPTER 1:
Demand Forecast and Procurement

Introduction

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires publicly owned utilities (POU) with an annual electrical demand exceeding 700-gigawatt hours (GWh) to develop integrated resource plans (IRPs) (California Public Utilities Code (PUC) Section 9621). IRPs are electricity system planning documents that describe how utilities plan to meet their energy and capacity resource needs while achieving policy goals and mandates, meeting physical and operational constraints, and fulfilling other priorities such as reducing impacts on customer rates. SB 350 requires the governing board of a POU to adopt an IRP and a process for updating it at least once every five years by January 1, 2019.[1] Imperial Irrigation District (IID) filed the initial IID IRP with the CEC in 2019, which was found to be consistent with SB 350 and the requirements of PUC Section 9621.

PUC Section 9622 requires the California Energy Commission (CEC) to review POU IRPs to ensure they achieve PUC Section 9621 provisions. If the CEC determines an IRP is inconsistent with the requirements of PUC Section 9621, the CEC shall provide recommendations to correct the deficiencies. The CEC adopted the *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines* (*Guidelines*) to govern the submission of the POU's IRPs.[2]

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

Imperial Irrigation District

IID is a POU in southeastern California, serving most of Imperial County and parts of Riverside and San Diego Counties, as shown in Figure 1. IID serves approximately 164,000 customers across the residential, commercial and industrial sectors. This includes 140,906 residential customers, 21,868 commercial customers, and 805 industrial customers. IID is the state's sixth-largest utility by peak demand, which is approximately 1,150 MW, and averages electric

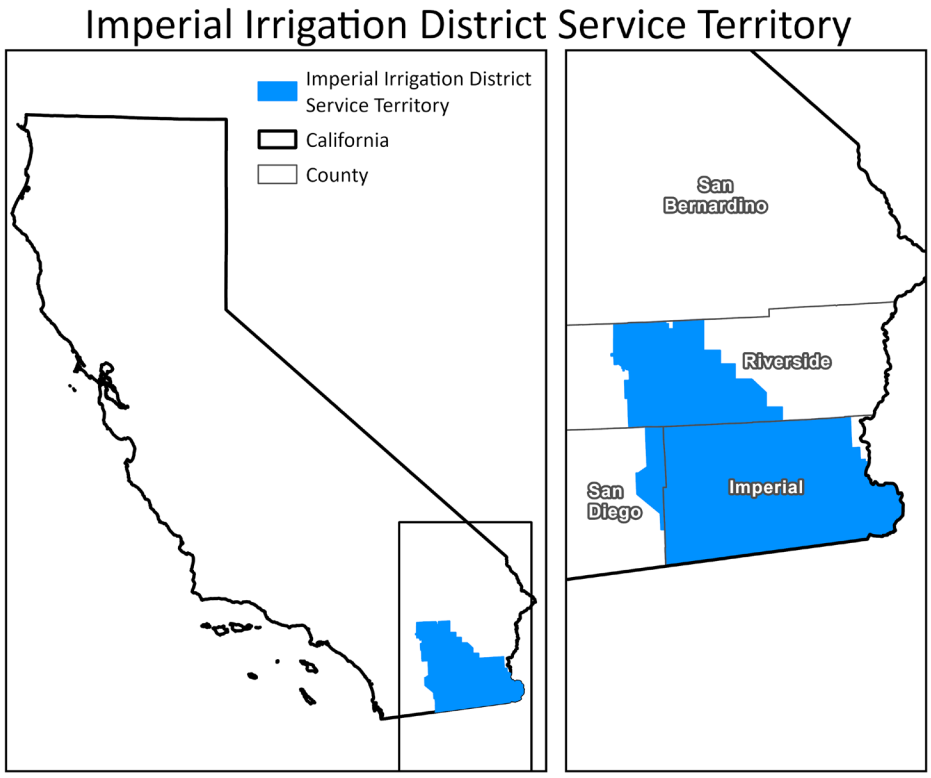
1 Public Utilities Code Article 16 (commencing with Section 399.11) of Chapter 2.3 of Part 1 of Division 1, https://law.justia.com/codes/california/code-puc/division-1/part-1/chapter-2-3/article-16/section-399-11/.

2 Vidaver, David, Melissa Jones, Paul Deaver, and Robert Kennedy. October 2018. *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines - Revised Second Edition (Chapter 2.E.1).* California Energy Commission. Publication Number: CEC-200-2018-004-CMF. https://efiling.energy.ca.gov/GetDocument.aspx?tn=224889&DocumentContentId=55481.

sales of about 3,400 GWh annually. In 2023, energy sales totaled approximately 3,422 gigawatt hours, a decrease of about 5 percent over 2022 sales. The retail sales are concentrated in the residential and commercial sectors of approximately 51 percent and 44 percent, respectively.

The *Imperial Irrigation District 2024 Integrated Resource Plans (IID 2024 IRP)* includes IID's most recent update to its renewable energy resource procurement plan. This is in accordance with the 60 percent renewable energy by 2030 target established in 2018 through Senate Bill 100 (De León, Chapter 312, Statutes of 2018), which is measured as a percentage of retail sales. Subsequently, IID plans to target 90 percent renewable retail sales by 2035, 95 percent by 2040, and 100 percent by 2045.

Figure 1: Map of Imperial Irrigation District Service Territory



Source: CEC

IID Planning Process

The development of the *IID 2024 IRP* focused on three phases: capacity expansion modeling, reliability analysis, and production cost analysis. IID's focus was the baseline scenario, which was then compared to the following other nine scenarios (discussed in more detail below): Geothermal Focused, Solar Focused, Reduced Small Hydro, High Load, Low Load, Long Duration Storage, Accelerated Decarbonization, Delayed Solar Builds, and Regionalization. These scenarios are explained in the Resource Portfolio Evaluation section of this document.

IID contracted Ascend Analytics, which used the PowerSIMM stochastic modeling software to complete the three phases of the analysis. The first phase is defining IID's capacity needs and effective load carrying capability to access the value of potential resources. In the second phase, the capacity expansion model is run to select the least cost portfolio that meets IID's three sets of constraints. This includes meeting the planning reserve margin necessary to achieve a 1-day-in-10 year loss of load reliability standard, RPS energy and GHG targets. In the third phase, the production cost modeling simulates the hourly operation of IID's system and provides insights into the energy mix, emissions, and costs of the selected portfolio.

Energy and Peak Demand Forecast, Method and Assumptions

The *Guidelines* 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] The *Guidelines* also state that the POU must provide information on the method used in developing the demand forecast if a POU uses a forecast other than the CEC's adopted demand forecast.[4] The demand forecast and supporting information provided present an adequate representation of future energy and peak demand that meets the *Guidelines* requirements.

CEC releases their California Energy Demand forecasts every year as part of the Integrated Energy Policy Report (IEPR). The CEC releases a full demand forecast every two years and an update in the interim years as part of the IEPR. All demand forecasts, for both energy and peak load, were extrapolated through 2045 using Microsoft Excel's forecast function, which is specifically designed for forecasting time series data trends.

IID used the CEC 2021 IEPR demand forecast for its expected high and low case as it was the most recent demand forecast that provided low and high demand scenarios. For its Baseline scenario, IID used the CEC 2022 IEPR mid case demand forecast. The most recent CEC 2023 IEPR demand forecast at the time of the analysis, projects a low of 1,149 MW and high of 1,191 MW peak demand for 2030 for IID. As such, CEC staff find the IID demand forecast of 1,175 MW to be in the acceptable range.

Resource Procurement Plan

The POU IRP Guidelines require that POUs report the mix of resources they plan to use to meet demand through 2030.[5] POUs are also required to provide an IRP with data and supporting information sufficient to demonstrate that the POUs' plan to meet the various

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

4 Given the timing of these POU IRP submittals the adopted forecast vintage is the 2022 CED Update. "California Energy Demand Update, 2022-2035," https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2022-integrated-energy-policy-report-update-2.

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

targets and goals. Staff has determined that *IID 2024 IRP* filing meets these requirements. The following is a discussion of the utility's existing resources, procurement strategy, the portfolio analysis underlying resource selections, and the resources in 2030 identified in the standardized reporting tables.

Existing Resources

IID owns existing resources including natural gas, battery storage, solar, and hydroelectric facilities totaling 571 MW. IID existing natural gas fired generators include Coachella (73 MW), El Centro (302 MW), Yucca (18 MW), Niland (87 MW), and Rockwood (40 MW). IID also owns a 20 MW battery energy storage system, one small hydroelectric facility (22 MW), and two solar energy facilities totaling 9 MW. In addition, IID has long term contracts of resources including large hydroelectric, nuclear, storage, solar, biofuels, geothermal, and small hydroelectric facilities totaling 240 MW. In 2023, thermal generation comprises the largest portion of IID's energy supply at 63 percent. The percentages of energy supplied from other resources are 18 percent solar, 10 percent hydroelectric, 6 percent geothermal, 2 percent biomass, and 1 percent nuclear. IID has a small entitlement through Southern California Public Power Authority of capacity in each of the three units at the Palo Verde Nuclear Generating Station. Each unit from the nuclear generating station provides approximately 5 MW of capacity within IID's resource portfolio.

Resource Portfolio Evaluation

IID's goal is to optimize the resource mix to meet demand while maintaining affordable rates, high reliability, and using sustainable resources. Historically, IID's generation portfolio has comprised a diverse mix of generation and storage. Currently, IID meets its demand by relying on market purchases, which may be unreliable because of volatility and price escalations. By 2030, IID expects to have 22 percent of energy delivered through spot market purchases. IID is currently short in capacity to meet demand between the months of June and September. As 2035 approaches, the capacity shortage is forecast to expand between April and October.

IID primarily considered the baseline portfolio for the *IID 2023 IRP* in addition to nine alternative scenarios.

- Geothermal-Focused: RPS-eligible geothermal resources available within IID's service territory is considered in place of wind resources.
- Solar-Focused: Removes both wind and geothermal as candidate resources in the capacity expansion model, leaving solar as the predominant RPS option. Near term, this scenario is realistic with limited availability of wind and geothermal resources.
- Reduced Small Hydro: Limited water availability causes generation to decrease to almost zero after 2030. This scenario shows the upper bound on how the capacity build-out would need to adjust to make up for the loss of RPS-eligible small hydro resources in IID's portfolio, which accounts for approximately 0.235 MW of capacity.

- High Load: Uses CEC 2021 IEPR high load case forecast, where additional capacity is needed to satisfy the capacity and energy constraints imposed on the resource selection optimization.
- Low Load: Uses CEC 2021 IEPR low load case forecast, where reduced future demand growth means that fewer resources are needed to satisfy capacity and energy constraints.
- Long Duration Storage: Considers the potential benefit of generic seasonal or long duration storage. This scenario is aimed at addressing the risk of overgeneration focusing on sizing, duration, and round-trip efficiency.
- Accelerated Decarbonization: Considers what it would take to reach 100 percent RPS generation by 2035. This is similar to the baseline scenario as both value reaching the RPS goal early due to assumed lower solar power purchase agreement (PPA) prices in the early to mid 2030s.
- Delayed Solar Builds: Delays builds of solar resources until the last possible year to satisfy the RPS and zero-carbon targets. This model would not be able to take advantage of procuring cheaper solar PPAs available in earlier years, causing slightly higher total costs.
- Regionalization: Assumes IID participates in the California ISO extended day-ahead market and energy imbalance markets or the Southwest Power Pool markets. In this scenario California ISO or Southwest Power Pool is responsible for balancing by January 1, 2035 and IID's supply portfolio is then dispatched economically from that point forward.

IID used the PowerSIMM Automatic Resource Selection (ARS) module to evaluate the performance portfolio of existing resources and candidate resources across a range of future operating conditions to assess their likely revenues, costs, and other characteristics. Starting in 2027, IID plans to add additional 8-hour storage units, 4-hour storage units, reciprocating internal combustion engine units, as well as new solar and geothermal units for a total of 442 MW. In 2030, IID plans to have 1,253 MW of peak dependable capacity with a shortfall of 99 MW when considering a 15 percent planning reserve margin.

The results of IID's capacity expansion modeling and production cost analysis of the baseline scenario and nine alternative scenarios yielded commonalities and differences. Across all scenarios, solar is responsible for most of the renewable energy generation to satisfy the RPS and carbon reduction goals. Since IID plans to largely rely on solar for RPS and carbon reductions, IID plans to focus the rest of the portfolio a diversifying the generation and capacity mix to provide system reliability. Two capacity resources that appear consistently across all scenarios were the addition of reciprocating internal combustion engine thermal units for initial capacity near-term, followed by increased energy storage in the intermediate and long-term. These resources would contribute the necessary capacity to support IID's reliability during the summer and provide ancillary services for IID to utilize in its role as a balancing authority.

IID's small-scale hydroelectric units on the canal system currently provide modest contributions, but concerns about their age, water availability, and the necessary investment to rehabilitate their turbines makes the units unsuitable as RPS-eligible resources. IID has contracted several nearby geothermal resources that supply steady RPS-eligible power to IID. Wind and additional geothermal resources were considered, but IID will continue to explore more procurement opportunities as projects become available.

IID recommends pursuing the geothermal heavy scenario as the recommended scenario for this IRP cycle. This scenario was chosen as IID would not need to rely on procuring California wind resources. In recent years, load serving entities have had a difficult time procuring in-state wind resources. If in-state wind resources become more available for IID, they would strongly consider procuring California wind resources. The other reason IID recommends the geothermal heavy scenario is the lower cost relative to other scenarios.

Procurement Strategy

IID currently has a variety of resources and is meeting its renewable energy and emissions goals, but it is also clear that IID is projected to be short in capacity and energy over the next few years. IID is planning to pursue their Geothermal-Focused scenario while being flexible in their procurement approach by adding low-cost wind resources as they become available.

Before summer of 2026, IID will need to procure approximately 180 MW via a PPA. At the same time, IID is cognizant that it needs to consider the emissions of resources within its portfolio to minimize the economic impact of exceeding allowed emissions. IID will need an additional 50 MW of renewable energy between the months of June and September in 2026. By procuring these resources, IID will be able to support meeting peak load while generating renewable energy certificates for their renewable portfolio and reducing fossil fuel generation

By 2027, IID will need about 160 MW/640 MWh of storage between the months of April and October. IID plans to procure a combination of 4-hour storage by 2027 and 8-hour storage beyond 2030 to ensure IID continues to operate reliably without having to rely on fossil-fuel resources. The additional storage would allow IID to shape the renewable capacity coverage for the hours it is short, which are 11:00 to 22:00. The energy storage would help cover the most expensive market hours, reduce market exposure, and increase reliability for IID. Additionally, IID plans to procure reciprocating internal combustion engine natural gas units to provide more firm capacity starting in 2027.

Given the reliability and ancillary service needs imposed by operating a balancing authority, IID is in need of modernization, or repowering/replacing existing fossil fuel generation with generators with operational flexibility, low emissions, competitive heat rates, and enough dispatchability that would allow additional renewables integration. IID acknowledges their capacity shortfall and continues to be an active participant in the spot market to fulfill their needs.

CHAPTER 2:
Review for Consistency With PUC Section 9621 Requirements

This chapter summarizes the main elements of the *IID 2024 IRP* and provides staff's findings regarding the consistency of the IRP filing with PUC Section 9621 requirements, as well as the *Guidelines*. These findings include whether the utility meets GHG emission reduction targets and RPS energy procurement requirements, as well as planning goals for retail rates, reliability, transmission and distribution systems, net load, and disadvantaged communities. In addition, the IRP must address procurement of energy efficiency and demand response, energy storage, transportation electrification and portfolio diversification.

Greenhouse Gas Emission Reduction Targets

POUs are required to meet the GHG targets established by the CARB, in coordination with the CEC and CPUC.[6] The initial GHG targets set by CARB reflect the electricity sector's percentage in achieving the economy wide GHG emission reductions of 40 percent from 1990 levels by 2030. Staff finds that IID plans to achieve the established GHG emission target range of 30-53 million metric tons of carbon dioxide equivalent (MMT CO_2e) published in the *SB 350 IRP Electric Sector GHG Planning Targets: 2020 Update (2020 CARB Update)*. The IID preferred resource portfolio results are in compliance with the requirement of PUC Section 9621(b)(1).

In 2023, the electricity sector GHG planning target range was brought into alignment with CARB's *2022 Scoping Plan for Achieving Carbon Neutrality* adopted in September 2023 (*2023 CARB Update*).[14] The electricity sector GHG planning target range retains the lower bound of 30 $MMTCO_2e$ from the *2020 CARB Update* but reduces the upper bound from 53 to 38 $MMTCO_2e$.

CEC staff reviewed the GHG emissions associated with IIDs preferred portfolio of resources in 2030 and independently assessed the emission factors associated with various resources in IID's portfolio to ensure consistency with other data available. The IRP preferred portfolio will allow IID to meet the target range under its utility-specific *2020 CARB Update* GHG target of 524,000 – 925,000 $MTCO_2e$, but does not meet the *2023 CARB Update* target of 524,000 – 663,000 $MTCO_2e$. It is important to note that IID's analysis was performed prior to the finalized release of the *2023 CARB Update* targets, and as such is being evaluated for compliance to the then-published *2020 CARB Update* targets.

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6 Public Utilities Code Section 9621(b)(1), https://codes.findlaw.com/ca/public-utilities-code/puc-sect-9621/.

IID's preferred portfolio results in 673,116 $MTCO_2e$, consistent with the requirement of PUC Section 9621(b)(1). Table 1 shows GHG emissions for IID's preferred portfolio of resources in 2023, 2025, and 2030.

Table 1: Greenhouse Gas Emissions from IID Resources Portfolio

	Fuel Type	GHG Intensity ($MTCO_2e$ per MWh)	Total Emissions ($MTCO_2e$) 2023	Total Emissions ($MTCO_2e$) 2025	Total Emissions ($MTCO_2e$) 2030
Coachella 1	Natural Gas	0.600	1,175	585	138
Coachella 2	Natural Gas	0.599	94	608	146
Coachella 3	Natural Gas	0.599	775	571	138
Coachella 4	Natural Gas	0.599	2,648	552	133
El Centro 2	Natural Gas	0.502	117,100	115,831	78,964
El Centro 3	Natural Gas	0.409	297,079	244,155	137,669
El Centro 4	Natural Gas	0.635	95,931	54,795	0
Niland 1	Natural Gas	0.528	27,173	22,063	6,489
Niland 2	Natural Gas	0.719	27,670	29,310	19,162
Rockwood 1	Natural Gas	0.884	542	2,132	162
Rockwood 2	Natural Gas	0.884	379	410	26
Mobile APR Units	Natural Gas	0.006	0	2,385	0
New RICE Units	Natural Gas	NA	NA	NA	19,421
Net Spot market purchases (sales)	NA	0.428	423,905	318,120	411,136
Total Portfolio emissions	**NA**	**NA**	**994,470**	**791,516**	**673,116**

Source: CEC, Energy Assessments Division, Based on IID 2024 IRP filing

Renewables Portfolio Standard Planning Requirements

PUC Section 9621(b)(2), as established by SB 350, requires that POU IRPs ensure procurement of at least 50 percent renewable energy resources by 2030, consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3. In 2018, SB 100 increased the RPS requirement for 2030 from 50 to 60 percent.[7]

IID's renewable procurement plans include additions of new solar, new 4-hour and 8-hour battery storage, and natural gas reciprocating internal combustion engine units. IID

7 Public Resources Code Section 399.11(a).

anticipates that RPS-eligible renewables will account for 60 percent of retail sales in 2030, in compliance with RPS target of 60 percent in 2030.

Staff reviewed the renewable procurement table, the discussion in the IRP filing, and the renewable procurement plan submitted and finds that IID's plans are consistent with the RPS procurement requirements and all interim compliance periods, as well as the requirements of PUC Section 9621(b)(2).

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, minimizing impacts to ratepayer bills. Staff reviewed the analysis and information IID presented in its IRP filing on the rate and bill impacts from different resource portfolios they evaluated. Staff finds the IID IRP is consistent with the rates discussion, as required in PUC Section 9621(b)(3).

IID produces power locally when feasible using efficient, low-cost hydroelectric facilities, steam-generation facilities, as well as several natural gas turbines. By doing so, IID can meet demand at the best possible rates. IID procures as many renewable resources as possible to meet the RPS goals. IID's diverse portfolio provides customers with some of the lowest cost rates in Southern California and this standard of quality service is the focal point of IID's future plans.

IID has emphasized their effort to keep the rates as low as possible. Their base rate has not increased in several years. Potential impacts on rates IID foresees are transportation electrification, new clean energy technology, and future city infrastructure development.

System and Local Reliability

SB 350 requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.[8] Staff reviewed the IID 2024 IRP filing capacity reporting table and discussion and finds that IID has planned for sufficient resources to maintain a reliable electric system. In addition, IID's selected portfolio of resources contains sufficient capacity to meet anticipated resource adequacy requirements in 2030. Staff finds this IRP is consistent with the SB 350 reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Section 9621(d)(1)(E).

System Reliability

IID uses a mix of its owned and contracted resources to meet IID's system resource adequacy obligations. These resources include both renewable and conventional generation within the

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

state and imported into IID's balancing authority. IID plans to make capacity purchases from the spot market to meets the system capacity requirement for resource adequacy from 2023 to 2042.

IID plans to meet electricity demand by following federal, state, and North American Electric Reliability Corporation requirements and standards for reliability and operations as a member of the Western Electric Coordinating Council. IID plans to meet 1-in-2 peak load conditions, plus a 15 percent planning reserve margin.

Local Capacity Needs

The IID system area consistently experiences potential thermal overloads during high-demand summer months when PV generation decreases while system load remains high, which requires the start-up of generation in the Coachella Valley area. This issue becomes apparent on high-demand days during the summer months, particularly during the intermediate hours when PV generation diminishes while system load remains high. IID system operations run 10-40 MW of gas turbines for one to three hours to mitigate this issue. One contingency scenario involves the overloading of the 92 kV CL line, which subsequently overloads the 92 kV CN line. Because the 92 kV CL line runs parallel with the 92 kV CN line, the overloading of one line will burden the other. To mitigate this issue, IID runs gas turbines that are physically closer to the load to alleviate the energy required from the lines. The overload has been documented in the North American Electric Reliability Corporation's transmission planning studies with a recommendation to reconductor the CN and CL lines.

Another challenge in the Coachella Valley area involves an N-2 contingency scenario where the loss of the 92 kV CD and CS lines results in overloads at the remaining terminal end of the loops. The potential overloads are seen during peak load days. The only cost-effective solution to alleviate the potential overloads is system load shedding. The use of battery storage to manage load is suggested as a cost-effective mitigation strategy.

Flexible Capacity Needs

IID has mostly natural gas resources for flexible capacity. Additionally, IID's El Centro Battery Energy Storage System reduces the volatility of impact from intermittent resources. On average between 2017 and 2030, IID has a shortfall of 281 MW and requires making additional market purchases to meet its resource requirements. IID is aware of its own capacity needs and is planning to procure and install renewable resources starting in 2027 and additional procurement beyond 2030. Additionally, IID plans to install their natural gas-fired reciprocating internal combustion engine resources as a cost-effective near-term solution for addressing their capacity needs as a dispatchable peaking resource.

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, as further specified in PUC Section

454.52(a)(1)(G). Staff finds the IRP to be consistent with these requirements as IID plans to maintain and enhance its transmission and distribution systems to adequately deliver resources to its service area.

Transmission System

IID's transmission and sub transmission system includes approximately 1,800 miles of overhead transmission lines. Their transmission system includes:

- 92 kV lines that are constantly being constructed and upgraded to provide transformation capacity to the distribution system.
- 161 kV lines which have been meeting the load serving requirements of the IID for over 50 years.
- 230 kV lines connecting IID to San Diego Gas & Electric and Southern California Edison through two separate circuit lines.
- 500 kV lines which connect to a major wholesale electric trading hub.

IID's transmission resources will require the following from the annual Transmission Planning assessment:

- 230kV Ramon – Mirage #2: A new 230 kV transmission circuit between IID's Ramon Substation and SCE's Mirage Substation. A second circuit increases resiliency of the system.
- 92kV CN and CL upgrade: Reconstructing approximately five circuit miles of wooden poles, the reinforcement of one mile of existing double circuit lattice towers, and the installation of 3.5 miles of fiber optic cable.
- 92kV Grapefruit Switching Station: Design and construction of a new switching station, rerouting six transmission lines from the Coachella Switching Station to the new switching station, functionally replacing the Coachella Switching Station.
- Ave 52 Capacitor Bank: This 92kV capacitor bank was found to be a necessary system upgrade showing voltage issues during contingency analysis.
- 92kV El Centro Switching Station breaker replacement: Most breakers were found to be overburdened at El Centro Switching Station during the short circuit portion and will need to be replaced.
- Spare 230kV:92kV transformer: IID is currently holding a transformer in stock as required by the spare equipment strategy simulations.
- El Centro Steam Plant Unit 2-2 and generator step-up transformer redundant protection upgrade: Lacks redundant protection systems and has already finished upgrading.

Network upgrades triggered by the interconnection of merchant generation into IID's Balancing Authority include:

- 230kV S-line upgrade: Resulted from an agreement between the California ISO and IID. Upgrades of 18.6 miles from El Centro Switching Station to the Imperial Valley Substation.
- 230kV El Centro Switching Station Bank #5: A new 230:92kV transformer to be installed in parallel to the Bank 4 at El Centro Switching Station. The installation would increase the total transfer capability on the new S-line as well as increase system reliability.
- New 230kV Salton Sea Transmission Line: Interconnecting three new geothermal plants in Calipatria, CA with a combined output of approximately 350 MW to IID's balancing authority via a new collector station and a new 230kV line between customer facilities to IID infrastructure.
- 92kV R-line upgrade: This project will upgrade approximately 33.8 miles between Dixieland to Anza Substation with a new conductor line.

Other projects IID is considering for economic and reliability benefits include:

- North Gila – Imperial Valley #2: An 85-mile 500kV transmission line from the North Gila facility to the Imperial Valley facility. The line is to run parallel to the existing 500kV NGIV line to provide redundancy and relieving congestion issues. Historically, there has limited the operation of the Desert Southwest transmission system.
- 92kV K-line Hardening: Storm hardening 28 miles of the 92kV K-line between the Niland Substation and the Mecca Substation. This upgrade will mitigate the effects of significant outages from extreme climate events and add new breakers to allow for the isolation of outages.

Distribution System

The IID distribution system includes 4,404 miles of overhead lines and 1,744 miles of underground lines. The Coachella Valley area has received many developer requests for residential, commercial, industrial, cannabis, resort, and entertainment projects. The forecasted load of 816 megavolt-amps will require the construction of 14 new capacitor bank additions and 22 new substations within the next 10-20 years as outlined in the *10 Year Coachella Valley Expansion Plan*.

The Coachella Valley area is experiencing challenges that stem from new loading requirements, in addition to the standard project development load including:

- High number of 1-2 MW EV charging stations requests.
- Microgrid installations which caused IID to revise its Interconnection Guidelines.
- Long-term impacts on substation and feeder capacity by fleet electrification and EV charging stations. Also, the incorporation of extra capacity needed as part of the *10 Year Coachella Valley Expansion Plan*.

The Imperial Valley has a significant number of potential customers seeking interconnection at the transmission level that are load-only entities. Customers that are load-only entities will only

consume electricity and will not be producing electricity back to the transmission grid. There is a newly formed group known as the Transmission Customer Service Proposal responsible for handling the administrative aspects of interconnection. The projected load of these customers ranges from 25 MW to 40 MW and new substations will be required as this demand exceeds current distribution capacity.

IID's advanced metering infrastructure is an ongoing effort. After implementation, IID will be able to collect data at the customer and panel level, including demand, voltage, power factor, and billing data. This information will allow IID to perform distribution system planning analysis to get more accurate loading forecast and distribution management.

Disadvantaged Communities and Localized Air Pollutants

IID is making efforts to keep rates affordable and reliable while procuring resources with less emissions and geographically dispersed, consistent with the statutory requirements of Public Utilities Code Section 454.52 (a)(1)(I). Staff reviewed the *IID 2024 IRP* filing to determine the extent to which it minimizes local air pollutants with a priority placed on disadvantaged communities.

IID closely follows state mandates to help minimize local air pollutants and allows IID to prioritize their disadvantaged communities.

Assembly Bill 617 (Garcia, Chapter 136, Statutes of 2017) has five central components requiring:

- Community-level air monitoring
- A state strategy and community specific emission reduction plans
- Accelerated review of retrofit pollution control technologies on industrial facilities subject to Cap-and-Trade
- Enhanced emission reporting requirements
- Increased penalty provisions for polluters

Senate Bill 535 (De León, Chapter 830, Statutes of 2012) requiring the California Environmental Protection Agency to identify disadvantaged communities for investment opportunities. SB 535 designates four categories of geographic areas as disadvantaged communities, which are:

- Census tracts in the highest 25 percent of overall scores in CalEnviroScreen 4.0
- Census tracts lacking overall scores due to data gaps but falling within the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores.
- Census Tracts identified as disadvantaged in California Environmental Protection Agency's 2017 SB 535, regardless of the communities' scores in CalEnviroScreen 4.0
- Lands under the control of federally recognized tribes.

A large portion of the IID territory is considered disadvantage. IID is developing and studying an energy and capacity portfolio that is not only affordable and reliable but helps meet the load projections including the planning reserve margins. The dispatchable technologies included in the IRP study are flexible from an operational standpoint, have less emissions, are geographically dispersed, and will allow IID to incorporate additional levels of renewable energy while lowering overall emission and reliably serving projected loads.

El Centro Generating Station is a major component of IID's thermal generation portfolio, operating as intermediate-duty generation within IID's power resources. El Centro Generating Station's water discharge is regulated by the California Regional Water Control Board. Wastewater discharge from El Centro Generating Station is a concern within the disadvantaged communities due to possible non-compliance issues along with stricter National Pollution Discharge Elimination System permit requirements. IID is developing project alternatives to address treatment and reuse of wastewater generated as part of electrical power generation operations. The primary project goal will involve eliminating surface water discharge and approaching a zero liquid discharge facility via the construction of evaporation ponds.

Net Energy Demand in Peak Hours

Senate Bill 338 (Skinner, Chapter 389, Statutes of 2017) requires POUs to consider existing renewable generation portfolio, grid operation efficiency, energy storage, distributed energy resources, and energy reduction measures (such as energy efficiency and demand response) to reduce the need for new or additional gas-fired generation and distribution and transmission resources (PUC Section 9621(c)). IID's IRP includes a discussion of how it considers preferred resources to meet peak demand when selecting resources for its portfolio and is consistent with the requirement set forth above. IID procures resources to meet 115 percent of its forecasted peak demand for each month to ensure that more than sufficient resources are available to meet customer loads. Historically, IID has had to make additional spot market purchases to meet customer loads. IID forecasts that additional spot market purchases will be required to continue meeting customer loads.

IID's portfolio will incorporate battery energy storage to be a hedge to solar volatility. This will allow IID to store excess energy during the day and use during evening hours as solar generation drops off to augment electrical peak demand reliability on the grid. IID is planning to install 4-hour energy storage resources by 2027 initially and 8-hour energy storage resources or longer beyond 2030 to ensure that IID continues to operate reliably without having to rely on its aging fossil generator fleet.

Additional Procurement Goals

PUC Section 9621(d)(1) requires filing POUs to address procurement of energy efficiency and demand response, energy storage, transportation electrification, and a diversified portfolio, which are discussed in the next section. The resource adequacy provisions of this code section are discussed in system reliability section above.

Energy Efficiency and Demand Response Resources

Staff finds that IID's IRP is consistent with the requirement in PUC Section 9621(d)(1)(A) as it includes a discussion of energy efficiency and demand response programs it plans to implement and quantifies the amount of energy efficiency savings it plans to achieve.

IID demonstrates their commitment to reduce carbon emissions as they integrate energy efficiency (EE) and demand response (DR) opportunities in their forecasting process. IID describes their goal to design and deliver programs that offer a range of cost-effective EE measures that benefit their customers, contribute towards achieving EE goals, and educate customers on emerging technologies.

The EE and DR programs IID offers to residential and commercial customers include:

- Residential Weatherization Program: Allows electric customers to receive up to $1,000 in recommended energy saving services and equipment for their residence. The program is open to all IID residential customers on a first-come, first-served basis. IID partners with a service provider that can evaluate and suggest a home's EE improvements.
- Custom Energy Solutions Program: Promotes EE by offering financial incentives to commercial customers who install EE equipment. Measures incentivized include interior and exterior lighting, process loads, and HVAC/refrigeration. IID offers technical expertise to assist customers in identifying EE measures and cost saving opportunities.
- Keep Your Cool Program: Provides EE refrigeration measures for non-residential facilities such as schools and grocery stores. This program offers commercial account customers direct installation refrigeration measures, which fall into three categories. These categories are measures that reduce air leakage from cooled spaces, higher efficiency equipment, and equipment controls.
- Quality AC Tune-Up Program: Allows small commercial account customers to receive HVAC services which include duct test and seal and/or a refrigerant charge adjustment, with inspection of all electrical connections; and tightening, inspection of all moving parts and lubrication, inspection of condensate drain, inspection of system controls and thermostat setting, as well as cleaning of evaporator and condenser air conditioning coils.
- Green Grants Program: Offered to non-profit organizations located in IID's service area. Funding is limited to EE and load management upgrades and investments in renewable resources that are not covered under any other existing public benefit program offered by IID.
- Tree for All Program: Provides customers with a free shade tree planted to maximize energy savings.
- Energy Rewards Rebate Program: Provides standardized incentives to both residential and non-residential IID customers to implement energy-saving technologies in their

home and businesses. The program offers incentives for a variety of measures, including attic insulation, lighting, motors, and HVAC equipment.

Overall, the projects realized 92 percent of expected energy savings on a kW basis and a cumulative verified net savings of over 35 GWh. These well-established and popular EE programs have been operating for over a decade and regularly meet or exceed planned savings goals and enrollment expectations. By 2030, IID plans to reduce 13,167 MWh from programs and 13,793 MWh from codes and standards with a total reduction of 26,960 MWh.

IID currently offers interruptible high-voltage rates for its large commercial and industrial customers through Key Customer Demand Response Program. Developed in 2010, this program requires enrolled customers with onsite backup generation to curtail a minimum of 500 kW upon timed notice by IID. Failure to curtail contracted reduction will result in a financial penalty. This generation can be used to reduce load during times of system stress either due to transmission or generation curtailments or if load exceeds forecasted demand.

IID also offers the Emergency Summer Load Reduction Program, an incentive to commercial customers who participate in reducing energy consumption during peak demand hours. This helps reduce strain on the IID electric grid and minimize power shortages in the IID service area. Participation of this program is not automated, and participation is voluntary. Customers that participate will be compensated but there is no penalty for customers that do not participate in an event. Non-residential customers who have a monthly energy demand of 1,000 kW or greater are eligible to participate.

IID has demonstrated that they have made great progress towards the EE goal set forth within SB 350 and help achieve the doubling of statewide EE. IID has demonstrated throughout their IRP that they have many EE programs they offer to their customers and the same for DR programs.

Energy Storage

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

IID identified that energy storage will be a crucial factor in the future to meet local and state needs and requirements. Of the resources in consideration, 465 MW of energy storage is planned to be procured by 2030 with dispatchable short-term and long-term energy storage resources. Energy resources will help reduce the capacity shortfall in the system and helps meet the 60 percent RPS requirement in 2030. Current existing energy storage includes El Centro Battery Storage System, a 30 MW/20 MWh battery storage facility and solicited a contract from SunCode for a 30 MW/120 MWh BESS near Holtville.

Transportation Electrification

Staff finds that IID's IRP is consistent with the requirements of PUC Section 9621(b)(4) and (d)(1)(C) as it addresses transportation electrification, projecting for light-duty EV growth, and includes details of the utility's rate design, incentives, rebates to encourage transportation electrification, and customer education efforts.

IID will consider revising its current rate structure given the expected load growth and changes in power consumption profiles from transportation electrification. IID also considers CARB's Advanced Clean Cars scenarios, including EV sales trajectory from 2026 to 2035, but not to specific charger installations and registered EVs are not identified. IID also discussed how the increasing number of charging station installation requests will impact transmission and distribution planning challenges. The Imperial Valley area has potential clients seeking interconnection at the transmission level, particularly load-only entities like electrical commercial fleets. Ongoing implementation of IID's Advanced Metering Infrastructure will allow for additional data collection to determine distribution system planning.

IID has various transportation programs to incentivize the adoption of EVs:

- ReCharge incentive – $500 rebate to purchase and install level 2 home chargers for existing homes.
- Evolve platform – An online EV platform connecting IID customers with EVs, charging stations, and incentives. Incentives are not limited to only local, but statewide and national incentives as well as EV savings calculators.

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, and demand response products. Staff's review of IID's IRP and IID's standardized tables show that the mix of resources combined with modeling and reliability analyses include a diverse array of zero-emission resources, including biofuels, geothermal, solar, small hydro, and battery storage. IID's current portfolio heavily relies on thermal generation at 63 percent but is making an effort to procure more renewable generation and clean resources.

ABBREVIATIONS

Abbreviation	Term
IID	Imperial Irrigation District
IID 2024 IRP	*Imperial Irrigation District 2024 Integrated Resource Plan*
California ISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
EE	Energy Efficiency
EV	Electric vehicle
GHG	Greenhouse gas
GWh	Gigawatt-hours
IRP	Integrated resource plan
kV	kilovolt
MMTCO2e	Million metric tons of carbon dioxide equivalent
MTCO2e	Metric tons of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
POU	Publicly owned utility
PUC	Public Utilities Code
RPS	Renewables Portfolio Standard
SB 350	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)

APPENDIX A: Glossary

Term	Definition
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 Fuel Substitution	Energy demand from consumption changing from fossil fuels to electricity, such as building electrification, not yet considered committed but deemed likely to occur.
Behind-the-meter resources	Generation and storage located at the customer site. More generally, it can refer to any device located at the customer site that affects the consumption of grid-provided energy (appliance control systems, for example)
California Air Resources Board (CARB)	The "clean air agency" in California government. CARB's main goals include attaining and maintaining healthy air quality, protecting the public from exposure to toxic air contaminants, and providing innovative approaches for complying with air pollution rules and regulations.

Term	Definition
California Energy Commission (CEC)	The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's seven major areas of responsibilities are: • Forecasting statewide energy demand. • Licensing of power plants and transmission lines sufficient to meet those needs. • Promoting energy conservation and efficiency measures. • Promoting the development of renewable energy. • Promoting the transition to clean transportation fuels. • Investing in energy innovation. • Planning for and supporting the state's response to energy emergencies. Funding for the Commission's activities comes from the Energy Resources Program Account, Federal Petroleum Violation Escrow Account, and other sources.
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.
Demand response	Providing wholesale and retail electricity customers with the ability to choose to respond to time-based prices and other incentives by reducing or shifting electricity use, particularly during peak demand periods, so that changes in customer demand become a viable option for addressing pricing, system operations and reliability, infrastructure planning, operation and deferral, and other issues.
Distributed energy resources	Small-scale power generation technologies (typically in the range of 3 to 10,000 kilowatts) located close to where electricity is used (for example, a home or business) to provide an alternative to or an enhancement of the traditional electric power system.
Greenhouse gas (GHG)	Any gas that absorbs infra-red radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), halogenated fluorocarbons (HCFCs) , ozone (O3), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).

Term	Definition
Integrated Energy Policy Report (IEPR)	Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the Energy Commission to prepare a biennial integrated energy report. The report contains an integrated assessment of major energy trends and issues facing California's electricity, natural gas, and transportation fuel sectors. The report provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies, enhance the state's economy, and protect public health and safety.
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 Energy Commission, along with the standardized tables and supporting Information, by the filing POU or authorized representative.
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.
Public Utilities Code (PUC)	The set of laws that regulates public utilities in California, including natural gas, telecommunications, private energy producers, and municipal utility districts.
Renewable Portfolio Standard (RPS)	A regulation that requires a minimum procurement of energy from renewable resources, such as wind, solar, biomass, and geothermal.
Senate Bill 350 (De León, Chapter 547, Statutes of 2015)	Also known as the Clean Energy and Pollution Reduction Act, this bill established clean energy, clean air, and greenhouse gas reduction goals, including reducing greenhouse gas to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050. The California Energy Commission is working with other state agencies to implement the bill.
Standardized Tables	The four tables that are required with the IRP filing submitted to the Energy Commission. These tables include information and data necessary to help staff determine if the IRP is consistent with PUC Section 9621. The four standardized tables are Capacity Resource Accounting Table (CRAT), Energy Balance Table (EBT), Renewable Procurement Table (RPT), and Greenhouse Gas Emissions Accounting Table (GEAT).
Zero-emission resources	An engine, motor, process, or other energy source, that emits no waste products that pollute the environment or disrupt the climate.