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STAFF REPORT

Review of 2023 City of Roseville 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. The City of Roseville - Roseville Electric submitted its Integrated Resource Plan and supplemental information for review on January 6, 2024. This staff paper presents the results of the California Energy Commission staff review of the *2023 City of Roseville Integrated Resource Plan*.

Keywords: Publicly owned utility, integrated resource plan, City of Roseville, Roseville Electric, Roseville, 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 with an annual electrical demand exceeding 700 gigawatt-hours to adopt an integrated resource plan. Those plans must meet certain requirements, targets, and goals, including greenhouse gas emission reduction targets and renewable energy procurement requirements identified in Public Utilities Code (PUC) 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 and the targets and planning goals from 2018 to 2030. Under PUC Section 9622, the California Energy Commission must review the integrated resource plans for consistency with the requirements of PUC Section 9621.

The *2023 City of Roseville Integrated Resource Plan* serves as a framework for the utility's transition away from carbon resources, such as natural gas, to clean renewable resources. The utility's long-term strategy is to ensure a cost-effective, reliable, and sustainable power supply by procuring wind, geothermal, hydroelectric, and solar power. This is one of many portfolio scenarios studied tor this integrated resource plan and referred to as the Balanced Resource Portfolio. This Balanced Resource Portfolio represents the best option amongst many portfolio scenarios studied.

The Roseville Electric Utility integrated resource plan identifies key challenges the utility faces through 2030 and outlines a suite of resource planning and risk management strategies to address them. Roseville needs resources to meet a potential deficit in peak capacity later in the planning period and acquire additional renewable resources and renewable energy credits to achieve Renewables Portfolio Standard procurement requirements after 2026

To meet these challenges, Roseville examined both current and proposed supply-side and demand-side resources that allow it to keep electricity rates affordable and ensure reliable service for its customers. Under the Balanced Resource Portfolio, Roseville plans to purchase short-term capacity resources to meet peak demand shortfalls; diversify its renewable portfolio with additional solar, geothermal and wind resources; acquire transmission to access carbon-free resources from the Pacific Northwest; and acquire flexible resources to integrate intermittent renewables. In addition to achieving Renewables Portfolio Standard procurement requirements in 2030, the Balanced Resource Portfolio will enable Roseville to meet its 2030 greenhouse gas emissions targets, as established by the California Air Resources Board.

In reviewing the *2023 City of Roseville Integrated Resource Plan* and determining consistency with the requirements of Public Utilities Code Section 9621, CEC 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 PUC Section 9621(b)(1), and the renewable energy procurement

requirement of PUC Section 9621(b)(2). Roseville Electric has a diverse portfolio that includes geothermal and large and small hydropower. For example, the City of Roseville signed a power purchase agreement with South Feather River Water and Power for a 20 MW share of their large and small hydroelectric assets. Roseville Electric is entitled to approximately 80 MW of transmission capacity from the Pacific Northwest, where hydropower is used to generate a large share of the electricity, and Roseville Electric executed a power purchase agreement with local community solar starting in 2017. Moving forward, Roseville's intended resource portfolio — the Balanced Resource Portfolio — includes procurement of additional generic wind, solar, geothermal, and small hydro resources. These generic resources are needed to meet not only Roseville Electric's greenhouse gas emission target but also its Renewables Portfolio Standard requirements. The utility's existing renewable energy credits and contracted resources will only be sufficient for compliance with the Renewables Portfolio Standard through 2026.

- *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). The goal of Roseville Electric's Balanced Resource Portfolio is to provide affordable and stable rates through expansion and extension of hydro resources, utilization of advanced metering information to leverage their existing assets, and development of new programs for transmission reliability and customer needs at the distribution level. To further meet transmission systems goals, Roseville Electric has purchased an additional 50 MW of firm transmission from the Pacific Northwest while also extending their existing contract term by 5 years for a total 79.3 MW. The utility is also pursuing more local generating resources with neighboring public utilities.
- *Considering Peak Needs:* The utility has considered the role of existing renewable generation, grid operational efficiencies, 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). The Roseville Electric Utility system is comprised of mainly residential customers. Peak demand is currently observed at hour 18:00 and is forecasted to be an hour later by 2035, due mainly to distributed energy resources such as solar photovoltaics and electric vehicles. The available capacity from solar photovoltaic is greatly diminished by hour 19:00 and the increase in demand from electric vehicles creates this shift in peak demand hour. Roseville Electric owns two local natural gas power plants that provide peak capacity. To ensure these plants continue to be available the utility successfully completed the following maintenance and upgrades. Roseville Power Plant Two was successfully refurbished and reliability improvements performed, while the utility's other local natural gas facility, the Roseville Energy Park, was modified to improve efficiency and to better integrate renewables and to meet peak demand.
- *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 PUC Section 9621(d). Roseville Electric is expected to meet its individual energy efficiency

doubling goal. This integrated resource plan demonstrates that Roseville Electric is taking great strides to incorporate energy efficiency and demand response into the utility's portfolio. Additionally, two local wastewater treatment plants increased Roseville's demand response capacity during grid emergencies by up to 4 megawatts. Roseville Electric has also outlined a pathway for additional demand response programs to enhance reliability and meet peak demand in their service area.

CHAPTER 1: Demand Forecast and Procurement

Introduction

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires publicly owned utilities (POUs) with an annual electrical demand exceeding 700 -gigawatt hours (GWh) to develop integrated resource plans (IRPs).[1] 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 starting no later than January 1, 2019.[2] Roseville Electric (Roseville) filed its initial IRP on April 11, 2019, and was deemed compliant by the CEC on August 9, 2019.

Public Utilities Code (PUC) Section 9622 requires the California Energy Commission to review POU IRPs, to ensure the IRPs achieve PUC Section 9621 provisions. If the CEC determines that 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 submission of the POU's IRPs.[3]

This chapter outlines the CEC's review process and provides an overview of Roseville Electric 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.

Roseville Electric

Roseville Electric is a vertically integrated, city-owned, not-for-profit utility that provides electric services in Placer County. The City of Roseville is the largest city in Placer County, housing 154,600 residents in a 43 square mile service territory. Roseville Electric's service territory, shown in Figure 1, includes about 65,000 customers, of which 58,000 are residential and 7,000 are commercial. Roseville Electric has electric sales of just over 1,200 GWh annually and peak loads of just under 350 MW in the summer.

Roseville's electric system includes generation and distribution facilities that are located within or near their electric service territory. Roseville Electric also has two generation facilities located within its service territory: Roseville Energy Park (REP) and Roseville Power Plant

1 PUC § 9621.

2 PUC § 9621(b).

3 CEC. October 2018. *Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines - Revised Second Edition (Chapter 2.E.1).* https://efiling.energy.ca.gov/GetDocument.aspx?tn=224889&DocumentContentId=55481.

(RPP2). REP is a 168 MW (155 MW dependable) facility consisting of two Siemens SGT 800 combustion turbine units and a Siemens SST 900 steam turbine. The second facility, RPP2, is a 48 MW combustion turbine plant primarily used as a peaking capacity resource. RPP2 operating hours are constrained annually by its emissions permit.

Roseville owns and operates its own distribution systems, while its bulk transmission needs are provided by contracts with the Western Area Power Authority (WAPA)[4], the Transmission Authority of Northern California (TANC), and PacifiCorp. The Roseville service territory is located within the area managed by the Balancing Authority of Northern California[5] (BANC) and constitutes roughly 7 percent of BANC's load. In March 2021, Roseville Electric joined the California Independent System Operator's (California ISO) Energy Imbalance Market, along with BANC members Modesto Irrigation District, Redding, and WAPA.

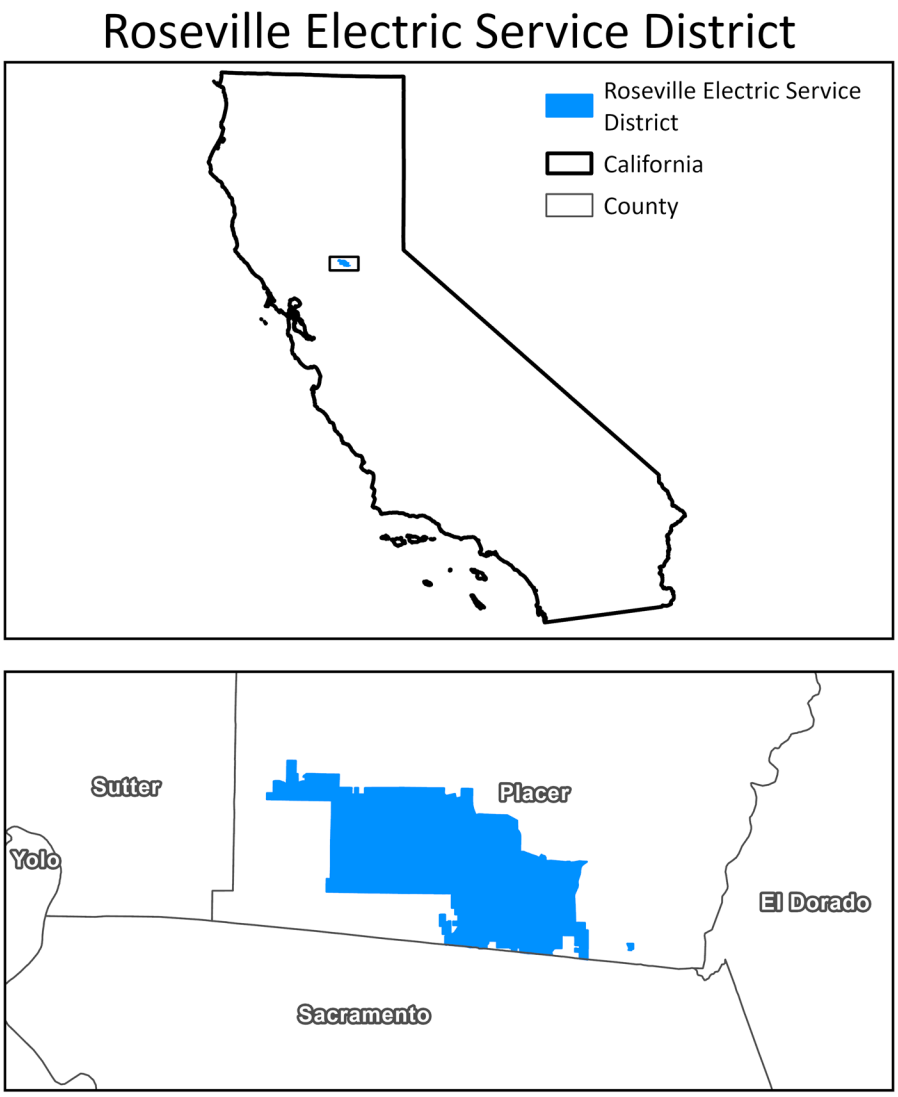
Northern California Power Agency (NCPA) members jointly own — and the NCPA licenses and operates — geothermal, large hydro, and natural gas generation projects located outside of Roseville's territory. Some of these projects are located within the California ISO Balancing Authority Area (BAA).[6]

4 WAPA is one of four power marketing administrations within the U.S. Department of Energy [external site] whose role is to market and transmit wholesale electricity from multi-use water projects.

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

6 NCPA, a California Joint Action Agency, was established in 1968 by a consortium of locally owned electric utilities to make joint investments in energy resources.

Figure 1: Map of Roseville Electric Service District



Source: CEC, Energy Assessments Division.

Roseville Electric Planning Process

The development of the *2023 City of Roseville Integrated Resource Plan (2023 Roseville IRP)* focused on four components: resource acquisition, distributed energy resources, customer engagement, and transmission and distribution systems. The elected City Council of Roseville has ultimate decision-making authority for the utility, with input from the Roseville Public Utilities Commission (RPUC). The RPUC is a seven-member body that studies and advises the City Council on utility issues, including planning, rates, and public information. Roseville's City

Council is ultimately responsible for adopting an IRP. On December 20, 2023, the Roseville City Council approved this *2023 Roseville IRP*.[7]

Roseville used a public process that solicited direct input from customers through two RPUC meetings, two public workshops, and a Council meeting. A dedicated e-mail account was created, allowing the public to ask questions, submit concerns and survey results. Customers also had the opportunity to complete a survey; survey results showed that customers' preference was to meet but not exceed compliance, to ensure electric reliability and affordability in the future. In addition, a dedicated webpage was created to host all information related to the IRP, including background about the IRP, details and recordings of public meetings, survey results, contact information, and the IRP document itself.

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.[8] The *Guidelines* also state that, if a POU uses a forecast other than the CEC's adopted demand forecast, the POU must provide information on the method used to develop its demand forecast.[9] The demand forecast and supporting information provided in the *2023 Roseville IRP* present a representation of future energy and peak demand that meets the *Guidelines* requirements.

The *2023 Roseville IRP* outlines multiple load scenarios representing different possibilities for future electricity demand. Their Base Plan (baseline) scenario projects electricity demand based on current building and appliance standards, anticipated technology adoption, and expected forward pricing and project costs. The other scenarios Roseville considers are the Green Goal scenario, in which the zero-carbon goal is accelerated from 2045 to 2035; the Electrification scenario, in which there is high demand for technologies that increase electrical load; and the Customer Choice scenario, in which there is high demand for technologies that reduce load. As discussed below, Roseville considered all four load scenarios when deciding on a resource portfolio. The *2023 Roseville IRP* ultimately focused on the Base Plan demand scenario which resulted in the Balanced Resource Portfolio, and as such, this section focuses on those demand projections.

Roseville's population is growing, yet, in the Base Plan load scenario, energy needs (or net energy for load) show a modest compounded annual growth of 0.6 percent from 2023-2030. This is due to forecasted energy efficiency savings for both residential and commercial sectors, the implementation of the 2022 Building Energy Efficiency and Standards, and the requirement

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7 City Council Meeting of December 20, 2023 - City of Roseville, CA

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

9 Given the timing of these POU IRP submittals the adopted forecast vintage is the 2022 CED Update. https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2022-integrated-energy-policy-report-update-2.

for solar PV on new homes. At the same time, Roseville expects peak demand to rise slightly over the forecast period, from 336 MW in 2024 to 357 MW in 2030.

Since the previous IRP cycle, growth in electric vehicles (EV) and distributed generation (DG) such as rooftop solar has prompted Roseville to make improvements to its load forecast. For the residential class, the near-term forecast includes the City of Roseville's specific plans, which account for new construction and customer demands. The small commercial growth rate is calculated using regression models with employment as the driver. The large commercial growth rate is based on a combination of internal expert knowledge of upcoming projects, external commercial development forecasts, and available land inventory. Climate is also a factor in determining load, with Roseville experiencing its highest demand in the summer to power air conditioning units.

Staff compared Roseville's Base Plan scenario for energy and peak demand to the CEC 2022 Demand Forecast Update report and found the Roseville Electric demand forecast to be in the acceptable range.

Resource Procurement Plan

The *Guidelines* require that POUs report the mix of resources they plan to use to meet demand through 2030.[10] POUs are also required to provide an IRP with data and supporting information sufficient to demonstrate the POU's plan to meet the various targets and goals. Staff has determined this 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

Roseville Electric has a diverse portfolio of resources including gas-fired generation, large and small hydroelectric, renewable resources, and market purchases. In the year 2022 the utility has about 326 MW of peak dependable capacity in Roseville and the CAISO, and 80 MW of transmission to the Pacific Northwest, which Roseville states will help them access short-term capacity purchases. Roseville's portfolio of resources produced just under 1,200 GWh of energy in 2018 to meet its customer load. As outlined below, Roseville's existing resources include three natural gas-fired facilities and three hydroelectric contracts.

Natural gas-fired resources:

- The REP provides 155 MW of dependable peak capacity. This facility is a newer (2007) combined cycle power plant connected to the distribution system, and, as such, the resource provides local reliability and serves as an intermediate load resource.

10 CEC. October 2018. POU IRP Guidelines, p. 6. https://efiling.energy.ca.gov/getdocument.aspx?tn=224889.

- RPP2 has a pair of 24-MW utility-owned combustion turbines which operate as 48MW of peaking capacity and are restricted by the annual air quality permit to a combined annual operation of 900 hours.
- Combustion Turbine Project 2 (STIG) is a 50-MW steam-injected gas turbine owned by the Northern California Power Agency (NCPA). Roseville is entitled to 36 percent of its output -- 18 MW of capacity and approximately 6 MW of ramping capacity — but rarely calls on this capacity. Roseville plans to use STIG in this fashion through 2026.

Hydroelectric contracts:

- A long-term contract with the WAPA calls for 54 MW of peak capacity and 155 GWh of energy from the federal Central Valley Project. The existing contract runs through 2024, and the Roseville City Council has extended this contract through 2054.[11]
- An ownership share of 31 MW of peak capacity and 72 GWh of energy from NCPA's 253-MW Calaveras project in average water years.
- A Power Purchase Agreement (PPA) with South Feather Water and Power Agency for 20 MW of capacity and 57 GWh of energy in average water years.

Roseville also has several long-term, Renewables Portfolio Standard (RPS) compliant contracts providing geothermal, small hydro, wind, and solar energy. Roseville has a roughly 8 percent share of NCPA's geothermal plants, which counts as approximately 50,000 MWh and 8 MW of capacity annually, across the forecast period. In addition, Roseville has power purchase agreements for renewable energy with Lost Hills Solar, Blackwell Solar, Avangrid Renewables, and Powerex Corp. totaling 336 GWh of energy in 2023 — though all of these contracts are set to expire by 2026. Starting in the 2025 to 2027 RPS compliance period[12], Roseville Electric's renewable projects and contracts will not meet their RPS requirements; the utility plans to make up the difference by purchasing renewable energy credits (RECs).

Resource Portfolio Evaluation

The *2023 Roseville IRP* evaluated resource portfolios to identify the appropriate resource mix and energy procurement strategies for 2024 and beyond to provide a cost-effective, emissions-limited portfolio. The IRP evaluated four different potential resource portfolios: a portfolio with only utility-scale solar power; a portfolio in which 70% of new renewable capacity is solar power, with 30% coming from other renewable resources; a portfolio in which 70% of new renewable capacity is wind power; and a "Balanced Resource Portfolio" split more evenly between solar, wind, hydro, and geothermal power.

Roseville modeled how each of these four portfolios performed, in terms of electricity reliability and cost, under the different electricity demand scenarios explained in the demand forecast

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

12 Compliance with the RPS program is determined for multi-year compliance periods that are set in statute and adopted in legislation.

section. Roseville found that the Balanced Resource Portfolio performed best, on average, across electricity demand scenarios. Thus, Roseville has decided to procure the Balanced Resource Portfolio to meet reliability, cost, and RPS requirements.

Roseville utilized the Electric Power Resource Institute's (EPRI) portfolio cost model Energy Book System (EBS). EBS can characterize many resource options, simulate the costs and benefits of each, and assess total portfolio risk. EBS is a stochastic model that can provide risk metrics by varying key inputs to provide a range of probable outcomes. In conjunction with EBS, Microsoft Excel was utilized for additional post-processing of the EBS output for reporting on various positions such as energy, capacity, resource diversity, hedge percentages, natural gas price exposure, renewable outlook, carbon outlook, forward pricing, flex requirements, individual instruments, and portfolio cost and risk.

Procurement Strategy

Roseville Electric's procurement strategy addresses three primary issues: meeting peak demand needs with carbon-limited resources, procuring necessary renewable resources to meet RPS requirements, and addressing renewable integration needs. Roseville's Balanced Resource Portfolio uses natural gas generation to meet reliability and peak needs. The utility will continue using the REP for reliability needs and operating reserves. REP is also capable of ramping quickly to facilitate renewable integration. The RPP2 provides power during peak hours and supports local reliability requirements. The STIG is a peaking power plant that Roseville is not including in their Balanced Resource Portfolio after 2026.

Even with continued use of natural gas generation, the Balanced Resource Portfolio falls short of meeting peak load and reserve margin requirements by about 51 MW in 2024. The annual shortfall decreases throughout the forecast period, with a capacity surplus of approximately 26 MW projected by 2030. Roseville determined that purchasing short-term (1 year or less) to mid-term (1 to 5 years) capacity is the lowest cost option to meet near term peak load and reserve margin requirements. To facilitate access to capacity markets, Roseville plans to procure additional transmission. Roseville extended the 50 MW transmission contract through the forecast period with PacifiCorp. To help address peak load requirements, Roseville created a program with two local wastewater treatment plants for up to 4 MW of demand response (DR) that can be made available during grid emergencies. This program outlined a pathway for additional DR programs to enhance reliability and meet peak demand in their service area.

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

Existing renewable contracts are projected to be sufficient to comply with RPS procurement requirements through 2024. Roseville Electric evaluated several types of renewable resources to meet RPS requirements beyond 2024 including additional geothermal, biomass, wind, and

solar PV, and determined that solar PV was the lowest cost option. However, as described above, the utility selected a more diversified renewable portfolio – the Balanced Resource Portfolio – to hedge against cost exposure and the changing market environment. Roseville plans to procure new renewables with a mix of generic solar, wind, geothermal and small hydro to fulfill its RPS obligations through 2030. Existing geothermal and small hydroelectric resources will maintain their roles within Roseville's renewable portfolio.

CHAPTER 2:
Review for Consistency with PUC Section 9621 Requirements

This chapter summarizes the main elements of the *2023 Roseville IRP* and provides staff's findings regarding the consistency 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 to the above elements, the IRP must address procurement of energy efficiency and demand response, energy storage, transportation electrification, and portfolio diversification.

Greenhouse Gas Emission Reduction Targets

POUs are required to meet the GHG targets established by the California Air Resources Board (CARB), in coordination with the CEC and the California Public Utilities Commission.[13] The initial GHG targets set by CARB reflect the electricity sector's percentage in achieving the economywide GHG emission reductions of 40 percent from 1990 levels by 2030.

The 2030 electricity sector GHG planning target range was brought into alignment with CARB's *2022 Scoping Plan for Achieving Carbon Neutrality (2023 CARB Update)* adopted in September 2023.[14,15] This electricity sector GHG planning target range of 30–38 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), retains the lower bound of 30 $MMTCO_2e$ from CARB's *2020 Update* but reduces the upper bound from the 53 $MMTCO_2e$ to 38 $MMTCO_2e$. [16]

Staff finds that Roseville plans to achieve the established GHG emission target range of 30-38 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) published in the *2023 CARB Update.* The Balanced Resource Portfolio results in compliance with the requirement of PUC Section 9621(b)(1). More specifically, the Balanced Resource Portfolio will allow Roseville to fall under its utility-specific *(2023 CARB Update)* GHG target of 136,000 – 172,000 $MTCO_2e$.

13 PUC Section 9621(b)(1).

14 Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2023 Update, https://ww2.arb.ca.gov/sites/default/files/2023-09/sb350-final-report-2023.pdf.

15 CARB's *2022 Scoping Plan for Achieving Carbon Neutrality*, https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents.

16 CARB's *Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2020 Update*, https://ww2.arb.ca.gov/sites/default/files/2021-04/sb350-final-report-2020.pdf.

CEC staff reviewed the GHG emissions associated with Roseville's Balanced Resource Portfolio and independently assessed the emission factors associated with various resources to ensure consistency with other available data.

Roseville projects that the Balanced Resource Portfolio results in roughly 160,300 $MTCO_2e$, consistent with the requirement in PUC Section 9621(b)(1). Table 1 shows GHG emissions for Roseville's Balanced Resource Portfolio in 2030, in the Base Plan load scenario.

In 2021 REP underwent an upgrade, improving efficiency, allowing a lower operating level, and increasing the full output level. Roseville is also monitoring market conditions for cost effective clean technology replacements for their natural gas fired generation to meet GHG targets. Currently, Roseville is including spot market purchases to backfill decreases in generation from their natural-gas fired resources.

Table 1: Greenhouse Gas Emissions from Roseville, Balanced Resource Portfolio

Power Source	Fuel Type	GHG Intensity (MT CO_2e /MWh)	Total Emissions (MT CO_2e) 2023	Total Emissions (MT CO_2e) 2025	Total Emissions (MT CO_2e) 2030
REP	Natural Gas	0.430	198,387	116,006	68,695
RPP 2	Natural Gas	0.800	6,925	3,822	2,222
STIG	Natural Gas	0.481	1,683	952	0
Net Spot market purchases (sales)	System	0.428	69,168	198,665	89,384
Total Portfolio emissions	**NA**	**NA**	**276,162**	**319,445**	**160,300**

Source: CEC, Energy Assessments Division, Based on Roseville Electric 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 (De León, Chapter 312, Statutes of 2018) increased the RPS requirement for 2030 from 50 to 60 percent by 2030.[17] Staff reviewed the renewable procurement table, the discussion in the IRP filing, and the renewable procurement plan submitted. Staff finds that, under the Base Plan load scenario, Roseville's Balanced Resource Portfolio, is consistent with the RPS procurement

17 Public Utilities Code § 399.11(a).

requirements and all interim compliance periods, as well as the requirements of PUC Section 9621(b)(2).

Roseville's renewable procurement plans include additions of new generic renewable resources between year-end 2024 and 2030. Roseville anticipates that RPS-eligible renewables will account for at least 60 percent of retail sales in 2030.

The *2023 Roseville IRP* states that Roseville plans to meet the 40 percent RPS target through 2023 with existing resources, but that many of Roseville's wind and solar renewable resource contracts end in 2024. This means additional renewable resources are needed beginning in compliance period 2024 to 2027. Roseville plans to use banked RECs in 2024, though even with the applied RECs, Roseville will need to procure additional resources to meet its RPS requirement.

Under the Base Plan load scenario, the Balanced Resource Portfolio includes the following generic resources to meet RPS compliance over the forecast period:

- 2024: 25 MW of Solar (delayed)
- 2025: No Planned Additions
- 2026: 10 MW of Geothermal
- 2027: 20 MW of Hydro
- 2028: 20 MW of Wind
- 2029: 10 MW of Wind and 25 MW of Solar
- 2030: 10 MW of Geothermal

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 Roseville Electric presented in its IRP filing on the rate and bill impacts from different resource portfolios they evaluated. Staff finds the *2023 Roseville IRP* to be consistent with the rates discussion, as required in PUC Section 9621(b)(3).

Maintaining competitive and stable rates is an essential goal for Roseville Electric and was fundamental in developing the IRP. Roseville believes it is possible to meet its clean energy and customer-centric goals in 2030.

Roseville does, however, project that costs will increase through 2030, primarily due to increasing environmental regulations and renewable integration costs. Unlike Roseville's previous IRP, the *2023 Roseville IRP* projects an increase in retail energy sales from growth in EVs and requirements by the 2022 Building Efficiency Standards. Even with the increase in EE and distributed solar, in Roseville's Base Plan load scenario, the compounded average annual growth in retail sales is projected to be less than one percent between the years 2023 and 2030.

Roseville's Balanced Resource Portfolio is diverse and flexible to protect against market prices and future changes to regulations; however, the utility cannot mitigate all risks. The Balanced Resource Portfolio is expected to increase average residential rates by at least seven to twelve percent over the planning horizon. Flexibility is essential to address uncertainties related to limited supply availability and technology changes.

Roseville Electric also plans to make investments in distribution facilities to account for more distributed energy resources, more EV fast chargers, and more volatile loads. Utilizing advanced metering infrastructure data will also allow Roseville to enhance new EE and DR programs and enhance system operations and costs.

System and Local Reliability

SB 350 requires filing POUs to adopt an IRP that ensures system and local reliability and addresses resource adequacy requirements.[18] Staff reviewed the IRP filing capacity reporting table and discussion and found that Roseville has planned sufficient resources to maintain a reliable electric system.

In addition, Roseville's Balanced Resource Portfolio contains sufficient capacity to meet anticipated resource adequacy requirements, for the Base Plan load scenario, in 2030. Staff finds that the *2023 Roseville IRP* is consistent with reliability requirements in PUC Section 9621(b)(3) and resource adequacy requirements in PUC Section 9621(d)(1)(E).

Roseville is a member of the BANC, which is responsible for balancing supply and demand for electricity within its area and between other balancing authorities. Roseville must still provide for its own reserve energy requirements using the capacity guidelines developed by BANC. Roseville plans to increase reliability by adopting new planning reserve margin procurement targets of 15 percent in the shoulder months (October - April) and 17.5 percent in the summer months (May – September), in the current year, and 20 percent in the summer months when more than a year out.

Roseville does not own bulk transmission (high voltage lines above 69 kilovolts). However, Roseville does have contract rights to use the bulk transmission owned by WAPA and the TANC, and Roseville regularly purchases short-term transmission to deliver generation to serve its load. Roseville owns about 300 MW of dependable peak generating capacity. Any load not met by owned or contracted resources is served by imports over WAPA's transmission system.[19]

The Roseville 60-kilovolt distribution system connects to WAPA's higher voltage transmission system at two receiving stations. The majority of Roseville's distribution lines are underground.

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18 Public Utilities Code § 9621(b)(3); Public Utilities Code § 454.52(a)(1)(E).

19 Under the Network Integrated Transmission Service agreement that expires on December 31, 2034.

As a result, the frequency and duration of distribution-level outages are well below industry averages.

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

Roseville recently implemented an advanced metering infrastructure (AMI)[20] system that will provide increased visibility into the distribution system's performance and localized Distributed Energy Resource (DER) impacts. It will also enable technology to mitigate the distribution system impacts. Once fully operational, this AMI system will allow Roseville to design more effective demand-side management strategies and rates that provide for better customer participation, as well as lower-cost grid and environmental benefits.

Local and Flexible Capacity Needs

Roseville does not have any transmission-constrained areas that require local generation. However, the utility owns and operates the Roseville Energy Park and Roseville Power Plant 2 that are directly connected to Roseville's distribution system. Both resources provide local capacity and flexible ramping capabilities. The utility expects to meet one- and three-hour ramping needs with existing resources, including its gas-fired generation.

Roseville Electric's operations agreement with WAPA provides Roseville with a 10 MW deviation band over an hour period. If Roseville needs additional ramping capability driven by roof-top and other distributed solar, Roseville buys that additional capability from WAPA or other BANC partners. To quantify future needs, Roseville developed a model that calculates average flexible ramping requirements based on scalable hourly generation profiles for planned resources in the Balanced Resource Portfolio. Results from this model were used to properly layer in future resources, so as not to compound the flexibility need.

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 determined that the *2023 Roseville IRP* adequately plans to maintain and enhance its transmission and distribution systems. Staff finds that Roseville is planning for enough transmission to adequately deliver resources to its service area to meet the requirement as discussed below. Staff also finds that Roseville plans to address the adequacy of its distribution system and, as such, finds the *2023 Roseville IRP* is consistent with the transmission and distribution requirements set forth above.

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20 Enables two-way communication between utilities and customers.

Transmission System

Roseville is a member of the TANC and is entitled to 29 MW of capacity on the California-Oregon Transmission Project, which links the utility to resources in Southern Oregon and other areas of the Pacific Northwest. Roseville extended the agreement for a renewable transmission services contract with PacifiCorp, providing an additional 50 MW of firm transmission capacity from the Pacific Northwest. This provides the utility access to additional firm energy and capacity. As part of the BANC balancing authority area, it also has the rights to 300 MW of import and export capacity, due to its funding of the Roseville Elverta transmission line. This provides Roseville access to imported energy that is not met by owned or contracted resources.

There are no transmission-level concerns for Roseville's assets during the forecast period. All other entities that Roseville has agreements or contracts with are responsible for operating and planning for adequate bulk transmission to ensure reliability.

Distribution System

As discussed in the System and Local Reliability section above, Roseville's 60-kilovolt distribution system is mostly underground and, as a result, has below industry average distribution-level outages - measured by either frequency or duration. Their most recent distribution planning study projected that upgrades to the distribution system would not be needed during the forecast period.

Disadvantaged Communities and Localized Air Pollutants

Staff reviewed the *2023 Roseville IRP* to determine the extent to which Roseville Electric plans to minimize local air pollutants, with a priority placed on disadvantaged communities. Roseville Electric did not find any disadvantaged communities, as defined by the California Environmental Protection Agency's Communities Environmental Health Screening Tool, within its service territory, but the utility acknowledges that it serves low-income customers.

Roseville offers numerous programs to reduce the energy bills of its low-income customers. Roseville has allocated proceeds from the sale of its GHG allowances to programs which benefit low-income customers. Specifically, proceeds have been used to fund increased bill credits, no-cost EE retrofits for low-income homeowners, and no-cost EE retrofits for multi-family housing. Roseville also offers rebate programs for shade trees, fans, sunscreens, window replacement, consumption audits, and information guides for saving energy.

Additionally, the portfolio selected by Roseville relies on short-term market purchases of energy and capacity, as well as increased DR, to meet peak needs. This approach reduces the amount of natural gas-fired generation required to meet demand and, consequently, the amount of local air pollution from electricity generation.

Net Energy Demand in Peak Hours

Senate Bill 338 (Skinner, Chapter 389, Statutes of 2017) requires POUs to consider existing renewable generation, grid operation efficiency, energy storage, distributed energy resources,

and energy reduction measures to reduce the need for new or additional gas-fired generation, distribution, and transmission resources.[21] The *2023 Roseville IRP* includes a discussion of how it considers preferred resources to meet peak demand when selecting its portfolio. Roseville's Balanced Resource Portfolio is consistent with the requirement set forth above.

Roseville's increased distributed roof-top solar decreases the mid-day net load and pushes the peak to later hours. For 2023, the peak occurs during the hour 18:00. However, given projected rooftop solar PV installations over the forecast period, Roseville expects that by 2035 the peak load will occur one hour later, at hour 19:00.

As in the above case, DR, DER and EE can aid in reducing and shifting the net peak. Roseville Electric partnered with Roseville's Environmental Utilities on a callable DR program that allows the Dry Creek and Pleasant Grove wastewater treatment plants to go to their backup generation. Together, the plants can provide up to 4 MW and are only used during grid emergencies. This DR program was used during the heatwave from September 6-9, 2023.

Roseville launched a customer program, contracting with EnergyHub, to have up to 6 MW of dispatchable DR through compatible thermostats. Roseville will incentivize customers to sign up for the program through bill or rate credits. The program is intended to be operated so customers notice little to no difference in comfort. The program will help meet reliability needs and reduce electricity use during constrained events. To date, Roseville Electric has signed 1 MW of dispatchable DR customers through this program. This program will reduce electricity demand during resource constrained events and also reduce emissions.

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

CEC Staff finds that the *2023 Roseville IRP* is consistent with the requirement in PUC Section 9621(d)(1)(A), as the IRP includes a discussion of EE and DR programs Roseville Electric plans to implement and quantifies the amount of energy efficiency savings the utility plans to achieve.

This IRP demonstrates the integration of EE programs and DR opportunities in the forecasting process. The *2023 Roseville IRP* describes many of the EE programs that Roseville Electric offers to its residential and commercial customers.

Roseville's submitted data includes results from Roseville's EE potential study, which projects an average EE target of 0.76 percent per year of forecasted retail sales. In addition, Roseville's

21 PUC Section 9621(c).

new AMI system will provide increased visibility into the distribution system's performance. Once fully operational, this AMI system will allow Roseville to design new DR and EE programs and strategies. These DR and EE programs and strategies will enhance system operations and, potentially, reduce costs.

Roseville is making progress and is on track to meet the EE goal set forth in SB 350. Further, the annual incremental savings demonstrate Roseville's commitment to doubling statewide EE. The utility has demonstrated, throughout the *2023 Roseville IRP*, that they are actively incorporating EE into their planning process. Furthermore, Roseville has outlined a pathway for DR programs/pilots in their service area.

Energy Storage

CEC staff finds that the *2023 Roseville IRP* is consistent with the requirement in PUC Section 9621(d)(1)(B) to address procurement of energy storage, as the IRP discussed the potential role of energy storage on Roseville's 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.

Roseville did not find energy storage to be cost-effective in any scenario and therefore did not establish an energy storage target in their Balanced Resource Portfolio. However, Roseville is considering battery storage as a resource in future IRPs.

Transportation Electrification

Staff finds that the *2023 Roseville IRP* is consistent with the requirement of PUC Section 9621(b)(4) and (d)(1)(C), as it addresses transportation electrification and makes projections concerning light-duty EV growth.

Roseville Electric has programs to encourage transportation electrification. The utility has successfully sold GHG allowances at quarterly CARB auctions and has utilized those funds to directly benefit Roseville. A portion of these funds were used for new public EV chargers and EV charger rebates to customers.

To encourage EV adoption, Roseville offers education, in-person and virtual outreach, and rebates for both residential and commercial customers. The education includes an in-house advisor to inform customers about available EVs and chargers, dealerships offering EVs, and decision-making tools, such as cost calculators and cost estimates. Roseville's low rates incentivize EVs by decreasing the cost of charging. Roseville's recent deployment of AMI will help Roseville design charging rates in the future that benefit customers by reducing variability in the utility's load profile. Roseville intends to develop a business plan that addresses the effect of electric vehicles and EV charging on the utility, its distribution grid, and its generation resources.

For this IRP, Roseville contracted with EV experts AECOM and Energeia to provide EV forecasts using an uptake model. The uptake model forecasts the adoption of EVs by segment based on policy, model availability, and financial drivers. Segments are defined as passenger vehicles; light-, medium-, and heavy-duty trucks; buses; and motorcycles.

In 2023, the energy (in GWh) required to charge EVs in the Roseville service area represented 0.79 percent of net energy for load. In the long-term, that amount rises to 1.4 percent of net energy for load -- an increase of 77 percent. This incremental load will increase Roseville Electric's direct GHG emissions and will result in added compliance costs for the utility. However, the increased EV use will result in a larger emission reduction from the transportation sector, decreasing total community-wide GHG emissions.

Portfolio Diversification

PUC Section 9621(d)(1)(D) requires that POUs address the procurement of a diversified portfolio of resources, including both short-term and long-term electricity and demand-response products. Roseville's Balanced Resource Portfolio includes demand response products, as well as a diverse array of zero-emission resources. Those resources include hydro, solar, wind, and geothermal generation, which provide renewable diversity, and natural gas, geothermal, and hydro provide flexible capacity.

APPENDIX A: Abbreviations

Abbreviation	Term
BANC	Balancing Authority of Northern California
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DR	Demand Response
DER	Distributed Energy Resources
EE	Energy Efficiency
EV	Electric vehicle
GHG	Greenhouse gas
GWh	Gigawatt-hours
IRP	Integrated resource plan
MMTCO2e	Million metric tons of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
POU	Publicly owned utility
NCPA	Northern California Power Agency
PPA	Power purchase agreement
PUC	Public Utilities Code
REP	Roseville Energy Park
RPS	Renewables Portfolio Standard
Roseville	Roseville Electric Utility
RPUC	Roseville Public Utility Commission
RPP2	Roseville Power Plant 2
SB 350	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)

APPENDIX B: Glossary

Term	Definition
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.
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.

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

Term	Definition
Zero-emission resources	An engine, motor, process, or other energy source, that emits no waste products that pollute the environment or disrupt the climate.