

R2005003

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November 1, 2022

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

)	
Order Instituting Rulemaking to Continue Electric)	
Integrated Resource Planning and Related)	Rulemaking 20-05-003
Procurement Processes.)	(Filed May 7, 2020)
)	
)	

**[PUBLIC VERSION] 2022 INTEGRATED RESOURCE PLAN
OF REDWOOD COAST ENERGY AUTHORITY**

In compliance with the requirements of California Public Utilities Code Sections 454.51 and 454.52; California Public Utilities Commission (“Commission”) Decisions (“D.”) 18-02-018, D.19-11-016, D.21-06-035, D. 22-02-004 and rulings and guidance in the above-captioned proceeding; Redwood Coast Energy Authority (“RCEA”) hereby provides its 2022 Integrated Resource Plan (“Compliance IRP”) to the Commission for certification.

I. COMPLIANCE IRP DOCUMENTS INCLUDED AS ATTACHMENTS TO THIS FILING

RCEA is e-filing this document in the instant Rulemaking and serving it to all parties identified in this Rulemaking’s service list. This filing includes the following IRP documents:

- RCEA’s Notice of Availability of public IRP documents
- RCEA Standard LSE Plan Narrative
- Board Resolution
- Verification

II. REQUEST FOR CONFIDENTIAL TREATMENT OF NON-PUBLIC DOCUMENTS

RCEA has developed both public (redacted) and confidential (unredacted) versions of its narrative and Resource Data Templates. RCEA has posted the public versions of these

documents on its website and is submitting the confidential versions of these documents to the Energy Division through the Commission's FTP upload process and mailing a hard copy version of the confidential IRP files to the Commission's physical address.

Concurrently with the submission of this IRP, RCEA is filing a Confidentiality Motion to protect the information provided in the confidential versions of these documents.

III. CONCLUSION

RCEA thanks the Commission for its time and effort in the 2022 IRP cycle and for its review of RCEA's Compliance IRP. RCEA respectfully requests that the Commission certify its Compliance IRP.

Respectfully submitted,

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Dated: November 1, 2022

[Public Version] Standard LSE Plan

Redwood Coast Energy Authority

2022 INTEGRATED RESOURCE PLAN

November 1, 2022

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I. Executive Summary

Introduction to RCEA

Formed in 2003, the Redwood Coast Energy Authority ("RCEA") is a Joint Powers Authority ("JPA") of the County of Humboldt, the Cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad, and the special district of the Humboldt Bay Municipal Water District.

As a JPA, RCEA is a local government agency. RCEA is governed by a nine-member board composed of representatives of its member local governments. Through these representatives RCEA is controlled by and accountable to the communities RCEA serves. RCEA operates several programs, including its Community Choice Aggregation ("CCA") program.¹

RCEA's CCA program was established in October 2016 with the submission of its Implementation Plan to the California Public Utilities Commission ("CPUC" or "Commission") and began serving load in May 2017. RCEA currently provides retail electric generation services and complementary energy programs to customers within the municipal boundaries of the following communities:

- Unincorporated Humboldt County
- City of Arcata
- City of Blue Lake
- City of Eureka
- City of Ferndale
- City of Fortuna
- City of Rio Dell
- City of Trinidad

RCEA's service area is identified in Figure 1.

¹ In addition, RCEA provides a range of demand-side management programs for residential and non-residential CCA customers and operates an advanced fuels and transportation program. RCEA is identified in the Energy Element of County of Humboldt's General Plan as the regional energy authority, with the purpose to "*foster, coordinate, and facilitate countywide strategic energy planning, implementation and education*".

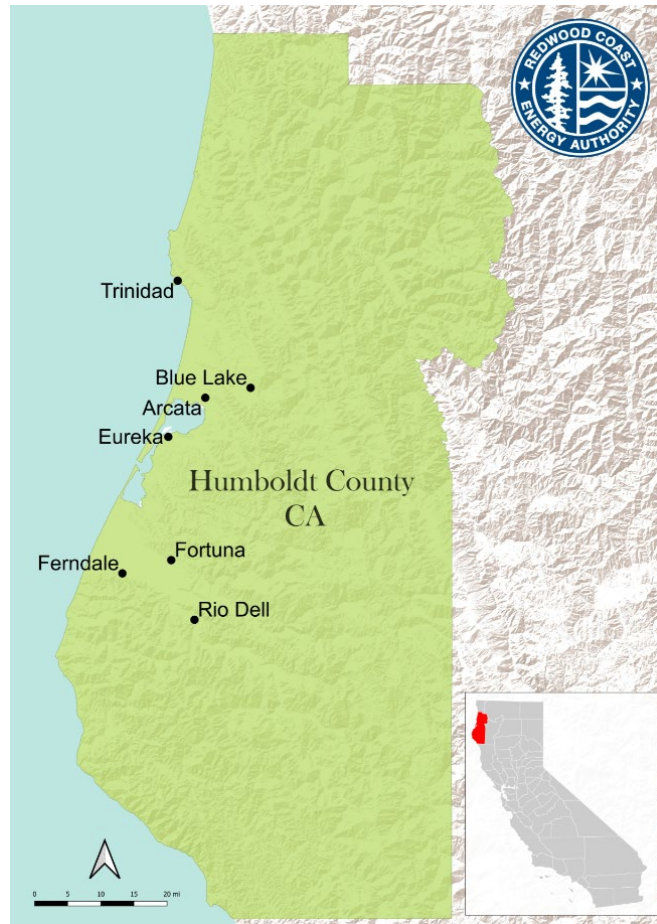


Figure 1: RCEA Service Area Map, showing locations of member entities

As of August 2022, RCEA was serving 53,723 residential accounts and 9,539 commercial and industrial accounts. 92% of CCA-eligible customers in RCEA’s service area participate in the CCA program. Residential customers make up about 90% of RCEA’s accounts and 50% of its electricity sales, with the remainder being commercial and industrial accounts. RCEA’s service area has a population of 136,463 (U.S. Census estimate for 2020), the majority of which live in households or work at businesses that receive generation service from RCEA. In 2021, RCEA’s peak demand was 112 MW, and its annual energy load was 651 GWh.

Based on current information, RCEA anticipates no changes to its service territory in the planning horizon of this IRP.

RCEA's Mission

RCEA's CCA program was formed for the express purpose of empowering its member communities to choose the generation resources that reflect their specific values and needs. Chief among these needs identified through community workshops and input to RCEA's Board of Directors are affordability, greenhouse gas ("GHG") reduction, air quality, protection of natural resources, and energy reliability in rural Humboldt County, an area especially prone to extended electric outages. These values, needs, and preferences are embodied in the following procurement goals adopted by RCEA's governing board:

- **Minimize GHG Emissions Associated with RCEA's CCA Program.** Procure a power mix that by 2025 has zero GHG emissions as counted under the California Air Resources Board's ("CARB") Regulation for the Mandatory Reporting of GHG Emissions, other than emissions from resources meeting California's Renewable Portfolio Standard ("RPS").²
- **Maximize Renewable Energy Content of RCEA's CCA Program.** Procure a power mix that reaches 100% clean and renewable content by 2025.³
- **Maximize Local Energy Content of RCEA's CCA Program (see additional discussion of this goal below).** Work toward Humboldt County being a net exporter of renewable electricity by 2030 and RCEA's power mix consisting of 100% local, net-zero-carbon-emission renewable sources, where technically and financially feasible.⁴
- **Support Customer Installation of Distributed Generation.** Support the deployment of behind-the-meter ("BTM") grid-connected renewable energy and storage systems as core strategies toward achieving environmental, economic, and community stability/resilience goals.⁵

² RePower Humboldt: The Redwood Coast Energy Authority's Comprehensive Action Plan for Energy, Adopted by RCEA Board of Directors December 2019, Strategy 4.1.2.

³ Ibid, Strategy 4.1.4.

⁴ Ibid, Section 4.

⁵ Ibid, Strategy 2.4.1.

- **Implement a Community Solar and Storage Program.** Evaluate, design, and launch community solar and storage program services that support the increased adoption of grid-connected solar and storage technologies.⁶
- **Minimize Energy Interruptions.** Work with local utility providers to minimize the impact of power outages and improve the reliability and resiliency of the local electricity delivery service.⁷
- **Provide CCA Program Customer Rate Savings.** Provide customer rates that are affordable and price-competitive with customers' other electric supply options.⁸

Consistent with Public Utilities Code ("PUC") Sections 366.2(a)(5) and 454.52 (b)(3)⁹, RCEA procurement staff strive to ensure all procurement by RCEA, including the portfolios set forth in this IRP, is consistent with these board-adopted goals.

Regarding the above local energy content goal, RCEA's procurement driven by compliance needs (SB 100, SB 350, D.19-11-016 and D.21-06-035) has resulted in execution of several long-term contracts for non-local resources that extend past 2030 and are therefore in conflict with the local goal as stated. RCEA is currently revisiting the feasibility of the goal and, barring assignment of these agreements to other buyers as allowed for in the contracts, may find it necessary to modify the goal to allow some portion of RCEA's 100% renewable power mix to come from non-local sources, provided that the associated goal of Humboldt County being a net exporter of renewable electricity is met, regardless of what entity is procuring the locally produced energy.

Introduction to RCEA's IRP

In accordance with the requirements of California PUC Sections 454.51 and 454.52, Commission Decisions ("D.") 18-02-018, D.19-11-016, D.20-03-028, and D. 22-02-004 (and subsequent

⁶ Ibid, Strategy 2.4.3.

⁷ Ibid, Strategy 4.2.1

⁸ Ibid, Strategy 4.3.1

⁹ Section references that are not preceded by "PUC" reference narrative sections.

updates to D. 22-02-004¹⁰), RCEA is providing its load serving entity ("LSE")-specific Integrated Resource Plan ("IRP") to the Commission for certification review and use in the Commission's statewide planning process. In addition to this narrative, RCEA's IRP includes the following documents:

- RCEA's 25 million metric ton ("MMT") Resource Data Template ("RDT")
- RCEA's 25 MMT Clean System Power calculator ("CSP calculator")
- RCEA's 30 MMT RDT
- RCEA's 25 MMT CSP calculator

The future resources identified in RCEA's IRP represent RCEA's good-faith projection of the resource mix that it will procure over the IRP planning horizon, based on the best information currently available. The resources identified in future iterations of RCEA's IRP may change due to new information and market trends, and the ultimate resource mix that RCEA actually procures may differ from what is reflected in the plan due to several variables including availability of supply, price of supply and other market or regulatory considerations.

As directed in D.22-02-004 and the June 15, 2022 *Administrative Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plans*, RCEA is submitting one preferred conforming portfolio that has lower GHG emissions than RCEA's proportional share of all four GHG emissions benchmarks for the electric sector under the following two planning scenarios:

- 38 MMT in 2030 declining to 30 MMT in 2035
- 30 MMT in 2030 declining to 25 MMT in 2035

Accordingly, RCEA is submitting this single preferred conforming portfolio as the conforming portfolio for these benchmarks. RCEA's governing board has approved this portfolio, indicating

¹⁰ The 2021 PSP Portfolio was updated by IRP staff with more recent Inputs and posted on the IRP website on June 15, 2022. In all instances where this narrative references D. 22-02-004, it is also referring to the updated guidance. Updated guidance is located here: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/lse-filing-requirement-resolve-results.pdf>

a goal to achieve a level of emissions below RCEA's proportional share of the 25 MMT benchmark by 2035. This portfolio reflects actual planned procurement and is consistent with the action plan described in Section IV.

Summary of RCEA's IRP

This narrative provides a detailed description of the development and content of RCEA's 2035 25 MMT Preferred Conforming Portfolio, its compliance with applicable requirements, and an action plan detailing RCEA's planned next steps. RCEA developed its IRP through the following steps:

1. Compiled contracted and owned generation resources and long-term RA capacity contracts.
2. Compiled expected allocation shares of Power Charge Indifference Adjustment ("PCIA") Carbon-Free, PCIA RPS and Cost Allocation Mechanism ("CAM") resources.
3. Compiled shortlisted resources for which RCEA is currently negotiating long-term energy and capacity contracts.
4. Compiled expected resource procurements via solicitations that have been authorized by RCEA's Board of Directors.
5. Identified candidate resources that are compatible with RCEA's Board-adopted RePower Humboldt Comprehensive Action Plan for Energy ("Strategic Plan") and adjusted their capacities and commercial operation dates according to current procurement and development expectations.
6. Populated its assigned forecasts for managed retail sales, peak demand, and BTM PV in the CSP calculator and RDT, as well as its custom load profile in the CSP calculator.
7. Established a base case of resources including those described in steps 1-4 above, and those described in step 5 that are unlikely to vary in scale and timing.
8. Identified its short energy position in the IRP planning years of 2024, 2026, 2030 and 2035 by comparing the forecasted generation of the above resources with its assigned load.

9. Added hypothetical generic planned contracts with existing carbon-free generation to fill its short energy and positions in advance of the anticipated online dates of candidate resources.
10. Evaluated four candidate portfolios of resources incremental to the base case for financial performance and reliability and selected one portfolio for further analysis based on the most favorable combination of cost, reliability, and compatibility with the RCEA Board's procurement directives expressed in its Strategic Plan.
11. Used the Commission's CSP calculator to ensure the GHG emissions associated with the four candidate portfolios were lower than RCEA's assigned share of the 2030 30 MMT benchmark and 2035 25 MMT benchmark.
12. Presented this set of portfolio configurations to RCEA's Board for concurrence on staff's recommended configuration.
13. Populated its RDT and CSP calculator with all base case and incremental candidate resources.
14. Identified its perfect capacity shortfall via the RDT Reliability tab and added hypothetical short-term resource adequacy ("RA") contracts with existing generic combustion turbine gas resources until the perfect capacity standard was satisfied.
15. Identified the resulting portfolio as its Preferred Conforming Portfolio and obtained authorization from the RCEA Board of Directors to submit to the CPUC.

RCEA reached the following findings regarding its Preferred Conforming Portfolio:

- The portfolio includes the procurement of the following new resources that are not yet operational:
 - 100 MW Sandrini Sol 1
 - 40 MW of Redwood Coast Offshore Wind
 - 17.25 MW Fairhaven Energy Storage
 - 6.5 MW of FIT Phase I solar projects
 - 6 MW of FIT Phase II solar plus storage projects
 - 5 MW North River Clean Power

- 4 MW Ormat Geothermal Portfolio
- 3 MW Foster Clean Power A
- 2.50 MW Tumbleweed Long-Duration Storage
- 2 MW Goal Line Long-Duration Storage
- 0.36 MW Fish Lake Geothermal
- 24 MW of new solar plus storage
- 15 MW of new geothermal
- 11 MW of new short duration storage
- 8 MW of new small hydro
- The portfolio provides for the following overall resource mix in 2035:
 - 147 MW of solar
 - 49 MW of short-duration storage
 - 40 MW of offshore wind
 - 19 MW of geothermal
 - 18 MW of biomass
 - 8 MW of small hydro
 - 4 MW of long-duration storage
- The discretionary procurement to be undertaken following the submission of this IRP is consistent with procurement timing, resource quantities, and general resource attributes identified in the 2021 Preferred System Plan (“PSP”).
- Under a 25 MMT by 2035 planning scenario, the portfolio would have 2030 CO₂ emissions of -0.005 MMT and 2035 GHG emissions of 0.028 MMT according to the 25 MMT CSP calculator calculations. This is 107% lower than RCEA’s assigned 2030 GHG emissions benchmark under this scenario of 0.074 MMT and 51% lower than RCEA’s assigned 2035 GHG emissions benchmark of 0.057 MMT.
- Under a 30 MMT by 2035 planning scenario, the portfolio would have 2030 CO₂ emissions of -0.02 MMT and 2035 GHG emissions of 0.009 MMT according to the 30 MMT CSP calculator calculations. This is 120% lower than RCEA’s assigned 2030 GHG

emissions benchmark under this scenario of 0.098 MMT and 51% lower than RCEA's assigned 2035 GHG emissions benchmark of 0.071 MMT.

- The portfolio meets the Commission's perfect capacity equivalent standard.
- The portfolio provides more than RCEA's load-proportional share of renewable integration resources.
- The portfolio is also consistent with the Commission's 30 MMT by 2035 GHG emission planning target and can be used in either a 25 MMT or 30 MMT consolidated statewide portfolio.

RCEA's Preferred Conforming Portfolio is consistent with its program goals and Board directives, while contributing its share of renewables integration and reliability at a forecasted cost that is affordable to RCEA customers. To implement its Preferred Conforming Portfolio, RCEA is adopting the action plan described in Section IV, below. This plan consists of the following actions, many of which are already underway:

- Continue to closely monitor progress of the Sandrini Sol 1 project and other long-term resources in development;
- Continue good-faith effort to procure remaining Mid-Term Reliability ("MTR") capacity obligation and monitor development progress of procured capacity;
- Secure import allocation rights for out-of-state long-lead time MTR resources;
- Continue to participate as an active partner in the development of Humboldt offshore wind in anticipation of the upcoming federal lease auction;
- Continue to procure local biomass power and investigate opportunities for alternative uses of biomass waste;
- Pursue additional clean microgrid projects as a source of local renewable energy and to foster community resiliency;
- Support development of new geothermal power in California;
- Pursue development of local small hydropower;
- Continue development and implementation of RCEA's Feed-In Tariff ("FIT") program and launch FIT Phase II;

- Pursue development of local energy storage;
- Launch 2023 demand response program;
- Expand capacity of BTM energy storage program up to the maximum target of 3 MW;
- Continue administering energy efficiency and other DSM programs, and continue leading RuralREN development;
- Continue supporting building and transportation electrification through planning, capturing grants and offering rebate programs;
- Reduce reliance on large hydropower, unspecified power, and gas-based RA; and
- Ensure best outcomes for disadvantaged communities.

Board Approval of IRP

In compliance with PUC Section 454.52(b)(3), this IRP was formally submitted to RCEA's governing board for approval based on the IRP's compliance with PUC Sections 454.51 and 454.52 ("IRP Statute") and all relevant procurement requirements adopted by RCEA's governing board.

On October 27, 2022 RCEA's Board of Directors issued Resolution 2022-8, which formally approves this IRP and adopts RCEA's sub-25 MMT portfolio as RCEA's Preferred Conforming Portfolio for use as the basis for future procurement activities. In Resolution 2022-8, RCEA's Board of Directors also makes the following approvals, authorizations, and determinations regarding its Preferred Conforming Portfolio:

- Approves the Preferred Conforming Portfolio as RCEA's actual procurement plan and authorizes procurement efforts based on this plan.
- The Preferred Conforming Portfolio achieves economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in PUC Section 454.52(a)(1)(A-I).
- The Preferred Conforming Portfolio includes a diversified procurement portfolio consisting of both short-term and long-term electricity and electricity-related demand reduction products.

- The Preferred Conforming Portfolio achieves the RA requirements established pursuant to PUC Section 380.
- The Preferred Conforming Portfolio is consistent with the procurement timing, resource mix, and operational attributes of both the Commission’s 30 MMT conforming portfolio and the Commission’s 25 MMT conforming portfolio.
- The Preferred Conforming Portfolio is aligned with all RCEA board-adopted procurement directives.

A copy of Resolution 2022-8 is attached to this IRP Narrative.

Request for Certification

RCEA respectfully requests that the Commission certify this IRP. As both the Legislature and the Commission have recognized, The Legislature has granted CCAs broad authority to procure resources on their customers’ behalf, an authority limited only where “*other generation procurement arrangements have been expressly authorized by statute.*”¹¹ Likewise, the Legislature has granted CCAs autonomy in setting their own rates and managing interactions with their customers.¹² The Commission has three primary interests in the CCA IRP process:

- Ensuring that CCA IRPs provide the CCA procurement information that the Commission needs to develop its statewide plan.¹³
- Ensuring that CCAs’ current and planned procurement is consistent with the RA requirements established pursuant to PUC Section 380.¹⁴

¹¹ PUC Section 366.2(a)(5).

¹² D.05-12-041 at 5 (“*Nothing in the statute directs the CPUC to regulate the CCA’s program except to the extent that its programs may affect utility operations and the rates and services to other customers. For example, the statute does not require the CPUC to set CCA rates or regulate the quality of its services*”); D.19-04-040 at 18 (“*the Commission does not approve CCA or ESP rates*”).

¹³ D.19-04-040 at 17-18 (“*The Commission’s portfolio aggregation and evaluation process, which relies on fulfillment of IRP filing requirements by LSEs, is the only process capable of assessing the overall needs of the CAISO grid and meeting the statewide GHG, reliability, and least-cost goals collectively. While LSEs may use their IRP process to meet local planning needs as well, the statewide planning function is the statutorily required process...*”).

¹⁴ PUC Section 454.52(b)(3)(C).

- Ensuring that each CCA’s current and planned procurement satisfies the CCA’s share of renewables integration resources identified in the Commission’s 2021 Preferred System Portfolio, and that the CCA either self-provides or pays for IOU procurement for its share of any renewable integration shortfall.¹⁵

RCEA has prepared its IRP with these interests in mind, and thanks the Commission in advance for its recognition of CCA procurement autonomy and the benefits of a collaborative approach with CCAs in its certification review of RCEA’s IRP.

II. Study Design

a. Objectives

RCEA had the following objectives in performing the analytical work to develop its IRP:

1. Identify a portfolio that achieves emissions that are equal to or less than RCEA’s proportional share of the 30 MMT by 2030 and 25MMT by 2035 GHG targets (“25MMT conforming portfolio”), as determined using the Commission’s CSP calculator. Since this lower emission portfolio is RCEA’s Preferred Conforming Portfolio, a second portfolio achieving emissions that are equal to or less than RCEA’s proportional share of the 38MMT by 2030 and 30 MMT by 2035 GHG targets (“30 MMT conforming portfolio”) was not developed, in keeping with direction from the Commission.
2. Identify a portfolio that achieves economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in PUC Section 454.52(a)(1)(A-I).
3. Identify a diverse and balanced portfolio that includes both short-term and long-term power products, but that transitions to mostly long-term procurements over the planning period.

¹⁵ PUC Section 454.51.

4. Identify a portfolio that achieves the RA requirements established pursuant to PUC Section 380 and provides RCEA's share of system reliability and renewable integration resources.
5. Identify a portfolio that complies with all RCEA board-adopted procurement directives.
6. Identify a portfolio that is compliant with RCEA's obligations under the Renewables Portfolio Standard program.
7. Identify a portfolio that is cost-effective and minimizes rate impacts on RCEA's customers.

b. Methodology

i. Modeling Tool(s)

RCEA used multiple modeling tools to test and compare the performance of candidate Preferred Conforming Portfolio resource portfolios including HedgeFox and RCEA's own Financial Model, both developed by The Energy Authority ("TEA"). RCEA used the HedgeFox model to shape forward market prices in the IRP study horizon to evaluate resource performance on a long-term hourly basis as well as candidate resource production curves. RCEA used these results to evaluate the incremental value of each candidate resource and portfolio configuration. Finally, RCEA evaluated the overall financial impact of its Preferred Conforming Portfolio on RCEA's financial outlook using its own Financial Model, including projected costs spanning energy, RA, and renewable attributes.

HedgeFox

HedgeFox is a Monte Carlo simulation model of markets, resources and portfolios developed by TEA. HedgeFox utilizes a combination of methodologies from statistical approaches, data science, machine learning models, and operational research optimization. In RCEA's IRP, HedgeFox used a deterministic price outlook to generate stochastically derived forward price shapes and resource production curves around it. This dataset allowed RCEA to value the performance of candidate portfolios under a range of potential price scenarios over the IRP study horizon.

RCEA Financial Model

RCEA maintains a financial model that provides a multi-year point forecast of all revenue and cost streams. For the IRP, the Financial Model was used to evaluate the comprehensive financial impact of its Preferred Conforming Portfolio integrating the cost of energy, renewables, and RA into a portfolio value metric. This outcome was benchmarked using comparable environmental and reliability targets fulfilled with generic resources.

None of the tools used in modeling RCEA's portfolio are resource investment models, such as the Commission's RESOLVE model, so they do not include capacity expansion logic to directly derive resources that would be an optimal investment plan for RCEA's service territory, taken as an independent system. Instead, RCEA has utilized the tools above to iterate through resource configurations for the Preferred Conforming Portfolio that would allow RCEA to meet its assigned share of GHG emissions and system reliability, while meeting the broader objectives of the CCA program as determined by RCEA's Board and community. While this approach is more top-down than the RESOLVE model, the iterative nature of RCEA's analysis should result in an IRP that can be easily evaluated and incorporated by the Commission as part of this IRP cycle.

ii. Modeling Approach

Load Forecast

RCEA developed its IRP using its assigned load forecast linked in the June 15, 2022

Administrative Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions

Benchmarks for 2022 Integrated Resource Plans ("Load Forecast Ruling"). RCEA's assigned load forecast is as follows in Table 1:

Table 1: RCEA's 2023-2035 Load Forecast

Year	Load Forecast (GWh)
2023	674.1
2024	677.9
2025	678.7
2026	680.6

Year	Load Forecast (GWh)
2027	682.1
2028	683.3
2029	684.4
2030	685.3
2031	686.1
2032	686.8
2033	687.4
2034	688.0
2035	688.5

Load Shape

In developing its Preferred Conforming Portfolio, RCEA used its own load shape rather than the default load shape from the CSP calculator. RCEA elected to use its own load shape to reflect the significant differences between its expected load shape and the default load shape, which reflects the CAISO hourly system average load shape forecast for the 2021 IEPR mid case. These differences are due to the geography of RCEA's service territory and the demographics of its customer base. Humboldt County is at the northernmost latitude of CAISO's territory and the majority of RCEA's load within the county is located within ten miles of the coast where cooling loads are minimal year-round. RCEA's 4,000-square-mile service territory is also primarily rural in nature, with the largest city served containing a population under 30,000. These geographical and demographic differences from most of the state results in a load which is more akin to the Pacific Northwest than the rest of California, with a winter peak driven by lighting and heating needs, and little HVAC usage over the summer months. RCEA's own load shape results in a peak demand that is 21% to 24% (37 to 40 MW) lower than the peak demand of the default CAISO average load shape, depending on the modeling. RCEA's custom load shape implies a winter peak that is near 1% (1 to 2 MW) greater than the default winter peak, and a summer peak that is 31% to 35% (56 to 60 MW) lower than the default summer peak. The use of this

custom load shape does not change RCEA’s total annual energy volumes for both load and load modifiers, and these energy volumes remain consistent with RCEA’s assigned load forecast.

Load-Proportional GHG Emissions Benchmark

RCEA assessed the emissions of its Preferred Conforming Portfolio against its 2030 and 2035 load-proportional share of the respective 30MMT and 25 MMT benchmarks, as assigned in the Load Forecast Ruling.¹⁶

Table 2: RCEA’s Assigned Shares of GHG Reduction Benchmarks

30 MMT Conforming Portfolio		25 MMT Conforming Portfolio	
2030 (38 MMT)	2035 (30 MMT)	2030 (30 MMT)	2035 (25 MMT)
0.098	0.074	0.071	0.057

Compiling Existing Resources

To initially populate its RDTs, RCEA added the following existing resources:

- Long-term energy purchase contracts and owned generating resources
- Long-term capacity purchase and sales contracts
- Carbon-free and voluntary RPS energy allocations from PG&E’s PCIA resources
- RCEA’s assigned share of capacity from CAM and DR resources, estimated per guidance from Energy Division staff
- Short-term procurements from generic existing large hydro, given the long timeline required for the development of selected new resources described below.
- RCEA also included in its analysis an assumed extension of its long-term contract with an existing biomass facility, currently set to expire in 2031, through the end of the planning period.

¹⁶ Load Forecast Ruling at 10.

Selecting New Resources

RCEA's approach to selecting new resources for its IRP has generally been top-down in nature, driven by the local Board and community's stated goals and values. RCEA's relatively small load and significant contractual commitments to date, in combination with the constraints the portfolio is subject to due to state and local decarbonization targets, RCEA's local development goals, and conformance to the Commission's IRP process all support utilization of this approach. RCEA has determined that a bottom-up analysis to selecting new resources starting from production cost modeling that serves RCEA's load at the least cost while meeting state regulatory compliance as the main objectives is not realistic or very useful, since it does not reflect RCEA's actual procurement plans and requires significant staff time from a small team tasked with resource planning, procurement, contract management, and regulatory compliance.

To identify its new resource procurement, RCEA referred to its Board-adopted Strategic Plan, the 2021 PSP new resource buildout, and new resource development opportunities. The origins of RCEA's Strategic Plan are in a 2013 study funded through the California Energy Commission's ("CEC") Renewable Energy Secure Community Program (RePower Humboldt Technical Study).¹⁷ The study found that Humboldt County could achieve an electricity portfolio made up almost entirely of local renewable energy resources, chiefly biomass, wind, wave, and hydropower, by 2030. The study's findings informed the launch of RCEA's CCA program and its initial portfolio targets. More recently, RCEA updated its organization's Strategic Plan in 2019. The updated Strategic Plan sets quantitative, resource-specific procurement targets and expresses a strong preference for reliance on local resources, made both feasible and desirable by RCEA's relatively light load, a rich natural resource supply in RCEA's service area, and isolation from the state's other load pockets.

In 2019, RCEA conducted an extensive stakeholder engagement process to develop the portfolio presented in its Strategic Plan, including hosting community workshops, soliciting

¹⁷ RePower Humboldt: A Strategic Plan for Renewable Energy Security and Prosperity. Schatz Energy Research Center and Redwood Coast Energy Authority. March 2013.

public comments, and integrating feedback from its Community Advisory Committee (“CAC”) and Board of Directors. The result of this effort regarding new supply-side resources was that staff was directed by RCEA’s Board and CAC to 1) pursue local offshore wind development instead of onshore wind, 2) procure more community-scale local solar and storage, and 3) investigate small hydro development opportunities. RCEA staff utilized these goals, as well as other emerging priorities in resource development, in identifying portfolios to evaluate for its IRP, and compared them to RCEA’s load proportional share of the Commission’s PSP to ensure consistency with statewide resource development plans.

Four candidate portfolios across the IRP planning horizon were evaluated, each with the same base case set of resources and a different configuration of incremental resources and procurement volumes. The base case resources reflect RCEA’s existing contractual commitments, shortlisted contracts under review, anticipated procurement pursuant to compliance obligations and authorized Board actions, and planned development efforts that are unlikely to vary in scale and timing. The base case resources and assumptions are listed below:

- All active and in-progress contracts, represented in the RDT as having a status of online, development or review
- 20 MW incremental solar plus battery storage operational by 2025 to be procured for MTR compliance
- 8 MW of new small hydropower operational by 2030
- 11 MW new standalone battery storage operational by 2026
- 6 MW solar plus storage procured through FIT Phase II program, operational 2025-2027
- 4 MW of community scale microgrids operational 2026-2030
- PG&E RPS & Carbon-Free Allocations contracted through 2035
- Balance of portfolio through 2029 met with short-term carbon-free energy

Incremental to the base case described above, the following resources, volumes and timing assumptions differentiate the four candidate portfolios:

1. Diverse Portfolio: 40 MW offshore wind by 2030; 15 MW new geothermal by 2030; biomass at current 18 MW level through 2035
2. Maximum Offshore Wind: 75 MW offshore wind by 2030; no new geothermal; no biomass after 2031 expiration of current power purchase agreement (“PPA”)
3. Maximum Geothermal: no offshore wind; 20 MW new geothermal by 2030, increasing to 40 MW by 2035; no biomass after 2031 expiration of current PPA
4. Short-Term Portfolio Content Category (“PCC”) 1: business-as-usual case for comparison comprised of short-term RPS procurement to meet portfolio needs 2030 and beyond in lieu of large new renewables; no biomass after 2031 expiration of current PPA

The portfolios were analyzed by leveraging the long-term hourly price forecast described above, as well as generation profiles and pricing for prospective resources that were provided to RCEA by private developers through its power solicitation processes. These profiles were further refined using the HedgeFox model. Each candidate portfolio was evaluated considering cost, reliability, GHG emissions, feasibility for development, and alignment with RCEA’s Board-adopted goals. Candidate portfolio 1 was ranked the highest for its overall ability to achieve these goals, high portfolio value, and resource diversity, as discussed further in Sections III(a) and III(b).

Economic Portfolio Value

RCEA evaluated candidate resources using long-run economic performance through 2044 to capture the value of resources with commercial operation dates near the end of the current IRP cycle’s time horizon. RCEA believes this allows for more holistic evaluation of long-term portfolio structures. Economic performance was modeled on an hourly basis with scaling to expected monthly production and is agnostic to long-run market fundamental views. This approach avoids temporal effects related to resource construction timing and captures the most important elements of a resource’s production curve relative to market value. Candidate resources are further evaluated for their RA value and renewable attribute value, culminating in a forward net value projection that is discounted to the present day.

Confirming Reliability

RCEA used its assigned percent share of the CAISO managed coincident peak provided by Energy Division staff as the basis to forecast its RA obligations through the IRP study horizon. RCEA then evaluated whether the candidate portfolio provided sufficient long-term capacity to meet RCEA's assigned reliability need each year, using a combination of contracted and calculated Net Qualifying Capacity ("NQC") and marginal Effective Load Carrying Capability ("ELCC") values provided in the RDT. RCEA targeted RA positions between 70% and 100% in each year to ensure the majority of its forecasted obligation across the planning horizon would be hedged by long-term contracts. RCEA then added enough short-term RA in years with outstanding open positions such that its total effective MW supply was equal to or greater than its reliability need in each year. Five of the twelve IRP years were over 100% hedged by long-term resources and thus didn't require the addition of assumed short-term RA procurement.

This procurement strategy allows RCEA some flexibility to adjust its portfolio due to the potential for significant changes in the compliance program as California continues to reassess its RA program to ensure system reliability over the ten-year planning horizon during the transition to a less carbon-intensive set of system resources. RCEA expects that this aspect of its planned portfolio may evolve the most in future IRP cycles as part of the broader policy discussion of California and Western Electricity Coordinating Council ("WECC") reliability.

RCEA also evaluated the performance of each candidate portfolio in terms of the monthly expected generation during RCEA's peak demand and total monthly generation relative to RCEA's load. These outcomes were incorporated into the comparative evaluation of the four candidate portfolios and used to weight them based on compatibility between generation profile and load, and a reduced reliance on unspecified system power.

Calculating GHG Emissions

RCEA calculated the emissions associated with the candidate portfolios described above, including its final Preferred Conforming Portfolio, using the Commission's CSP calculator. In comparing the emissions associated with each candidate portfolio, where scenarios failed to

comply or meet RCEA’s own emissions objectives, portfolios were modified to achieve compliance.

III. Study Results

a. Conforming and Alternative Portfolios

As required by the Commission, RCEA is submitting one portfolio that achieves emissions that are equal to or less than its proportional share of both the 30 MMT and the 25MMT GHG planning scenarios. In addition to conformance with the “equal to or less than” GHG emissions requirement, this portfolio is consistent with inputs and assumptions used by staff to develop the 2021 PSP, utilizes RCEA’s assigned forecasts for energy load, peak demand and demand modifiers, and achieves a perfect capacity equivalent equal to or greater than RCEA’s annual reliability need. In keeping with guidance from Energy Division staff, RCEA is providing copies of the RDT and CSP calculator for both the 25 MMT and 30 MMT GHG planning scenarios that contain identical supply and demand resources and inputs.

RCEA’s 25 MMT Conforming Portfolio

The diverse portfolio described in Section II(b)(ii) was built out into RCEA’s 25 MMT Conforming Portfolio. Table 3 is a list of resources by type, size and contract status included in this portfolio across the whole IRP horizon. The table includes existing resources that RCEA owns or contracts with, consistent with definitions provided in the RDT, resources RCEA plans to contract with in the future, and new resources that RCEA plans to invest in. No short-term, balance-of-position procurements are listed in the table.

Table 3: Specific Projects in RCEA’s 25 MMT Conforming Portfolio

Resource Name	Contract Status	Contracted Capacity (MW)	Description
Humboldt Redwood	Online	18	Biomass co-generation facility located in Scotia, Humboldt County

Resource Name	Contract Status	Contracted Capacity (MW)	Description
Cove Hydro	Online	6	Run-of-river hydroelectric plant located on Hatchet Creek in Shasta County
Redwood Coast Airport Solar Microgrid	Online	2	RCEA-owned front-of-meter multi-customer solar plus battery storage microgrid at Humboldt County's regional airport
Tierra Buena Energy Storage	Online	3	Jointly procured standalone storage resource in Sutter County that provides capacity only
Leapfrog Demand Response	Online	6	CAISO-wide DR capacity that provides capacity only
Sandrini Sol 1	Development	100	Solar facility in Kern County under construction
Hatchery Road Solar	Development	4	FIT Phase I project near Blue Lake, Humboldt County
North Coast Highway Solar	Development	2	FIT Phase I project near Hydesville, Humboldt County
Fairhaven Energy Storage	Development	17.25	Short-duration Li-ion battery storage in Samoa, Humboldt County to provide MTR capacity
Tumbleweed Long-Duration Storage	Development	2.5	Standalone Li-ion battery storage in Kern County to provide MTR long lead time ("LLT") capacity
Goal Line Long-Duration Storage	Development	2	Standalone Li-ion battery storage in San Diego County to provide MTR LLT capacity
Ormat Geothermal Portfolio	Development	Up to 4	Multiple new geothermal resources in Nevada and California to provide MTR LLT capacity
Fish Lake Geothermal	Development	0.36	New geothermal resource to be built in Nevada to provide MTR LLT capacity
Foster Clean Power A	Review	3	Solar plus storage resource to be built in Arcata, Humboldt County

Resource Name	Contract Status	Contracted Capacity (MW)	Description
North River Clean Power	Review	5	Solar plus storage resource to be built near McKinleyville, Humboldt County
Mad River Solar	Review	1	FIT Phase I project under evaluation
FIT Phase II Projects	Planned New	6	Solar plus storage hybrid resources to be located in Humboldt County
Community Microgrids	Planned New	4	Solar plus storage hybrid microgrids to be located in Humboldt County
Redwood Coast Offshore Wind	Planned New	40	Initial scale floating wind project 20-30 miles west of Humboldt Bay
New Local Small Hydro	Planned New	8	Run-of-river hydroelectric plant(s) to be located in Humboldt and/or Trinity County
GeoZone Project	Planned New	15	New geothermal resource to be developed in Sonoma, Mendocino, and/or Lake County
New Local Storage	Planned New	11	Short-duration Li-ion battery storage to be developed in Blue Lake, Humboldt County
Zero Emission Resource	Planned New	20	Solar plus storage hybrid resource to be located anywhere within CAISO for MTR Zero Emission Resource requirement

In summary, RCEA's 25 MMT Conforming Portfolio is composed of the following supply resources to meet RCEA's projected 2030 and 2035 energy and capacity needs:

- 18 MW online biomass
- 5.6 MW online small hydro
- 8 MW planned new small hydro
- 2.3 MW online solar
- 114.4 MW in development solar
- 30 MW planned new solar
- 40 MW planned new offshore wind
- 4.36 MW in development geothermal

- 15 MW planned new geothermal
- 4.5 MW in development long-duration storage
- 4.7 online short-duration storage
- 23.5 MW in development short-duration storage
- 41 MW planned new short-duration storage
- Carbon-Free and RPS Voluntary Allocations from existing PCIA resources

This portfolio includes a mix of online, in development and planned new resources, both contracted and not-yet-procured. Contracts with the status “review” in the RDT are included in the “development” categories listed above. On a nameplate capacity basis, approximately 8% of RCEA’s 2035 energy portfolio is composed of operational resources, while 92% of its 2035 portfolio is composed of new build resources. On the basis of expected energy production, the split is 12% operational and 88% new. This reflects RCEA’s plans to be an active player in the State’s development of new renewable resources.

As demonstrated in Table 4, new resource procurement in RCEA’s 25 MMT Conforming Portfolio is generally consistent with the Commission’s adopted 2021 PSP (38 MMT core portfolio, adopted with the 2020 IEPR demand forecast and high EV assumptions, 2022 costs and transmission upgrades), identified in D. 22-02-004 and subsequent guidance¹⁰. RCEA’s share of PSP resources is calculated as its assigned managed retail sales forecast as a percent of the total assigned CPUC-jurisdictional retail sales forecast.

Table 4: 25 MMT Conforming Portfolio Resource Procurement by Resource Type Compared to 2021 PSP

Resource Type	2021 PSP 2035 New Resource Capacity (MW)	RCEA Share of 2021 PSP New Resources (MW)	RCEA 25 MMT Conforming Portfolio (MW)	Explanation of Differences Between Load Share and 25 MMT Conforming Portfolio
Biomass	134	0	0	No difference
Geothermal	1,135	4	19.4	Pursuant to Strategic Plan goals & the MTR Procurement Order

Resource Type	2021 PSP 2035 New Resource Capacity (MW)	RCEA Share of 2021 PSP New Resources (MW)	RCEA 25 MMT Conforming Portfolio (MW)	Explanation of Differences Between Load Share and 25 MMT Conforming Portfolio
Hydro (Small)	-	0	8	Pursuant to Strategic Plan goals
Wind	3,562	13	0	Higher solar, geothermal, and offshore wind procurement in lieu of onshore wind
Wind on New OOS Transmission	4,636	17	0	
Offshore Wind	4,707	17	40	Pursuant to Strategic Plan goals
Utility-Scale Solar	17,418	63	144	Pursuant to Strategic Plan goals, RPS SB350 compliance & MTR Order
Battery Storage	17,350	63	47.3	10-year 17 MW contract expires in 2033, otherwise minimal difference
Pumped (Long-Duration) Storage	1,000	4	4.5	Minimal difference
Shed Demand Response	997	4	0	DR MCC bucket cannot accommodate additional capacity
Total Resources (Renewables + Storage + DR)	50,920	185	281	

The differences between RCEA’s proportional share of the 2021 PSP and the new resource buildout contemplated in its 25 MMT Conforming Portfolio reflect RCEA’s prior resource commitments and Board-adopted goals for renewable energy procurement and local development. For instance, RCEA’s 2019 RPS RFP resulted in the execution of a long-term PPA

with a new solar facility that will hedge around 45% of RCEA’s retail load starting in mid-2023, resulting in higher solar and lower wind procurement than RCEA’s load share of the PSP solar and wind buildout. The 2019 RFP was issued to meet RCEA’s long-term contracting requirement in RPS Compliance Period 4 and beyond per SB 350, as well as its internal clean and renewable energy goals.

As demonstrated in Figure 2, RCEA’s 25 MMT Conforming Portfolio is generally consistent with new resource procurement timing, as set forth in D.22-02-004.

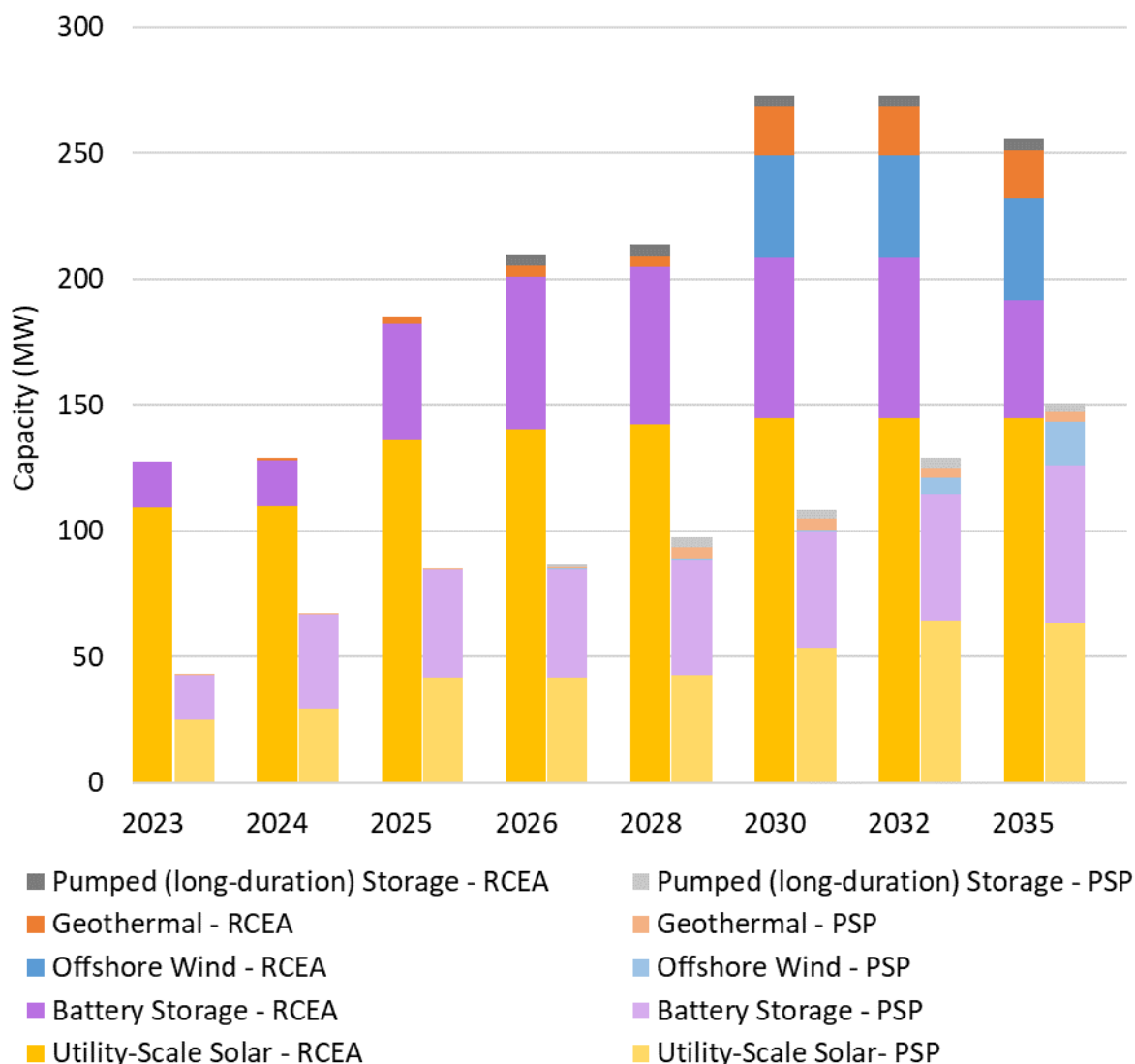


Figure 2: 25 MMT Conforming Portfolio New Resource Timing Compared To 2021 PSP Buildout

Generally, RCEA's timing for new resource procurement under its 25 MMT conforming portfolio aligns with the gradual annual increase of each resource category outlined in the 2021 PSP new resource buildout. On a cumulative capacity basis, RCEA's 25 MMT Conforming Portfolio results in the buildout of new resources in excess of its 2021 PSP obligation. Deviations from the resource procurement timing across all resources are mainly due to RCEA's more aggressive renewable procurement targets, leading to higher procurement at a faster rate across all resource types, except for short-duration battery storage. In comparison to the 2021 PSP, RCEA's 25 MMT conforming portfolio results in deficiencies of new short-duration storage in 2024 and 2035. The 2024 deficiency is attributed to MTR procurement challenges described in Section IV(a)(ii), and the 2035 deficiency is due to expiration of a 10-year battery storage contract in 2033 that isn't replaced in the portfolio. Another major exception is RCEA's pre-existing contract for a 100 MW solar facility that was executed primarily for RPS compliance purposes, as previously discussed.

Consistent with Energy Division staff guidance, RCEA does not plan to procure exactly according to the timing and proportional share of the 2021 PSP. This would be infeasible and imprudent for RCEA given its small size and thus small annual incremental resource shares. The resource timing outlined in RCEA's Conforming Portfolio layers in contracts of varying sizes to account for the pricing benefit associated with larger projects, while still allowing for smaller procurements in line with RCEA's Strategic Plan and Board direction, such as distributed solar and storage procured through RCEA's FIT program.

RCEA's 30 MMT Conforming Portfolio

RCEA's 30 MMT Conforming Portfolio is identical to its 25 MMT Conforming Portfolio described in the previous section and achieves emissions less than RCEA's proportional share of the 2030 38 MMT and 2035 30 MMT GHG emission benchmarks.

b. Preferred Conforming Portfolio

RCEA has adopted its 25 MMT Conforming Portfolio, which is described in detail in Section III(a), as its Preferred Conforming Portfolio. The portfolio includes the procurement of the following new resources that are not yet operational, the buildout of which is summarized in Figure 3:

- 100 MW Sandrini Sol 1
- 40 MW of Redwood Coast Offshore Wind
- 17.25 MW Fairhaven Energy Storage
- 6.5 MW of FIT Phase I solar projects
- 6 MW of FIT Phase II solar plus storage projects
- 5 MW North River Clean Power
- 4 MW Ormat Geothermal Portfolio
- 3 MW Foster Clean Power A
- 2.50 MW Tumbleweed Long-Duration Storage
- 2 MW Goal Line Long-Duration Storage
- 0.36 MW Fish Lake Geothermal
- 24 MW of new solar plus storage
- 15 MW of new geothermal
- 11 MW of new short duration storage
- 8 MW of new small hydro

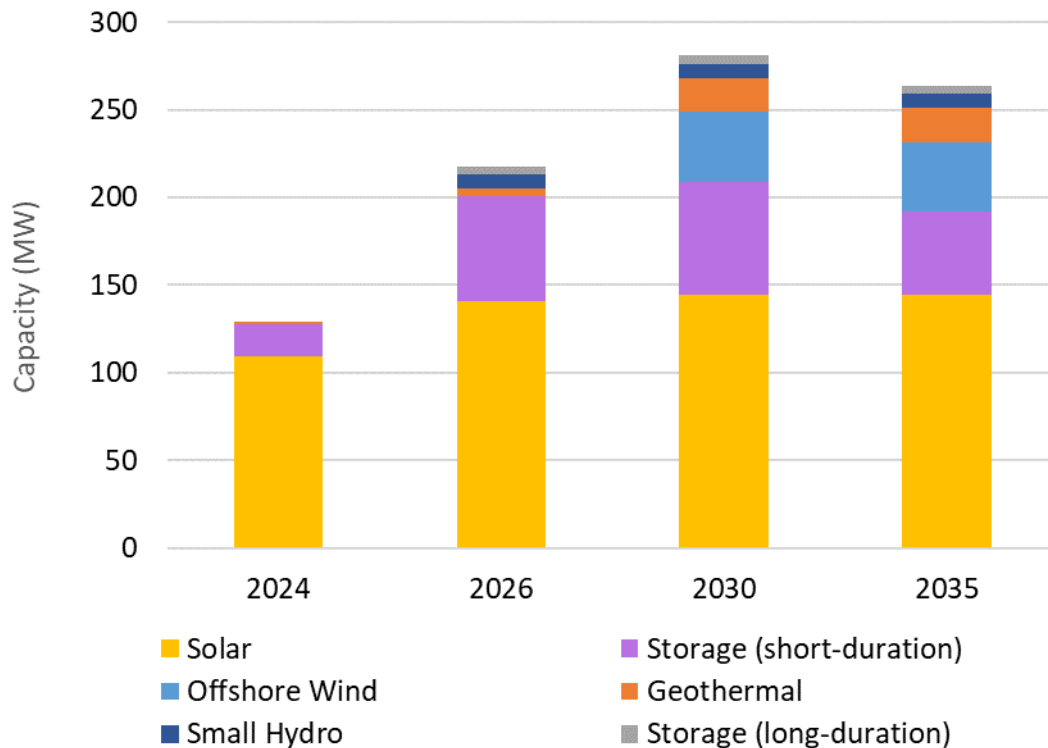


Figure 3: RCEA 25 MMT Preferred Conforming Portfolio New Resource Capacity Buildout

The Preferred Conforming Portfolio provides for the following overall resource mix in 2035:

- 147 MW of solar
- 49 MW of short-duration storage
- 40 MW of offshore wind
- 19 MW of geothermal
- 18 MW of biomass
- 8 MW of small hydro
- 4 MW of long-duration storage

In accordance with PUC Section 454.51(b)(3), RCEA’s governing board has determined that the resource mix in this portfolio achieves “*economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in PUC Section 454.51(a)(1).*” RCEA has determined that this Preferred Conforming Portfolio achieves

the statutory and administrative requirements in PUC Section 454.52(a)(1), as demonstrated in the following portfolio characteristics and benefits.

Meeting GHG Reduction Goals

RCEA's Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(A) goal of meeting the state's GHG reduction targets, as set by the Air Resources Board in conjunction with the Energy Commission and the Public Utilities Commission. The resultant GHG emissions from RCEA's Preferred Conforming Portfolio are lower than its load-proportional share of the 2030 30 MMT emissions benchmark and the 2035 25 MMT emissions benchmark, which are 0.074 MMT and 0.057 MMT, respectively. According to the CSP calculator, RCEA's Preferred Conforming Portfolio would result in -0.005 MMT of CO₂ in 2030 and 0.028 MMT of CO₂ in 2035, beating the benchmarks by 0.079 and 0.029 MMT, respectively. RCEA's negative emissions in 2030 are a result of oversupply of clean power outweighing positive emissions from system power, which includes dispatchable gas within CAISO and unspecified imports. By supplying excess power to the grid during certain hours, the portfolio banks emissions credits thereby resulting in net negative system power and thus net negative emissions in that particular year.

Procuring Renewable Energy and Long-Term Contracts

RCEA's Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(B) goal of ensuring that portfolios are composed of at least 60% eligible renewable resources by 2030. The portfolio contemplates increasing amounts of renewable energy each year until arriving at a portfolio of 100% PCC1 renewable resources by 2030, excluding RCEA's expected allocation of PG&E's PCIA carbon-free resources.

Beginning in 2024 and for each year thereafter in the IRP planning horizon, RCEA will have over 100% of its RPS procurement obligation required by SB 100 under long-term contracts of 10 years or greater duration, thereby significantly exceeding the SB 350 requirement for a minimum of 65% of the SB 100 RPS requirement in each compliance period to come from such long-term contracts. As of the date of submitting this IRP, RCEA has already procured long-term PCC1 solar, biomass and hydroelectric contracts making up well over half of its total portfolio,

with the biomass and hydroelectric contracts currently delivering and the solar project set to begin delivering in mid-2023.

Minimizing Bill Impact

RCEA is committed to providing just, reasonable, and competitive rates that will not increase bills above what the customer would pay in the absence of RCEA's CCA program. RCEA's Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(D) goal of minimizing the impact of planned procurement on ratepayers' bills. The portfolio consists primarily of renewable resources that have benefitted from increasing economies of scale over the past several years and have price projections that continue to drop in the foreseeable future. However, the portfolio also includes more expensive RPS resources such as offshore wind and geothermal, as RCEA recognizes the benefits of having a diverse portfolio, the importance of advancing emerging technologies such as floating offshore wind, the community benefits associated with these local resources, and these resources' contributions to reliability. The above-market cost of these resources is a tradeoff for their time-of-generation benefits, but RCEA's financial modeling supports their inclusion in the portfolio.

Based on the modeling described in Section II(b)(ii), RCEA's Preferred Conforming Portfolio is expected to maintain load-weighted annual cost within 6% of RCEA's calendar-year 2019 expenses throughout the modeling horizon after accounting for changes in the market prices of energy.

Also described in Section II(b)(ii), RCEA compared four potential candidate portfolios based on net cost through 2035. The portfolio that was eventually selected to become RCEA's Preferred Conforming Portfolio was chosen for its resource diversity, cost, reliability performance, alignment with RCEA's Board-adopted goals, and likelihood for implementation. The Preferred Conforming Portfolio is not projected to be the least expensive of the candidate portfolios considered. However, by providing a more diversified portfolio it reduces risk associated with any one technology for RCEA and more fully achieves energy resource diversification goals stated in RCEA's Strategic Plan.

Ensuring System and Local Reliability

RCEA will continue throughout the IRP planning horizon to procure RA in keeping with Commission year-ahead and month-ahead requirements, as well as contracting for long-term incremental capacity in keeping with existing and any future Commission reliability decisions. RCEA's Preferred Conforming Portfolio includes resources already contracted specifically to meet Commission reliability decisions to date, as well as expected capacity procurements pursuant to these obligations. However, with the current restructuring of the RA program in California, RCEA expects to adjust its RA procurement plans in the next IRP cycle to align with the products and obligations that are to be established with the new program.

RCEA's Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(E) goal of ensuring system and local reliability, as measured by the Commission's perfect capacity equivalent standard. Specifically, the portfolio is expected to supply between 146-151% of RCEA's forecast total load in the summer months and 101-108% in the winter months during 2030 and 2035.

Strengthening the Transmission and Distribution System

RCEA's Preferred Conforming Portfolio places strong emphasis on developing new, diverse, local resource capacity in Humboldt County, preserving existing diverse resource capacity via continued local biomass procurement, and supporting improvement of the local bulk transmission and distribution ("T&D") system.

In recent decades, generation located within the area now served by RCEA consisted mainly of PG&E's natural gas-fired Humboldt Bay Generating Station ("HBGS"), three biomass power plants with intermittent operating histories, and a handful of small, run-of-the-river hydropower plants operated seasonally. RCEA's Preferred Conforming Portfolio plans for several additional new clean resources to be built within or adjacent to its service area. These planned resources, including offshore wind, co-located and standalone solar and energy storage, and small hydro, will diversify energy sources meeting local load. Particularly in the

case of projects including energy storage, these new resources will contribute to resilience for local communities by potentially keeping segments of the local grid energized under conditions where outages might otherwise occur.

About 42% of the total energy supply in the 2035 portfolio is expected to come from resources within the Humboldt Local Capacity Area, which could reduce the future need for gas-fired generation within the region, especially if coupled with sufficient transmission infrastructure upgrades. RCEA's Preferred Conforming Portfolio also emphasizes resource diversity by including several dispatchable or baseload resources to complement the intermittent solar and wind in the portfolio, including storage, biomass, hydropower and geothermal. Although these have been and will be some of RCEA's more expensive procurements, their contribution to system and local reliability outweighs their above-market cost.

Plans for large-scale development of offshore wind off the Humboldt Coast, with RCEA as an active development partner, will call for development of new bulk transmission infrastructure that will benefit its service area by increasing capacity for both import and export of energy, overcoming the currently limited transmission connection between Humboldt County and the rest of the state. Transmission upgrades may also have the benefit of resolving current transmission and distribution constraints impeding interconnection of new load and distributed generation within the county, as described further in Section III(m).

Demand-Side Energy Management

RCEA's Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(G) goal of enhancing demand-side management ("DSM"). The assigned demand modifiers for energy efficiency, building and vehicle electrification, and BTM customer solar are incorporated into RCEA's Preferred Conforming Portfolio via demand-side assumptions in the CSP calculator from the CEC's IEPR demand forecast. A summary of these load modifiers is presented in Table 5.

Table 5: RCEA CSP Summary of Demand Modifiers

Demand Summary (GWh)	2024	2026	2030	2035
Managed Retail Sales Forecast (assigned to LSE)	678	681	685	689
Baseline Demand, non-C&I	428	435	448	455
Baseline Demand, C&I	397	403	415	422
Electric Vehicle Load	29	41	63	95
Building Electrification	3	6	12	19
Energy Efficiency	(11)	(19)	(34)	(49)
BTM PV	(114)	(130)	(164)	(199)
Demand (at generator busbar)	732	735	739	743

Minimizing Localized Air Pollutants with Emphasis on Disadvantaged Communities

RCEA’s Preferred Conforming Portfolio increases reliance over the IRP planning horizon on renewable and carbon-free resources that minimize local air pollutants and GHG emissions. RCEA does plan to continue to procure local biomass power that, while an RPS resource, does produce some local emissions. However, the use of existing generating infrastructure and community benefits including jobs and a means of disposing residual material from local forest products manufacturing make biomass a preferred resource for communities served by RCEA. RCEA’s service area does not include any CalEnviroScreen 4.0 (“CES”) disadvantaged communities (“DACs”) as defined by the State of California, but discussion on the broader definition of disadvantaged communities per this IRP cycle is included in subsequent narrative sections.

RCEA’s Preferred Conforming Portfolio achieves results and performance characteristics consistent with the PUC Section 454.52(a)(1)(H) goal of minimizing localized air pollutants and other GHG emissions with early priority on disadvantaged communities. RCEA’s Preferred Conforming Portfolio relies primarily on renewable generation and would have extremely low

GHG and localized air pollution emissions. While RCEA's Preferred Conforming Portfolio does not include any energy contracts with gas generators, it does include a biomass facility located in RCEA's service territory. Air pollutant implications of this are discussed further in Section III(f). Lastly, RCEA's Preferred Conforming Portfolio minimizes RCEA's reliance on unspecified system power, instead opting for renewable generation procurement and development whenever feasible. RCEA's Preferred Conforming Portfolio will not include any contracts for new natural gas resources or re-contracting with terms of five years or more for existing natural gas resources.

c. GHG Emissions Results

RCEA used its load-based proportional share of the 2030 30 MMT and 2035 25 MMT benchmarks to determine the emissions compliance for its Preferred Conforming Portfolio, as described in Section III(d). Under the 2035 25 MMT GHG emission planning scenario, RCEA's Preferred Conforming Portfolio would result in CO₂ emissions that are 107% lower than its assigned 2030 GHG benchmark and 51% lower than its assigned 2035 GHG benchmark, as shown in Figure 4. Also shown are the resultant criteria air pollutants generated by the portfolio from the 25 MMT CSP calculator, which are described further in Section III(d).

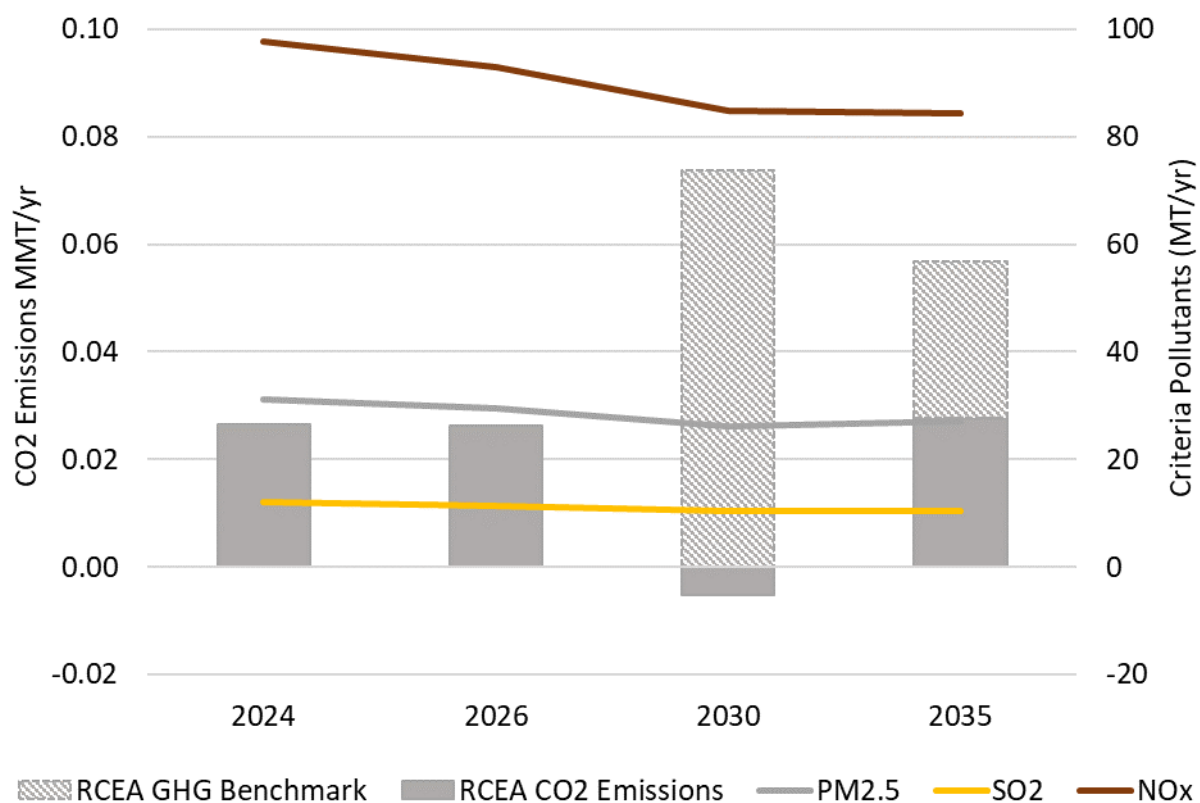


Figure 4: RCEA Preferred Conforming Portfolio 25 MMT CSP Calculator Results

Under the 2035 30 MMT GHG emission planning scenario, RCEA's Preferred Conforming Portfolio would result in CO2 emissions that are 120% lower than its assigned 2030 GHG benchmark and 87% lower than its assigned 2035 GHG benchmark, as shown in Figure 5. Also shown are the resultant criteria air pollutants generated by the portfolio from the 30 MMT CSP calculator, which are described further in Section II.

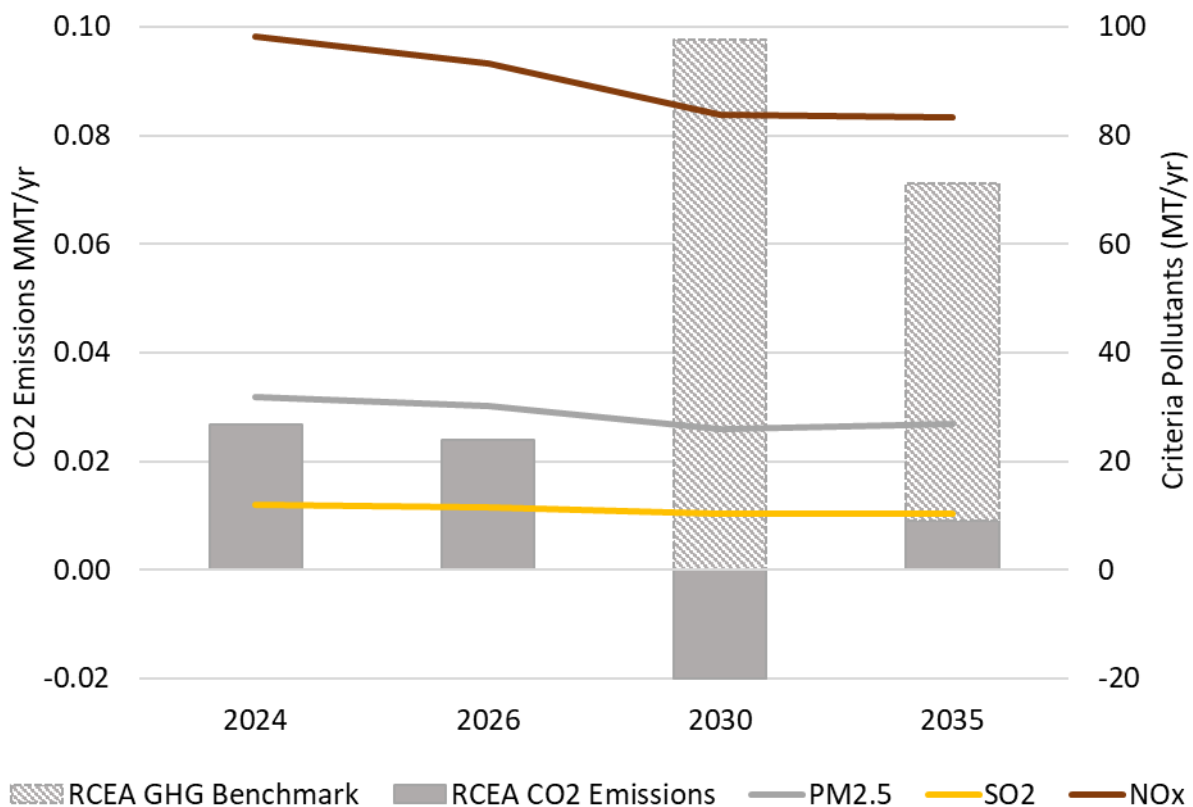


Figure 5: RCEA Preferred Conforming Portfolio 30 MMT CSP Calculator Results

RCEA used a custom hourly load shape for analyzing GHG emissions in the CSP calculator. Historical load data from January 2018 through December 2021 was obtained from RCEA's settlement quality meter data ("SQMD"). This load data was aggregated using the same methodology as RCEA's current SQMD process, which has used localized load profiles instead of PG&E system profiles since March 1, 2019. This dataset is reflective of realized customer opt-out rates. Hourly load data across all four historic years were synchronized across 8,760 hourly intervals, and averaged at each interval. The average load at each hour was then divided by the total average annual usage to generate a normalized load profile that could be applied to forecasted demand. The monthly energy usage is the sum of the hourly output in each month and the peak demand for each month is the resulting maximum forecasted hour for each month.

d. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

Table 6 shows 2030 and 2035 criteria air emissions associated with RCEA's Preferred Conforming Portfolio as estimated by the 25 MMT version of the CSP calculator, in metric tons per year.

Table 6: 25 MMT Preferred Conforming Portfolio Criteria Air Pollutants

Pollutant	2030	2035
PM 2.5	26.2	27.1
SO ₂	10.4	10.4
NOx	84.2	84.2

Table 7 shows 2030 and 2035 criteria air emissions associated with RCEA's Preferred Conforming Portfolio as estimated by the 30 MMT version of the CSP calculator, in metric tons per year.

Table 7: 30 MMT Preferred Conforming Portfolio Criteria Air Pollutants

Pollutant	2030	2035
PM 2.5	26.0	27.0
SO ₂	10.4	10.4
NOx	83.9	83.3

ii. Focus on Disadvantaged Communities

CalEnviroScreen 4.0's mapping tool shows that no part of RCEA's service territory includes the state's top 25% of impacted census tracts, or census tracts with the highest pollution burden. Therefore, there are no "disadvantaged communities" in RCEA's service area according to CES 4.0 criteria. While not featured in the top 25th percentile of CES 4.0, the Yurok Reservation and Hoopa Reservation, both within RCEA's service area, are identified as SB 535 Disadvantaged

Communities according to the 2022 map developed by the California Office of Environmental Health Hazard Assessment.¹⁸ In addition to these two SB 535 Disadvantaged Communities, several other federally recognized tribes have tribal lands within Humboldt County¹⁹:

- Bear River Band of the Rohnerville Rancheria
- Big Lagoon Rancheria
- Blue Lake Rancheria
- Cher-Ae Heights Indian Community of the Trinidad Rancheria
- Trinidad Rancheria
- Karuk Tribe
- Wiyot Tribe

Of the tribes within RCEA's service area footprint, the Hoopa Valley Tribe experiences particularly high air pollution due to its location within a high fire threat district.²⁰

Consequently, the Hoopa Valley Tribe is also subject to frequent PSPS events and power outages. RCEA has initiated conversations with the Tribe to discuss the feasibility of installing a clean energy substation microgrid and other clean sources of back-up power. Additionally, RCEA is partnering with the Bear River Band of the Rohnerville Rancheria to launch a Mobile Home Solar program. This program, developed per the request of RCEA's CAC, is geared toward providing clean energy to low-income customers living in mobile homes.

RCEA recognizes poverty and low household income are widespread in Humboldt County, as shown by other criteria beyond those used in CES. For example, of RCEA's ~62,000 electric accounts, approximately 15,000 are residential CARE-eligible accounts. RCEA is dedicated to minimizing local air pollution and recognizes that lower income residents can be the most vulnerable to air pollution and other adverse environmental impacts, generally. RCEA also

¹⁸ <https://oehha.ca.gov/calenviroscreen/sb535>

¹⁹ List of Federally Recognized Tribes, Indian Health Service, January 28, 2022

²⁰ Office of the State Fire Marshal, CalFire, State Responsibility Area, November, 2007 (most recent data available)

adopted a resolution calling for a Racial Justice Plan following the 2020 IRP cycle; one of the goals to be included in this plan is to pursue energy justice in power procurement and energy resource development. It is anticipated the RCEA Board of Directors will adopt the Racial Justice Plan in Q4 2022.

RCEA's Preferred Conforming Portfolio includes approximately 10-15% of its energy supply from the Humboldt Redwood biomass plant. As part of its solicitation process for procuring biomass power, RCEA required the offerors to disclose their environmental compliance history, including emissions violations. This compliance history was considered in selecting local power providers. Furthermore, in response to concerns from members of the public and the RCEA Board, the biomass PPA includes clauses that allow the contract to be canceled on the grounds of non-compliance with applicable laws, including air quality standards.

The Humboldt Redwood biomass plant is the only specified source of NO_x, SO₂ or PM_{2.5} emissions in RCEA's Preferred Conforming Portfolio. Since the portfolio contemplates steady biomass procurement from the same facility, with the facility's current contract with RCEA running until 2031 and this contract assumed in RCEA's Preferred Conforming Portfolio to be extended throughout the IRP planning horizon, the resulting criteria pollutants are expected to remain constant over time as is shown in the CSP calculator results. RCEA's Board made it a condition of extending the biomass contract to 2031 that the plant's owner, Humboldt Sawmill Company ("HSC"), provides periodic reporting to RCEA on plant performance and alternative uses of the biomass feedstock used by the plant. This condition was in response to community concerns about criteria pollutants and GHG emissions from the plant. To fulfill the Board's intent, RCEA has entered a memorandum of understanding ("MOU") with HSC that calls for annual reporting on fuel use and sources, emissions, and information regarding HSC's consideration of other potential feedstock uses that could result in reduced air quality impacts.

As previously stated, RCEA's Board adopted a policy of transitioning to 100% clean and renewable power by 2025. Except for RA resources, RCEA intends to develop or contract for its full energy needs with renewable and GHG-free generation and energy storage resources. RCEA's Preferred Conforming Portfolio does not include energy contracts for gas generators,

including those located within or adjacent to DACs. The portfolio also minimizes the use of unspecified system power, reducing its potential indirect reliance on gas generators that have an impact on DACs. The portfolio does, however, continue to rely on unspecified system power for declining portions of its pre-2025 energy needs, as well as on combustion gas capacity to meet the balance of its RA needs in four of the twelve IRP planning years. However, RCEA aims to reduce its reliance on unspecified system power and gas-based RA over the IRP planning horizon.

e. Cost and Rate Analysis

RCEA's goal since CCA program launch has been to offer competitive rates to its customers. RCEA's rates are currently discounted 0.5% below the corresponding rates offered to bundled customers by the IOU operating in RCEA's service area. Like many other CCAs, RCEA does not currently use a traditional bottom-up, cost-of-service rate-making model. Given the construct in California where CCAs operate within IOU service areas and must compete with the IOU for rate-sensitive customers who can opt out of CCA service at any time, RCEA sets its rates at a fixed discount relative to the IOU's corresponding rates, taking the PCIA and other departing load charges into account. The intent is to apply a rate discount that guarantees cost-competitiveness with the IOU while allowing RCEA to cover its operating costs, including new resource procurement, and building reserves needed for long-term financial viability. Should RCEA find itself challenged to meet its financial targets due to increased procurement costs over expected revenue, the first response would be to temporarily reduce reserve contributions or even draw down reserves. RCEA might also respond by temporarily reducing its short-term procurement of renewable or carbon-free resources such that state-mandated RPS targets are achieved but voluntary over-procurement is reduced or eliminated. Reducing or eliminating the customer rate discount is generally considered a last-resort solution. Therefore, procurement cost impacts do not necessarily imply customer rate impacts.

To ensure long-term financial stability, RCEA may make a strategic decision to move to a cost-of-service rate structure in the future rather than a fixed discount from IOU rates, but in any

case, will continue to provide customer rates that are just and reasonable. RCEA's Preferred Conforming Portfolio has been designed to keep power procurement costs at a level that will support this customer rate goal. In selecting supply resources for this portfolio, RCEA carefully considered the cost implications of candidate resource selections and procurement timing. This analysis was informed by forward price projections generated as described in Section II(b). In general, RCEA sought to balance the need to procure resources with enough lead time to meet its LSE-specific energy shortfalls and the Commission-identified overall system need for new resources with the cost-saving benefits of waiting to procure renewable and storage resources with downward sloping cost projections.

RCEA's Preferred Conforming Portfolio takes advantage of the historically falling cost of solar, wind, and battery storage resources. Recent data show cost declines have leveled off or even reversed, but this may be a transitory consequence of recent global supply chain interruptions. The portfolio also takes advantage of the fact that, compared to IOUs, CCAs have significantly shorter generation project development timelines, in part because CCAs do not require Commission approval of such projects. These shorter timelines result in significant direct cost savings and give RCEA more flexibility to time its procurement to take maximum advantage of falling renewable generation prices. RCEA used recent developer-derived estimates for new resource builds as a starting point for expected resource costs. Additionally, RCEA's economic analysis was cognizant of the recently passed Inflation Reduction Act, which has created further downward pressure on the expected costs of new renewable and carbon-free generating technologies. RCEA has calibrated the expected costs assumed in its economic analysis of the various portfolio configurations to account for these effects. In general, these calibrations, applied in a technology-neutral and conforming manner with the legislation, result in greater net portfolio value over time for planned new resources that do not yet have executed contracts. RCEA believes the benefits of the Inflation Reduction Act in reducing the costs of new resource builds may be greater than assumed in its economic analysis but has tempered these expectations for the purpose of prudent portfolio management and planning.

RCEA's Preferred Conforming Portfolio is diverse in both technology type and operational timing, seeking to both capture current opportunities for development while looking ahead to further cost-effective resource buildout. To ensure that its Preferred Conforming Portfolio is cost-effective, RCEA evaluated the incremental value of each resource relative to its current portfolio. The RCEA Preferred Conforming Portfolio meets reliability and emissions requirements while representing a clear net economic benefit to RCEA customers on an economic basis.

RCEA's Preferred Conforming Portfolio reflects its Board's larger commitment to developing renewable resources within the local region, which represents the broader community and RCEA customers' prioritization to reduce their contribution to climate change. As always, the prioritization for local green energy development must be balanced against the potential cost and rate impacts to RCEA's customers. At this time, the results of RCEA's economic analysis supports that the cost impact of its Preferred Conforming Portfolio can be absorbed over time with reasonable rate adjustments, but this is an issue that RCEA staff will continue to monitor and discuss with its Board and the larger community.

In September 2021, RCEA's Board adopted a policy allowing the organization to *"negotiate and execute non-standard pricing agreements with eligible commercial and industrial customers and RCEA's member agencies,"* provided that such agreements:

1. apply exclusively to customers with aggregate annual load across all its accounts in RCEA's service territory greater than 7 million kWh, and RCEA's member agencies regardless of annual load;
2. be based on marginal cost and account for any volume and/or price risk;
3. be priced to allow RCEA to cover variable costs and achieve some level of contribution to fixed cost and reserve margin, in conformance with RCEA's financial objectives and its Risk Management Policy and controls;
4. require a commitment level from the customer (e.g., volume, length of term) commensurate with the non-standard pricing agreement offered to the customer;

5. be consistent with RCEA's renewable and carbon-free compliance requirements and portfolio targets.

As these terms show, such pricing agreements would, for specific large customers, constitute a departure from RCEA's IOU-discounted ratemaking approach described above, instead using a cost-of-service model. Several existing Direct Access customers located in RCEA's service area as well as prospective new industrial customers have expressed interest in such non-standard pricing agreements. These customers could substantially increase RCEA's load over the IRP horizon but are not included in RCEA's load forecast and thus are not reflected volumetrically in the Preferred Conforming Portfolio. Should efforts to acquire these customers progress over the next few years, RCEA will work with the CEC and CPUC to ensure its managed retail sales forecast accounts for this increased load during the next IRP cycle.

f. System Reliability Analysis

RCEA's Preferred Conforming Portfolio is reliable and contributes RCEA's fair share to system reliability. To confirm this, RCEA assessed the portfolio based on annual RA position relative to its assigned reliability need, total seasonal generation, and hourly generation during system peak hours. For total generation, RCEA's Preferred Conforming Portfolio is expected to generate 146-151% of RCEA's forecast load in the summer months (June through October) and 101-108% in the non-summer months (November through May) during 2030 and 2035. During system peak hours, RCEA's Preferred Conforming Portfolio is expected to provide up to 180% of RCEA's own forecasted local demand in summer months in 2030 and 2035. In the winter and shoulder months, the Preferred Conforming Portfolio is expected to generate up to 125% of RCEA's forecast demand during forecasted system winter peaks in 2030 and 2035.

RCEA intentionally developed its Preferred Conforming Portfolio to exceed its forecasted need in the summer months, given the summer-peaking nature of California's broader electric system. It is expected that RCEA's portfolio and Humboldt's renewable resources in general could provide much-needed reliability to the broader grid during these critical months (assuming sufficient transmission upgrades) and, likewise, RCEA's service territory could utilize

some amount of system power during its own winter peak when demand is low in other parts of the state. Additional transmission infrastructure or upgrades to existing infrastructure would likely be required to maximize the contribution to system reliability by capacity resources developed in the Humboldt Local Capacity Area, given the transmission-constrained nature of the region.

The effective capacity of RCEA's Preferred Conforming Portfolio is provided in Figure 6 and Table 8 from the Reliability tab of the RDT. Figure 6 shows effective resource capacity by contract status and Table 8 shows total reliability need, total supply, and net capacity position for all study years (note that the rows containing RCEA's total reliability need, and net capacity position are confidential and are excluded from the public version of this narrative).

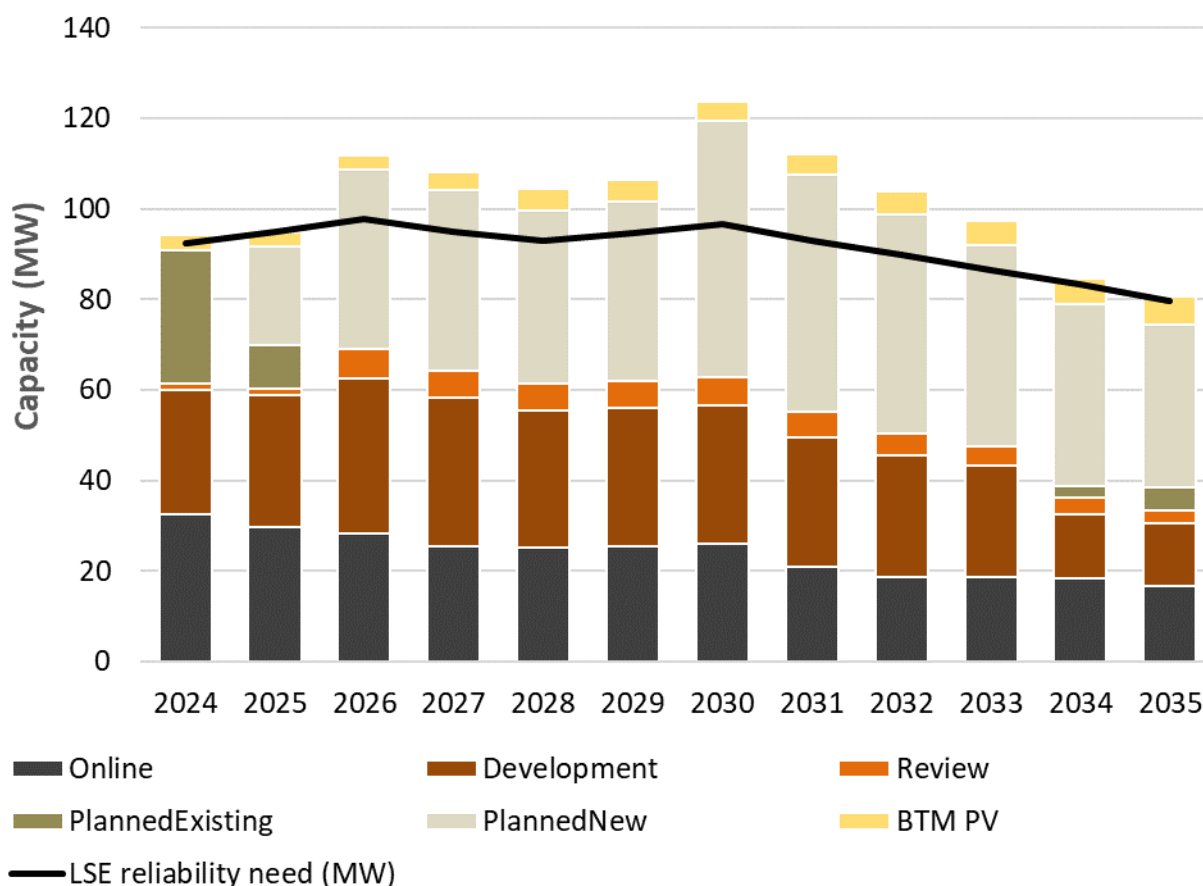


Figure 6: RCEA Capacity Need by Contract Status (25 MMT RDT)

Table 8: Load and Resource by Contract Status (25 MMT RDT)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
RCEA reliability need (MW)	Confidential											
ELCC by contract status (effective MW)												
Online	32	30	29	26	25	26	26	21	19	19	19	17
Development	27	29	34	32	30	30	30	28	26	25	14	14
Review	1	1	6	6	6	6	6	6	5	4	4	3
Planned Existing	30	10	0	0	0	0	0	0	0	0	3	5
Planned New	0	22	40	40	38	40	57	53	48	44	40	36
BTM PV	3	3	3	4	5	5	4	5	5	5	6	6
RCEA total supply	94	95	112	108	105	106	124	112	104	97	85	81
Net capacity position	Confidential											

As demonstrated above, RCEA's Preferred Conforming Portfolio meets the perfect capacity equivalent standard defined by Energy Division staff in all IRP years. In eight of the twelve IRP planning years, the effective capacity from long-term RCEA's contracted and planned resources exceeds its managed reliability need. In only the first two years and the last two years of the IRP planning horizon, RCEA met the small balance of its managed reliability need via short-term RA procurements from generic existing combined cycle gas resources. This demonstrates that RCEA's preferred resource selections work together to effectively and reliably integrate a renewables-heavy portfolio while reducing reliance on existing fossil resources, thus meeting and exceeding RCEA's share of any systemwide renewable integration resource requirement.

g. High Electrification Planning

RCEA's Strategic Plan, updated in 2019, includes a goal to "[e]xpand existing energy efficiency, conservation and electrification programs to reduce GHG emissions from fossil fuel use in buildings by 20% by 2030 and maintain a trajectory to reduce emission from natural gas by 90% by 2050." The Strategic Plan also describes RCEA's transportation electrification goals as follows:

"Accelerate the adoption of electric vehicles, with a target of over 6,000 electric vehicles on the road in Humboldt County by 2025 and 22,000 vehicles by 2030. Develop public, workplace, and residential electric vehicle charging infrastructure necessary to support these county-wide electric vehicle targets.

Work with other local public entities to reduce vehicle miles traveled in Humboldt County by at least 25% by 2030.

By 2030 reduce greenhouse gas emission from transportation by over 65% through reductions in vehicle miles traveled, improved vehicle efficiency, the adoption of electric vehicles, and, where determined to be an effective emissions-reduction strategy, the use of biofuels as a bridge to a full transition to zero-emissions vehicles. Maintain a trajectory of emissions reduction to eliminate the use of fossil fuels by 2050."

To achieve these ambitious goals, in addition to operating a CCA program, RCEA's organization includes separate departments focused on demand-side management, transportation electrification and infrastructure planning. Strategies implemented by these departments in pursuit of the above goals are described in this IRP.

RCEA's Demand Side Management department is implementing or has implemented the following programs that include high electrification targets or activities:

- As an elect-to-administer Program Administrator ("PA"), RCEA is operating an Enhanced Heat Pump Incentive Campaign ("EHPIC") promoting non-residential heat pump installations. RCEA also offers incentives for direct install of a broad range of energy

efficiency and fuel substitution measures including refrigeration, LED lighting, and kitchen equipment. This program is funded through June 2023. RCEA also offers rebates for residential heat pump installations and other energy efficient equipment.

- RCEA, on behalf of six partners, submitted a Motion to form the Rural Regional Energy Network (“RuralREN”) in March 2022. The RuralREN consists of six program areas. The RuralREN’s key electrification offerings consist of a residential whole-house energy efficiency and electrification rebate and direct-install program, a commercial energy efficiency and electrification rebate and direct-install program, and a workforce program to build careers and upskill existing workers in building electrification technologies.
- RCEA has applied to extend its existing Local Government Partnership (“LGP”) with PG&E for the period July 2023-December 2025, with an option to extend that for one additional year. The RCEA-PG&E LGP has in its most recent phase been a non-resource program (i.e., without specific measurable energy saving targets). Program offerings include public energy project management, benchmarking, leads to resource acquisition programs, public and non-residential energy assessments, and energy education events and workshops.
- RCEA is a recipient of a TECH Quick Start Grant funding rebates for installations of heat pumps for customers using "unregulated" or non-utility household fuels (e.g., firewood, fuel oil and propane) and has applied for a second round of funding to conduct a barrier analysis for rural unregulated fuel users electrification. If awarded, offerings under this program will include community and contractor workshops to educate and identify rural barriers to electrification, electrification assessments, heat pump (space and water heating) installations, and the barrier analysis itself. The term for this grant is January 2023 – April 2024.
- Energy Conservation Assistance Act (“ECAA”) is a funding source provided by the CEC which provides low-interest loan financing to public agencies, community colleges, cities, community service districts, and others for energy efficiency and renewable energy projects. RCEA helps local qualified entities navigate the ECAA financing process to fund their own energy projects, including electrification projects.

RCEA's infrastructure planning and transportation department is pursuing the following strategies and programs to achieve high transportation electrification:

- Regional Electric Vehicle Charging Network ("REVNet"): RCEA owns and operates a network of 27 public charging stations within its service area that features 52 charging ports at 13 locations.²¹
- California Electric Vehicle Infrastructure Project ("CALeVIP") 1.0/2.0: RCEA has received funding from the CEC's CALeVIP program for a number of the public electric vehicle charging stations ("EVCS") operated by, or to be operated by, RCEA. Many of these charging stations are already operational, with additional stations to be installed as part of RCEA's Redwood Coast Airport Microgrid ("RCAM") and at other locations.²²
- CEC Regional MD/HD Community Blueprint. RCEA has received a \$200,000 grant from the CEC to identify how the region can transition to clean energy for mid- and heavy-duty vehicles. The project scope includes inventorying vehicle classes and counts, identifying use cases, determining types and volumes of fueling requirements (electricity and hydrogen), and recommending associated infrastructure. Initial tasks include characterizing existing vehicle population and stakeholder engagement, scheduled to begin in the second quarter of 2023. Electric load impacts of this program have not yet been determined but are expected to be available for reporting in the next IRP cycle.²³
- GFO-21-604: North Coast Plug-In Electric Vehicle Charging Network Phase 2. With funding from the CEC, RCEA collaborated with Schatz Energy Research Center on a project to improve electric vehicle charging access in RCEA's service area. Key tasks included installing ten EVCS at nine locations in Humboldt County, the successful demonstration of a not-for-profit EVCS owner/operator model, the development of a

²¹ <https://redwoodenergy.org/evs/public-charging/>

²² <https://calevip.org/incentive-project/northern-california>

²³ https://www.energy.ca.gov/sites/default/files/2021-08/2021-09-08_Business_Meeting_Agenda_ADA.pdf. (See item 11.d.)

novel hardware and software solution to address parking scarcity at one key location, and data collection from network operations.²⁴

- Communities in Charge program. RCEA has engaged with non-profit GRID Alternatives through this CALSTART-administered, CEC-funded program *“to design and implement incentive projects for the deployment of light-duty electric vehicle chargers.”*²⁵
- Transportation electrification rebates. To date these have included rebates for purchase of electric vehicles, electric vehicle chargers, and electric bikes, with the EV and EV charger rebates currently active. The electric vehicle rebate offers an additional 50% of the rebate amount offered by the State of California’s Clean Vehicle Rebate Project rebate.²⁶

As a result of these activities and those built into the high electrification IEPR case, RCEA’s retail load and peak demand would increase above its assigned managed retail sales forecast. Based on guidance from Energy Division staff, RCEA calculated an incremental load of 147 GWh and an incremental peak demand of 1.7 MW in 2030, growing to 257 GWh and 5.9 MW in 2035, under the high electrification planning scenario. Table 9 shows RCEA’s additional resource procurement plans given this planning scenario, which is comprised of expanded buildout of planned new geothermal procurement shown in RCEA’s RDT.

Table 9: 2035 Additional Resource Planning for High Electrification

Resource Type	MWs	Annual GWh	2035 GHG target	Transmission Zone	Substation/ Bus	Alternative location
Geothermal	30	258	Both	PG&E	Sonoma	Mendocino

²⁴ <https://www.energy.ca.gov/publications/2022/north-coast-plug-electric-vehicle-charging-network>

²⁵ <https://www.energy.ca.gov/proceedings/energy-commission-proceedings/communities-charge#:~:text=CALSTART%2C%20Inc.,incentive%20projects%20with%20public%20input.>

²⁶ <https://redwoodenergy.org/evs/rebates/> and <https://redwoodenergy.org/evs/evchargers/>

h. Existing Resource Planning

In developing its Preferred Conforming Portfolio, RCEA aimed to reduce reliance on uncontracted existing resources and on system power over the IRP planning horizon. The following existing resources, which have contract statuses of “online” and “planned existing” in the RDT, are included in the portfolio:

1. Long-term energy purchase contracts and an owned generating resource
2. Long-term capacity purchase and sales contracts
3. Carbon-free and voluntary RPS energy allocations from PG&E’s PCIA resources
4. RCEA’s assigned capacity share of CAM, RMR and DR resources
5. Short-term procurements from existing generic large hydro
6. Extension of the Humboldt Redwood biomass contract from 2031 to 2035

The first four groups of existing resources do not present risk of non-availability for RCEA’s portfolio because they are already procured through executed contracts. There is some volumetric risk associated with the energy and capacity allocations described in the third and fourth items, but they represent a small portion of the overall portfolio and thus can be optimized with short-term purchase and resale transactions.

Risk associated with reliance on short-term procurement from existing generic large hydropower resources due to drought and declining snowpack is discussed in Section III(i). Competition with other LSEs is also a factor for this resource, including those within California and across the greater WECC as other states adopt and ramp up clean energy goals. Given RCEA’s small load relative to other LSEs, it does not foresee an inability to procure the carbon-free volumes shown in its Preferred Conforming Portfolio due to competition. However, given that procurement of existing large hydro has little to no incremental climate benefits, RCEA aims to reduce reliance on this resource over the next several years, and to phase it out completely from its portfolio by 2030.

Risk of not being able to extend the contracted delivery term of the Humboldt Redwood biomass facility, should RCEA’s Board elect to, is low. RCEA and the plant owner have an

established, positive working relationship. Also, the technology type and cost of the facility are such that competition with other LSEs is low, as demonstrated by the fact that the plant was operating on a merchant basis for years prior to RCEA’s award of a contract in 2016.

Table 10 shows a comparison of the amounts of existing resources included in RCEA’s 2022 Preferred Conforming Portfolio to those included in its 2020 38 MMT Preferred Conforming Portfolio, in terms of maximum annual energy contribution throughout the respective IRP horizons. Excluded from the table are resources that have become operational since RCEA’s 2020 IRP submission, as well as RCEA’s elected allocations of PG&E’s PCIA-eligible RPS and carbon-free resources. The portfolio reliance on existing resources has significantly reduced from 2020 to 2022, and new candidate resources that were not yet planned in 2020 have now been incorporated into RCEA’s procurement strategy.

Table 10: Existing Resources in RCEA’s Preferred Conforming Portfolio

Existing Resource Type	2020 38 MMT PCP (GWh/year)	2022 25 MMT PCP (GWh/year)
Biomass	120	100
Large Hydro	240	200
Small Hydro	15	10
Wind	145	0
Total	520	310

There is some risk of reduced generation and underperformance of future existing resources within RCEA’s service area due to PG&E’s disconnection of all third-party generators with nameplate capacity greater than 1 MW during islanding of the utility’s HBGS facility to mitigate PSPS events and other transmission outages, as discussed in Section III(n). RCEA is engaging PG&E on this issue in an effort to come to resolution that maintains safe operation of the HBGS island while not precluding continued operation of third-party generators during transmission shutoffs.

i. Hydro Generation Risk Management

RCEA plans to phase out large hydropower procurement by 2030 when large-scale renewables come online; as such, the Preferred Conforming Portfolio includes short-term large hydro in declining amounts through 2029, as shown in Table 11. RCEA's renewable and carbon-free procurement targets are based on guidance from the RCEA Board of Directors and generally guided the development of RCEA's Preferred Conforming Portfolio.

Table 11: RCEA's Procurement Targets

	2024	2025	2026	2027	2028	2029	2030
Renewable	50%	56%	62%	68%	76%	84%	100%
Carbon Free	45%	44%	38%	32%	24%	16%	0%

In developing the portfolio, RCEA took several steps to manage the risk of reduced hydropower availability due to in-state drought. Specifically, RCEA limited its reliance on large hydro, which could come from in-state or out-of-state resources to the near-term IRP planning years, in recognition that once new RPS resources in the portfolio are fully developed they will generate sufficient energy to meet RCEA's load.

Compared to RCEA's 2020 IRP portfolio, RCEA's Preferred Conforming Portfolio relies on less large hydropower, as shown in Table 10. The Preferred Conforming Portfolio also relies less on in-state hydroelectric generation, favoring import of this resource from the larger WECC region where climate and drought impacts aren't yet taking as severe of a toll on the hydro resources as in California. RCEA is cognizant that out-of-state hydropower will face the same challenges from climate and drought impacts over time given warming temperatures and the potential for reduced snowpack in the long run. RCEA believes its strategy will avoid exposure to significant impacts from these risks over time as it will continue to substitute new renewable resources for legacy hydropower. It is likely that RCEA will not be reliant on existing hydropower by the time climate risks severely hamper its availability.

The only in-state large hydropower included in the portfolio is a small amount from PG&E's Carbon-Free Allocation of PCIA resources. RCEA will look to further reduce its use of large hydro over time as newer generating technologies become less costly, and development of planned resources progresses. RCEA has robust environmental goals that it would prefer to meet with new (and ideally local) renewables. Nevertheless, RCEA must balance that preference with the commitment it has made to pursuing near-term environmental goals that necessitate the continued use of large hydropower in the near term.

At the same time, RCEA recognizes the important role that small, run-of-river RPS-eligible hydropower, both existing and new projects, can play in the portfolio. In 2019, RCEA added a 15-year contract with the existing 5.6 MW Cove hydro project to its portfolio, which began delivering RPS-eligible power to RCEA in early 2020. RCEA has also engaged a consultant to investigate potential for development of new RPS-eligible hydro projects in Humboldt and Trinity Counties, as a first step in development of this resource included in RCEA's Preferred Conforming Portfolio. Although this investigation into small hydro development was recently paused during the pandemic, RCEA plans to pick up on these efforts in the coming years, as discussed in Section IV(a)(v).

j. Long-Duration Storage Planning

RCEA and twelve other CCAs issued a request for information ("RFI") on long-duration storage ("LDS") in June 2020. This RFI defined LDS resources as those with the capability to discharge at full capacity for at least 8 hours. Subsequently RCEA and a smaller group including seven other CCAs issued an LDS request for offers ("RFO") in October 2020, to meet each CCA's respective portfolio needs and in anticipation of potential procurement mandates by the CPUC.

In February 2021, California Community Power ("CC Power") was formed by ten CCAs, including RCEA, to share resources and risk related to the procurement of difficult-to-acquire resources. Once formed, CC Power took over the Joint LDS RFO, including shortlisting of projects and coordination of negotiations and development of necessary agreements.

In June 2021, as part of the 2020 IRP, the CPUC issued through Decision 21-06-035 the MTR Procurement Order (“MTR Order”) requiring jurisdictional LSEs to procure and/or develop a collective 11,500 MW of new capacity by 2026. The MTR Order identified a need of 1,000 MW of LDS.

Through the Joint LDS RFO, projects were evaluated, ranked, and selected for shortlisting with the objective of meeting the RFO’s cost effectiveness goals, criteria and requirements under the MTR Order and CC Power’s enhanced contract conditions for labor, environment and environmental justice. Subsets of the CCAs that issued the joint RFO elected to contract for two LDS projects:

- The Tumbleweed project, with a nameplate capacity of 69 MW/552 MWh, for which RCEA’s entitlement share is 3.62% or 2.50 MW, with an expected NQC of 1.95 MW. This project’s expected COD is June 1, 2026 with an agreement term of 15 years.
- The Goal Line project, with a nameplate capacity of 50 MW/400 MWh, for which RCEA’s entitlement share is 4.00% or 2.00 MW, with an expected NQC of 1.64 MW. This project’s expected COD is June 1, 2025 with an agreement term of 15 years.

Energy storage service agreements between the developers and CC Power are now in place, along with project participation share agreements (“PPSAs”) among CC Power and the participating CCAs.

The two LDS projects RCEA is participating in through CC Power will satisfy RCEA’s LDS procurement mandate (approximately 3.50 MW, provided the balance of RCEA’s 7 MW long lead time MTR procurement obligation is met through clean firm resources, also being addressed through participation in CC Power joint procurement; see Section III[k] below) under the Commission’s MTR Order.

One disadvantage of participating in joint procurement is that it is generally unlikely to result in RCEA procuring resources within its own service area. RCEA’s board has adopted a goal of procuring 100% of RCEA’s energy locally by 2030. Since energy storage technically is not generation, procurement of non-local storage is not necessarily at odds with this goal.

However, RCEA does prefer to procure future energy storage resources co-located with generation under contract to RCEA to maximize benefits of the storage to RCEA. RCEA does not have plans to procure additional LSD at this time.

k. Clean Firm Power Planning

Included within the CPUC's MTR Order is an identified need of 1,000 MW of new incremental capacity delivered from *"clean firm generation (with an annual capacity factor of at least 80 percent) resources that are not subject to use limitations or are weather dependent. The [...] resource [...] must be a generating resource, not storage, able to generate when needed, for as long as needed, and may not have any on-site emissions, except if the resource otherwise qualifies under the Renewables Portfolio Standard program eligibility requirements."*²⁷ As with the CPUC's LDS procurement requirement discussed in Section III(j) above, RCEA elected to meet this requirement via joint procurement with other CCAs through a CC Power solicitation. As long lead-time resources, these firm clean resources ("FCR") need to be online by August 2026. RCEA's share of the FCR requirement is approximately 3.5 MW.

In October 2021, CC Power issued the FCR RFO. Offers were due December 13, 2021, and CC Power received bids from six bidders and 16 projects with only five of the projects located in California. Two bidders offering geothermal projects were shortlisted, Open Mountain Energy ("OME") and Ormat. Project details are as follows:

- The OME Fish Lake project, with a nameplate capacity of 13 MW, for which RCEA's entitlement share is 2.8% or 0.36 MW. This project's expected COD is on or about April 1, 2024 with an agreement term of 20 years.

²⁷ 2022 IRP narrative template: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/narrative-template.docx>

- The Ormat portfolio of projects, with a nameplate capacity of 64 to 125 MW, for which RCEA's entitlement share is 3.2% or up to 4 MW. The first project's expected COD is on or about June 1, 2024 with an agreement term of 20 years.

On May 31, 2022, CC Power's board of directors unanimously approved Resolutions No. 22-05-03 and 22-05-04 approving and delegating authority to the CC Power General Manager to execute PPAs with OME and Ormat respectively, and subsequent PPSAs with the participating members once each member receives governing board approval to participate in the projects. RCEA's board approved the agreements at its July 28, 2022 meeting. Once all participating CCAs' boards approve the agreements, the PPAs and PPSAs will be executed.

Almost all these geothermal resources are expected to be outside the CAISO balancing authority in northern Nevada or the Imperial Irrigation District and will require Maximum Import Capability ("MIC") to be secured to deliver energy and capacity. MIC at northern Nevada delivery points is limited, and suppliers indicate that transmission capacity on NV Energy to southern Nevada is constrained. MIC expansion at northern Nevada delivery points such as Gonder, Summit, and Silver Peak would considerably decrease the risk of these projects not being able to provide clean firm capacity to CAISO. Transmission projects that focus on better connecting CAISO with northern Nevada resources, such as alleviating the Control substation constraint for the Oxbow line, could also de-risk northern Nevada as a source of clean firm resources and potentially reduce significant wheeling costs through other transmission providers.

The CC Power 125 MW portfolio also may contain a new resource inside CAISO at the Geysers. However, the Phase 1 results of its Cluster 14 study indicate that required network upgrades are costly and not high priority—with a potential completion no earlier than 2029, which is after the envisioned extension in the MTR Order. This may result in substituting an import resource.

Beyond compliance with the MTR Order, procurement of geothermal energy helps RCEA to build its long-term renewable resource portfolio, ensuring compliance with SB 100 and SB 350,

as well as fulfilling RCEA's board's own goal of procuring 100% renewable energy by 2030. However, the geothermal resources are not located within or adjacent to RCEA's own service area; thus, this procurement is at odds with RCEA's additional goal of procuring all its energy locally by 2030. Given the difficulty of procuring resources that meet the CPUC's restrictive criteria for FCR (biomass and geothermal being seen as the only commercially mature forms of generation that meet these criteria), RCEA does not plan to voluntarily procure more resources in this category.

I. Out-of-State Wind Planning

The Commission's PSP calls for 1.5 GW of new out-of-state wind generation ("OOS wind") to be operational in 2030 and 4.6 GW of new OOS wind operational by 2035. RCEA's PCP does not contain any OOS wind resources. As a small LSE with goals to procure as much of its energy and capacity within or as close to its service area as possible, OOS wind resources are not part of RCEA's procurement strategy. As discussed in Section III(m), RCEA is currently active in efforts to develop the Humboldt offshore wind resource and does not have additional plans for long-term wind contracts. Additionally, CAISO's import capability allocation process for securing import rights to OOS capacity presents more risk in these transactions than RCEA can bear, unless mandated to procure resources that are only available at reasonable cost outside of CAISO. RCEA communicated this intent to CAISO on September 21, 2022 in response to its Request for Expressions of Interest Accessing OOS Wind Resources in Idaho, considering the attributes of the proposed Southwest Intertie Project North transmission line. Consequently, RCEA does not intend to initiate any OOS wind procurement in this or subsequent IRP cycles.

m. Offshore Wind Planning

Four years ago, RCEA began exploring how to access offshore wind resources to deliver local clean energy to Humboldt County, with the objective of being involved in development of prospective projects. Since then, RCEA has undertaken the following activities which are described in more detail below:

1. Formed a public-private partnership with a consortium of private wind developers;
2. Submitted an unsolicited lease request to the Bureau of Ocean Energy Management ("BOEM");
3. Cost-shared a CAISO interconnection study for a prospective Humboldt project;
4. Supported the Humboldt Bay Harbor District in seeking funding for port development activities under an MOU; and
5. Conducted significant outreach and stakeholder engagement within the Humboldt community through workshops, presentations and one-on-one meetings with various stakeholder groups including Native American Tribes, commercial fishing associations, local government, environmental non-profits, organized labor, and elected officials.

In 2017-2018, RCEA issued an RFQ and selected an experienced offshore wind development team with which to enter a public-private partnership. That team has since formed Redwood Coast Offshore Wind LLC ("ROW") as the special purpose project company to develop and operate a community-led, commercial scale offshore wind farm off the Humboldt County coast, which is expected to have a capacity of approximately 100-150 MW. While RCEA is expected to be a principal purchaser of the power, it is expected that there will be other off-takers as well, given the size and cost of the project. RCEA and ROW have since been engaging in BOEM's leasing and environmental assessment process and are planning to bid on one or more lease blocks in the Humboldt Wind Energy Area ("WEA") in Q4 2022 following issuance of BOEM's Final Sale Notice.

Two of the four portfolio configurations RCEA analyzed in its IRP modeling include offshore wind procurement at different scales. RCEA modeled 40 MW in its diverse portfolio configuration, which eventually became its Preferred Conforming Portfolio, and 75 MW in its high offshore wind portfolio configuration. These quantities were arrived at by scaling up or down according to the open energy position after accounting for resources in the base portfolio and expected sizes of other resources incremental to the base portfolio. Although RCEA is confident it will be a primary off-taker of the initial Humboldt offshore wind project, the exact

quantity will depend on price, timing of commercial operation, and other contractual supply relative to RCEA's load at the time of operation.

Developing and procuring offshore wind has been an integral part of RCEA's strategic resource planning for many years, dating back to the RePower Humboldt Technical Study described in Section II(b)(ii). The benefits of offshore wind in RCEA's Preferred Conforming Portfolio include the resource's complementary generation profile to solar and other renewables in the planned portfolio, as well as its proximity to RCEA's load and thus reduced basis risk assuming the resource is interconnected in or near Humboldt. Beyond the portfolio benefits, development of this resource has numerous benefits for RCEA's service area including workforce and economic development, and port infrastructure revitalization spurred by the potential establishment of an offshore wind manufacturing hub at Humboldt Bay. Additionally, the resource may have less negative impact on the local community than local renewable energy alternatives such as onshore wind or even large-scale solar development.

The risks and challenges posed to the successful and timely development of offshore wind include:

- Cost of transmission upgrades needed to enable development of fully deliverable north coast offshore floating wind projects;
- Uncertainty regarding offshore wind CODs contingent on BOEM lessee plan approval timelines, as well as environmental review and permitting;
- Uncertainty regarding costs of mitigating yet-to-be-identified environmental impacts of offshore wind, and how these costs will affect PPA pricing;
- Need to organize joint procurement for offshore wind, long-duration storage, and other long lead time resources due to large scale of expected development relative to RCEA's portfolio needs;
- Anticipated technology risk and high PPA price for floating offshore wind as a newly commercialized technology;

RCEA has been tracking the implementation of AB 525 objectives by way of participating in workshops and reviewing the first of several AB 525 reports that will be published²⁸. The Schatz Energy Research Center ("SERC") at Cal Poly Humboldt, with whom RCEA has partnered on renewable energy microgrids, has conducted much of the research informing the first of several AB 525 reports.

Section 7.2 of D.22-02-004 references the Commission's request to CAISO to study an *"offshore wind sensitivity portfolio to evaluate the transmission needs and costs to interconnect approximately 8,000 MW of offshore wind at various potential locations including Humboldt, Diablo, and Morro Bay"*. The Decision also references RCEA's comments on the 2021 PSP which conveyed that the CPUC's busbar map should map *"100-150 MW of offshore wind to the Humboldt area as energy-only resources."* While not captured in the decision, RCEA also commented that it would be prudent for the CPUC to proactively plan for the full-scale development of offshore wind beyond the initial 100-150 MW energy-only resource included in the busbar map. RCEA reiterates that comment here as CPUC and CAISO planning for the maximum expansion of the Humboldt WEA established by BOEM will be necessary to meet the AB 525 preliminary planning goal of 3 GW of offshore wind by 2030 and 10 - 15 GW by 2045.²⁹ Further details about the necessity to plan for transmission that accommodates the full buildout of the Humboldt WEA are in the following Section III(n).

n. Transmission Planning

Transmission Upgrades for Contracted Resources

In terms of contracted resources in RCEA's Preferred Conforming Portfolio, only Sandrini Sol 1 and likely a portion of the Ormat Geothermal Portfolio will require transmission upgrades. The remainder of contracted resources in the portfolio will be interconnected to the distribution

²⁸ Offshore Wind Energy Development off the California Coast: Maximum Feasible Capacity and Megawatt Planning Goals for 2030 and 2045, California Energy Commission, August 2022.

²⁹ Flint, Scott, Rhett deMesa, Pamela Doughman, and Elizabeth Huber. 2022. Offshore Wind Development off the California Coast: Maximum Feasible Capacity and Megawatt Planning Goals for 2030 and 2045. California Energy Commission. Publication Number: CEC-800-2022-001-CMD.

system via PG&E's Wholesale Distribution Access Tariff ("WDAT"), so will not require transmission upgrades. A summary of interconnection upgrades needed for these projects is included as Table 12.

Sandrini Sol 1 (COD June 2023): Interconnection work for the Sandrini solar project is tentatively scheduled to be completed in Q1 of 2023. PG&E is currently constructing the final portion of the required transmission line that is within their property of the Wheeler Ridge Substation. A material modification amendment ("MMA") to the project developer's large generator interconnection agreement ("GIA") with PG&E and CAISO, which was executed in 2020, was required for the project to interconnect at higher voltage than was originally anticipated. The MMA has been accepted and is not expected to impact the anticipated schedule.

As described in Section III(k), RCEA is a joint participant in procurement of geothermal resources located outside CAISO by CC Power for purposes of compliance with the MTR Order, specifically procurement of clean firm energy from long lead time resources, as defined in the decision. The geothermal resources consist of a single project located in Nevada from one developer, and a portfolio of projects from a second developer in Nevada and the Imperial Irrigation District. The individual participating CCAs each need to secure their own proportionate share of MIC, since CC Power is not a load-serving entity and is ineligible to pursue MIC. All the CCAs filed MIC expansion requests in June 2022, immediately after CC Power executed the PPAs for these projects with the developers. Following are additional project/portfolio-specific details on these geothermal resources being procured through CC Power.

Fish Lake Geothermal (COD June 2024): The Fish Lake geothermal project will connect to the Silver Peak substation in NV Energy territory. It is currently finalizing its GIA and expecting execution shortly. The developer does not anticipate any transmission-scale upgrades, just an upgrade to the Silver Peak substation. Fish Lake has secured transmission to a point where CC Power members have secured 2023 MIC in preparation for a long-term MIC reservation.

However, wheeling power has resulted in higher costs that could be mitigated if MIC in northern Nevada became available.

Ormat Geothermal Portfolio (COD starting Oct 2024): The Ormat portfolio of geothermal projects are expected to be mostly import resources in northern NV Energy territory or the Imperial Irrigation District. Projects are at various stages of maturity in their subsurface characterization, permitting, and interconnection. The RDT contains a representation of what the portfolio might look like (entered as 7 projects with potential substations). Ormat has limited ability to deliver at southern Nevada import points (Mead and Merchant), so MIC expansion will likely be needed at Summit, Gonder, and Silver Peak to deliver up to 125 MW. One potential CAISO resource in the portfolio (at the Geysers) recently received Phase 1 results from its Cluster 14 study indicating that it is impacted by a costly network upgrade with a completion date no earlier than 2029, which may require it be substituted for an import resource.

Table 12. Interconnection Upgrades for Additional Contracted Projects

Project	Location	Interconnection Upgrades Needed
Hatchery Road Solar	Blue Lake, Humboldt	The developer and PG&E are working on engineering for the Distribution and Network Upgrades, and reconstruction of the control room at the Blue Lake substation
North Coast Highway Solar	Hydesville, Humboldt	Network Upgrades possible, but study is in progress and full extent is unknown; interconnecting through PG&E WDAT
Fairhaven Energy Storage	Samoa, Humboldt	The developer is working with PG&E to repower the Fairhaven substation and has submitted final designs for needed modification of the site's grid interconnection
Tumbleweed Long-Duration Storage	Kern County	None
Goal Line Long-Duration Storage	San Diego County	Network Upgrades possible, but study is in progress and full extent is unknown; project is included in CAISO's ongoing Queue Cluster 14 study process

Project	Location	Interconnection Upgrades Needed
Foster Clean Power A	Arcata, Humboldt	None
North River Clean Power	McKinleyville, Humboldt	Reliability Network Upgrades and Distribution Upgrades possible at Janes Creek substation, but study is in progress
Mad River Solar	McKinleyville, Humboldt	Reliability Network Upgrades and Distribution Upgrades possible at Janes Creek substation, but study is in progress

Humboldt-Specific Transmission Issues

Limited distribution and transmission capacity is a key barrier to RCEA’s decarbonization efforts. This issue is both import and export capacity, so it will affect both distributed energy resources and electrification deployment. Some pockets of excess capacity are available, but they may not align with priority sites identified using RCEA’s project selection criteria for its service area. Humboldt County has a local peak load of 112 MW, existing local generation resources of approximately 200 MW in aggregate, and existing transmission capacity of approximately 70 MW linking Humboldt County to the rest of the statewide grid.

RCEA’s service territory experienced widespread Public Safety Power Shutoffs with little notice in 2019. Following this first set of PSPS events, RCEA engaged local agencies and PG&E to assess the islanding capability of the HBGS natural gas plant to power the Humboldt Bay and surrounding loads during subsequent PSPS events that affect transmission into the region but not the local area itself. In summer 2020, PG&E successfully activated the HBGS island to maintain power to most of the local grid. This resulted in a significant reduction in PSPS impacts to RCEA’s load during the following fire season.

The HBGS island is no longer utilized solely during PSPS events, but also to mitigate impacts of other transmission outages and shutoffs on the lines that connect Humboldt County to the larger grid, such as those caused by extreme storm and wildfire events. Despite the benefits of this implemented solution for RCEA’s customers, it has been accompanied by impacts to RCEA’s contracted generation, which has resulted in material financial harm to RCEA and its suppliers. PG&E has established a procedure of disconnecting generators above 1 MW in size during HBGS

islanding events. In 2021, PG&E disconnected HSC during PSPS events that coincided with very high pricing hours, resulting in an estimated \$135,000 to \$165,000 loss to RCEA. RCEA is engaging PG&E to explore whether alternative practices can be implemented that avoid or reduce disconnections of the Humboldt Redwood plant and other current and future renewable energy generators within the Humboldt Bay island area.

While the HBGS island can serve most customers in the area served by RCEA, it does not extend to RCEA customers in the portion of northeastern Humboldt County served by PG&E's Hoopa and Willow Creek substations. RCEA's infrastructure planning and transportation department has tentatively identified a need for a substation-level microgrid solution of 2-10 MW in scale as one medium-term solution to ensure energy resiliency for communities in this area.

Another key transmission issue specific to RCEA's service area, and parts of Sonoma Clean Power Authority's ("SCPA") service area, is PG&E's recently announced inability to accommodate new load and generation in the Southern Humboldt area due to grid constraints. The IOU recently announced that constraints on the Bridgeville-Garberville 60kV transmission line are preventing interconnection of new loads and generators in this portion of the two CCAs' service territories. Additional transmission planning and budgeting must be immediately effectuated to enable new interconnections in southern Humboldt County and northern Mendocino County to accommodate the region's planned development activities and to support state and local electrification goals. RCEA is beginning to work with PG&E and County officials to better understand the impacts of this transmission constraint and identify possible near-term solutions for customers and generators while PG&E and CAISO pursue transmission upgrades as a long-term solution. Like the aforementioned northeastern part of Humboldt not served by the HBGS island, RCEA's infrastructure planning and transportation department has tentatively identified a need for a substation-level microgrid solution of 2-10 MW in scale as one medium-term solution that could help mitigate the southern Humboldt County grid constraints.

Planned Resource Transmission Needs

Two resource types that RCEA has included as planned new resources in its Preferred Conforming Portfolio will require substantial transmission upgrades for California LSEs and ratepayers to access the full resource capability. North coast offshore wind and northern California geothermal are very site-specific resources that happen to be located in constrained areas of the grid. There are potential synergies in the build-out of transmission for both resources, as one of the transmission corridors being evaluated for offshore wind traverses the area of Northern California where development of new geothermal capacity is being evaluated. As described in Section III(m), RCEA is actively participating in efforts to develop the North Coast offshore wind resource, while to the south SCPA is working on a similar effort for geothermal development within and adjacent to their service territory. RCEA is in the early stages of collaborating with SCPA on shared transmission interests under a recently implemented MOU, as described further in Section IV(a)(v).

In 2019, RCEA and the ROW consortium cost-shared a CAISO cluster 11 phase 1 interconnection study to determine the amount and cost of upgrades needed for an initial offshore wind project of up to 150 MW. The study results were made available to RCEA. Additionally, since 2020 SERC has published a series of reports on transmission needs associated with north coast offshore wind development.³⁰ These reports are a valuable planning reference for RCEA and its commercial offshore wind partners. One of the findings from SERC's transmission study was that an energy-only, initial scale project of 100-150 MW would be feasible to interconnect with relatively minimal transmission upgrades and generation curtailment. However, transmission infrastructure upgrades are needed to unlock economies of scale and facilitate gigawatt-scale development of fully deliverable offshore wind capacity off the Humboldt coast, which is key to achieving the state's goal of 5 GW by 2030 and 25 GW by 2045. As discussed in Section III(m), RCEA encourages the CPUC and CAISO to begin planning for these transmission upgrades beyond the initial energy-only resource included in RCEA's Preferred Conforming Portfolio. RCEA asks the CPUC to include this in the forthcoming busbar map and overall PSP submitted to CAISO for use in their TPP. RCEA further encourages the CPUC and CAISO to pursue other

³⁰ <http://schatzcenter.org/publications/>

avenues outside the TPP that could expedite the budgeting for full-scale buildout of the Humboldt County offshore wind resource.

RCEA sees a potential opportunity to align the transmission planning to address the issues described above regarding the southern Humboldt grid constraints with that required for the North Coast offshore wind buildout. The cost-effectiveness and viability of the North Coast offshore wind projects would be improved by the buildout of regional T&D necessary to serve new load and generation in southern Humboldt. Even partial initial development of the Humboldt WEA could be impeded due to the current grid constraints recently announced by PG&E and described above. The IOU has reported that *“it could cost more than \$900 million and take up to a decade to make the upgrades necessary to increase capacity for the utility’s substations and its two main transmission lines for the region”*³¹. While RCEA does not have expertise in T&D planning, the timing and scale of the upgrades to address the near-term need of enabling new load interconnections could potentially align with that of large-scale wind development over the next decade. At the very least, the two needs should be evaluated in the context of one another to determine whether there could be cost synergies.

RCEA’s Preferred Conforming Portfolio includes a total of 104 MW of planned new resources to be built at the locations identified in RCEA’s Resources Data Template. Table 13 provides a list of these resources, their identified locations, and RCEA’s preferred alternate locations if the Commission’s modeling finds that the selected locations are not feasible. Other than Redwood Coast Offshore Wind and the Sonoma-Mendocino Geothermal Opportunity Zone (“GeoZone”) project, the remainder of planned new resources in the portfolio will be interconnected to the distribution system so will not require transmission upgrades.

Table 13: RCEA Preferred Conforming Portfolio Planned New Resource Locations

Resource Name	Contracted Capacity (MW)	Selected Location	Preferred Alternative Location
FIT Phase II Projects	6	Humboldt County	None

³¹ <https://lostcoastoutpost.com/2022/sep/19/pges-electricity-transmission-limits-threaten-thro/>

Resource Name	Contracted Capacity (MW)	Selected Location	Preferred Alternative Location
Community Microgrids	4	Humboldt County	None
New Local Storage	11	Humboldt County	Sonoma County
Zero Emission Resource	20	PG&E TAC area	SCE TAC area
Redwood Coast Offshore Wind	40	Humboldt WEA	Morro Bay WEA
New Local Small Hydro	8	Humboldt County	Trinity County
GeoZone Project	15	Sonoma County	Mendocino County

IV. Action Plan

a. Proposed Procurement Activities and Potential Barriers

Below are the activities RCEA proposes to undertake across resource types to implement its Preferred Conforming Portfolio. Per the CPUC's guidance, barriers are integrated into the discussion of each new resource identified. A summary of barriers that are cross-cutting or otherwise do not relate directly to any specific resource type are described in Section IV(a)(xii).

i. Resources to meet D.19-11-016 procurement requirements

In D.19-11-016, the Commission ordered LSEs to collectively procure a total of 3,300 MW of incremental system capacity by 2023, with specific procurement obligations allocated to each LSE. As part of its contribution to system reliability and renewable integration needs, RCEA committed to self-procuring its assigned share of the identified system capacity needs. RCEA has since procured more than its assigned obligation share of 10.7 MW³², of which 50% was online by August 1, 2021, 75% was online by August 1, 2022, and 100% is anticipated to be online by August 1, 2023.

³² D.19-11-016, Ordering Paragraph 3.

Detailed information regarding RCEA's procurement towards the D.19-11-016 requirement is provided in RCEA's response to the August 1, 2022 IRP Data Request, as well as its RDT. RCEA's contract with Leapfrog Power for 5.5 MW RA from aggregated demand response began commercial operation June 1, 2021. RCEA's contract with Viridity Energy Solutions (owned by Ormat) for 2.5 MW RA from the 5 MW Tierra Buena Energy Storage facility began commercial operation August 1, 2022. The remainder of RCEA's incremental capacity obligation will be met when the Sandrini Sol 1 project comes online in spring 2023. RCEA has sold a small portion of the incremental capacity from Sandrini to the University of California Regents under long-term contract. The project has begun construction under a limited notice to proceed so it does not face any special development barriers other than common risks such as interconnection approval and securing the remaining permits. Based on expected ELCC values for standalone solar and with the resale to UC Regents, the incremental RA from Sandrini Sol 1 will be more than adequate to ensure RCEA's 2023 compliance.

ii. Resources to meet D.21-06-035 procurement requirements, including:

a. 1,000 MW of firm zero-emitting resource requirements

RCEA has contracted for up to 4.36 MW of new geothermal capacity through its share of two executed contracts from CC Power. These resources were identified through a solicitation completed in early 2022, as discussed in Section III(k). RCEA expects these two contracts to provide 3.6 MW of MTR NQC (based on September ELCCs) which satisfies its 3-3.5 MW obligation for firm zero-emitting resources.

The 13 MW Fish Lake geothermal project is expected to be commissioned in June 2024, of which RCEA's share is 0.36 MW. As represented in the RDT, the project has high viability scores with subsurface characterization complete, a nearly finalized GIA, and partial financing. The CC Power members have also secured the MIC at the project's delivery point sufficient to claim a long-term reservation, as discussed in Section III(n).

The Ormat portfolio of up to 125 MW, of which RCEA's share is 4 MW, has several risks. The contract included an illustrative facility list indicating a possible first COD in October 2024 and

final COD in 2026. RCEA used the illustrative facility list to calibrate the representation of the Ormat portfolio in the RDT, which is likely to mostly rely on resources in northern NV Energy territory or the Imperial Irrigation District. Unlike Fish Lake, many of the projects in Ormat's portfolio are still dependent on subsurface characterization and need additional permitting. Importantly, although CC Power is hopeful the Ormat contract will provide 125 MW of capacity for MTR, only 64 MW is guaranteed. Because specific projects are not yet identified, the CC Power members have also not been able to secure MIC, which is scarce in northern Nevada and may be difficult to obtain. Although Ormat can provide some transmission service to southern Nevada, MIC expansion at Gonder, Silver Peak, and Summit or transmission upgrades will likely be required to deliver the maximum capacity of the portfolio to CAISO.

CC Power currently holds bi-weekly meetings with Ormat and plans to closely follow development progress in the Ormat portfolio. An update will be provided to the CPUC on timing and scope of the contract in the planned February 2023 regulatory filing. If it is determined unlikely that Ormat can deliver 125 MW by June 2028, RCEA will consider offering a solicitation for replacement capacity independently or through CC Power in 2023.

b. 1,000 MW of long-duration storage resource requirements

As discussed in Section III(j), RCEA participated in the joint CCA RFO for LDS capacity, as a member of CC Power. Earlier in 2022, RCEA and fellow participating CCAs executed agreements for shares of the Tumbleweed and Goal Line LDS projects, which are both expected to be online by 2026 in time for the Commission's LLT resource deadline. RCEA is currently participating in the CC Power project committees for both contracts and reviewing the progress reporting from the respective developers.

High-cost relative to the uncertain market value of LDS is a barrier to procuring these resources. Revenue estimates of energy arbitrage and ancillary services for these assets are highly speculative in 2026 and beyond.

c. 2,500 MW of zero-emissions generation, generation paired with storage, or demand response resource requirements

On September 29, 2021 RCEA released an “RFQ-RFO for Long-Term Reliability Resources” aimed at procuring MTR capacity with a special emphasis on the zero-emissions generation category. The submitted offers that could have counted toward this requirement were deemed either uneconomic or to not have a clear pathway to achieving deliverability status by the summer 2025 deadline. Then on August 26, 2022 RCEA released a "Request for Offers for Zero-Emission Reliability Resources Compliant with CPUC MTR D.21-06-035." The RFO sought to procure bundled energy, renewable energy certificates, where applicable, and RA specifically to satisfy RCEA’s 8 MW NQC requirement for replacing the Diablo Canyon Nuclear Power Plant as identified in D.21-06-035. RCEA received a small number of offers by the response deadline, but none were deemed conforming, either being RA-only or having too late a commercial operation date for compliance.

From RCEA's solicitation efforts to date it seems there is a shortage of resources that can comply with the Commission's deadline for zero-emissions generating capacity, which RCEA attributes mainly to supply chain delays, the anti-circumvention tariff investigation earlier this year, and the backup of the interconnection queues. RCEA is currently evaluating alternative options for complying with this mandate and will continue to make good faith effort to procure its needed zero-emissions generating capacity. RCEA has included a new, generic 20 MW solar plus short-duration battery storage resource in its IRP as a placeholder for compliance with this MTR Order subcategory and is indifferent as to the location of this resource, given the market scarcity.

d. All other procurement requirements

RCEA’s general incremental capacity obligation pursuant to the MTR Order is 7 MW by August 1, 2023, an additional 20 MW by June 1, 2024 and an additional 5 MW by June 1, 2025.

To procure this capacity, RCEA issued a solicitation in Q3 2021, as described above, and has since executed two contracts. The Fairhaven Energy Storage project is a 17.25 MW standalone

short-duration battery to be built in RCEA's service area at the site and to utilize the interconnection capacity of the former DG Fairhaven biomass plant. It is expected the facility will be operational in Q4 2023 and provide 16.6 MW of MTR capacity in time for the 2024 tranche. The second project is Foster Clean Power A, a 3 MW solar plus 1.25 MW storage facility to be built in RCEA's service area. It is expected the project will be operational as energy-only in summer 2023, after which the project owner will pursue full capacity deliverability status ("FCDS") through CAISO's Distributed Generation Deliverability process. FCDS would be awarded in Q2 2024, in time to provide 1.3 MW of MTR capacity for the 2024 tranche.

Despite best efforts to procure for the first MTR Order deadline, RCEA currently does not have any incremental capacity procured for August 1, 2023. Both Fairhaven and Foster were shortlisted with CODs prior to that deadline, and a third project was shortlisted with a COD prior to the 2024 deadline. During the negotiation process, all three project CODs slipped beyond their original anticipated dates, such that Fairhaven and Foster could no longer meet the 2023 compliance tranche deadline, and the third shortlisted project could no longer meet any of the MTR Order deadlines. The COD slippage was due to the developers' concerns around supply chain delays and uncertainty in availability of specific equipment that their original bids were designed around. Given the late stage at which RCEA was notified of the delays, procuring a new project in time to comply with the 2023 obligation was infeasible. RCEA continues to make good faith efforts to comply with the mandate to purchase capacity from another LSE with excess MTR capacity and confidence in its own 2023 position.

iii. Offshore wind

In anticipation of BOEM's Final Sale Notice, RCEA and ROW are preparing to bid on one or more lease blocks in the WEA for site assessment and development of a 100-150 MW project. Most recently, RCEA helped inform the provisions of the multi-factor lease auction by submitting comments in response to BOEM's Proposed Sale Notice. BOEM intends to hold the lease auction in Q4 of 2022 and RCEA plans to execute a public private partnership agreement with the ROW partners in tandem with the auction. The agreement will contemplate RCEA's role as an eventual off-taker of the project without binding the parties to a specific procurement.

When the time comes, RCEA may decide to procure offshore wind directly as an active member of the project development consortium but is also evaluating options for joint procurement with other LSEs.

Figure 7 shows a general timeline of offshore wind development in California and shows key dates in the development process. Regardless of who the eventual lessee is, RCEA is committed to ensuring a North Coast project is developed with community values and stakeholder concerns prioritized, resulting in the success of this resource in its portfolio.

The risks and challenges facing offshore wind development are described in Section III(m) above.



**Figure 7: CA offshore wind timeline from Aker Offshore Wind, one of RCEA’s partners;
<https://redwoodenergy.org/redwood-coast-offshore-wind/>**

iv. Out-of-state wind

As described In Section III(l). RCEA does not plan to procure any OOS wind and thus does not have any action items planned for this resource type. RCEA may pursue this resource in the future, and notes that OOS wind delivery barriers may mirror those that exist for OOS geothermal.

v. Other renewable energy not described above

Continue to procure local biomass power and investigate opportunities for alternative uses of biomass waste. RCEA's biomass PPA for the Humboldt Redwood plant was extended to 2031 but has not yet been procured through the end of the IRP planning horizon. As California's leading producer of forest products, Humboldt County incidentally generates a large amount of mill waste that must be disposed of, with biomass power plants having historically offered an important means of such disposal, while simultaneously providing a source of renewable energy. In conjunction with extending the PPA to its current term, and in response to community concerns about air quality and GHG impacts from biomass power, RCEA and HSC executed an MOU that encourages the parties to work together to identify and pursue economically viable alternative uses for the biomass feedstock, in an effort to plan for the transition away from combustion-based use called for in RCEA's Strategic Plan following the PPA term. RCEA and HSC's first annual meet and confer on this topic as called for in the MOU occurred in May 2022. HSC provided a summary of their recent RFI to assess opportunities to use biomass feedstock for production of alternative energy products. At this time, no viable alternative for the continuous stream of biomass feedstock in Humboldt has presented itself, so RCEA has included continued procurement of the Humboldt Redwood plant in its Preferred Conforming Portfolio. To date, RCEA's Board at multiple decision points has elected to continue procuring biomass power and has not indicated a firm date by which to end such procurement. Extended procurement will continue to be weighed against other power supply options over the next decade in light of any feedstock alternatives identified through the aforementioned MOU process. Action to extend the contract is not anticipated prior to 2030.

The challenges associated with biomass procurement from existing plants include community acceptance of the combustion-based technology, particulate emissions staying within compliant levels, and disconnections by the T&D operator during events that warrant islanding of the local grid.

Pursue additional clean microgrid projects as a source of local renewable energy and to foster community resiliency. RCEA has collaborated with SERC and PG&E on development of RCAM,

designed to increase renewable generation in RCEA's portfolio while providing resilience for a subset of its customers and ancillary services on the local distribution grid. RCAM is the first front-of-meter, multi-customer, renewable energy microgrid and became operational at the Arcata-Eureka Airport in late 2021. The project, funded through a CEC grant and USDA loan, has served as a great model that RCEA intends to replicate throughout its service territory. RCEA has engaged in preliminary conversations with stakeholders in eastern Humboldt to assess the feasibility of substation microgrids. RCEA's infrastructure planning team is planning on ramping up these efforts over the next few years and anticipates bringing at least two microgrids online by 2026 and 2030.

Barriers to developing local microgrids include high cost, and ability to secure funding, risk of disconnection by the T&D operator during events that warrant islanding of the local grid, and ability to secure deliverability status to capture RA value.

Support development of new geothermal power in California. In pursuit of their respective long-lead resource development goals, RCEA and SCPA have executed an MOU to collaborate on enabling transformative renewable energy development along the Northern California coast, specifically within the Humboldt WEA and the Sonoma-Mendocino GeoZone. The CCAs are in early stages of collaboration in various areas including: advocacy for upgrades to the shared grid interconnection transmission corridors to the Humboldt WEA and GeoZone; mitigation of policy barriers for renewable energy project development; and the sharing of experience and information on partnerships and agreements for the mutual benefit of the CCA's regions. The anticipated actions contemplated by this MOU are: to share non-confidential information on best practices and local Tribal and community engagement related to working with private entities in public-private partnerships; to understand, collaborate and engage with regulatory authorities and transmission operators on relevant transmission-related issues; to explore grant or public funding opportunities that are consistent with the purpose of this MOU; to develop communication strategies for engaging local and state agencies and elected officials in order to advance the purpose of this MOU; and to timely communicate with the other Party about relevant developments that could affect or impact the purpose of this MOU. RCEA plans

to engage in all these activities with SCPA over the coming years in anticipation of an individual or joint procurement effort in the latter part of this decade.

Barriers to development of geothermal include potentially high cost and available transmission capacity to accommodate resource scale and timing. Geothermal development is relatively new in the regions RCEA is targeting, and there may be delays in planned development schedules due to unforeseen challenges.

Pursue development of local small hydropower. RCEA's planning documents, dating back to the original RePower Humboldt Technical Study in 2012, have identified the potential for tens of MW of new, low-impact run-of-the-river hydropower that can be developed in RCEA's service area. RCEA hired an expert consultant to perform an updated assessment of regional small hydropower potential and develop a plan for RCEA to facilitate development of feasible sites, with the intent of having new resources online as early as 2028. The consultant's final report, including identification of project sites with greatest development potential, and characterization of the hydrologic profiles associated with several divergence points on the candidate creeks, was completed in December 2021 and will inform RCEA's next steps in facilitating small hydropower development, possibly including a solicitation in the coming years.

While small hydro presents a promising renewable development opportunity, there are numerous barriers including: uncertainty regarding environmental compliance and permitting needed for development; seasonal variation in production; vulnerability to drought while ensuring sufficient in-stream flows; and community acceptance of the development on remote creek sites.

Continue development and implementation of RCEA's FIT program and add energy storage to FIT Phase II. RCEA's FIT offers above-market pricing on 20-year contracts for small (1 MW or less), new RPS projects built within RCEA's service area. The tariff uses a market-adjusting price that can move upward or downward in each application period depending on the amount of capacity offered in the previous application period. At the time of application, the price is locked in for the term of the PPA. The tariff was launched in 2019 with a program capacity of 6.5 MW, which is now approaching full subscription with six contracts approved by RCEA's

Board and multiple projects in the County permitting pipeline or fully permitted and ready to break ground. In 2020 the Board approved adding 6 MW to the program capacity along with making modifications to the program, which may include a downward adjustment in the base price, increased allowed project capacity, and optional or required co-located storage coupled with a RA price adder. RCEA is planning to develop and launch Phase II of the FIT program in 2023-2024 with project CODs anticipated 2025-2027.

Interconnection and commodity cost increases have been major challenges for RCEA's FIT projects. For one project, following execution of the GIA, PG&E discovered that interconnection of the project would require reconstruction of the entire substation control room upon their physical site walk. Because this site walk takes place after interconnection costs have already been agreed upon between the parties, this presents a huge risk to the independent developer of being saddled with those unforeseen costs.

The Humboldt-specific transmission issues described in Section III(n) pose significant barriers and potentially negative economic impact to development of new resources within RCEA's service area. In addition, uncertainty in projects' ability to secure a deliverability status for new resources in Humboldt due to insufficient grid capacity is a concern. The lack of locally based energy project developers with capacity to build projects at the 1-MW level (the maximum project size allowed in RCEA's FIT Phase I program), and the reluctance of larger outside developers to pursue projects at this modest scale in remote Humboldt County due to added mobilization costs appear to be additional barriers to implementing FIT projects.

vi. [Other energy storage not described above](#)

RCEA recently contracted for Fairhaven Energy Storage, a battery project sited at a former biomass facility in its service territory, which will take advantage of the unused interconnection capacity and deliverability allocation at the site. RCEA is aware of other former biomass power plant and lumber mill sites around Humboldt County that could be ideal locations for additional energy storage projects and is in preliminary discussions regarding the development opportunities. An initial project is shown in the Preferred Conforming Portfolio at the Blue Lake substation, but timing and type of procurement is not yet known.

The main barrier to developing these former industrial sites is competing interests for use of the properties. As population growth in Humboldt has increased, the need for development of housing, business and recreation has also increased. As such, these previously developed sites are of high value for alternate uses to power projects.

vii. Other demand response not described above

RCEA has been developing its own demand response program, with anticipated issuance of a solicitation for external business partners in Q4 2022 and a targeted program launch of Q2 2023. The program will serve RCEA customers by providing utility bill savings opportunities and will likely leverage dispatchable automated demand response (“ADR”) technologies. The program would also support grid decarbonization and add value to RCEA’s demand resource portfolio.

Since its CCA launch, RCEA has sought to mirror DR program offerings made available to bundled IOU customers in RCEA's service area. Beginning In 2017, RCEA offered an alternative to PG&E's Peak Day Pricing (“PDP”) open to all nonresidential customers. It was not feasible to build monthly PDP-style credits for unbundled CCA customers into PG&E's billing system in the same way bundled customers can receive these credits. RCEA instead worked with its billing services provider Calpine Energy Solutions to apply a cumulative credit to each participating customer's bill following the program's summer season, and to set up a system to alert customers of event days, mirroring PG&E's notification system. This program satisfied a small number of nonresidential CCA customers who requested such a program and might otherwise have opted out of CCA service. However, the program did not have widespread participation.

In summer 2021, RCEA introduced a Demand Reduction Incentive Program (“DRIP”) that improved on the earlier PDP alternative by allowing RCEA to set its own event days rather than being limited to event days called by PG&E. In principle, this increased financial benefit to RCEA by aligning event days with days when day-ahead wholesale prices were expected to be at a maximum, while allowing customers to receive a \$0.25/kWh credit for reduction of load below a custom baseline calculated for each customer. These event days were aligned fairly well with CAISO Flex Alert days (seven out of the eleven DRIP event days called by RCEA in 2021

coincided with Flex Alert days), adding a reliability benefit to the program. Credits were applied monthly with an end-of-season true-up. However, participation was again low and RCEA did not realize a net cost benefit. RCEA suspended the program for 2022 and is currently planning for an improved program offering for 2023 and beyond, as previously discussed.

Barriers to implementing a successful demand response program in RCEA's service area include limited customer participation to achieve meaningful scale, and difficulty in ensuring cost neutrality for RCEA while offering customer value through a comprehensive program that includes ADR tools. Participation in demand response programs is contingent on ratepayers realizing a net cost savings on their utility bill, especially for commercial customers who have more capacity for load shifting than residential customers. Considering the incentives offered to enroll participants, as well as the capital cost of ADR devices, ensuring the program generates enough revenue from reduced peak capacity demand and wholesale energy arbitrage poses a challenge. Additional challenges facing supply side DR are discussed below in Section V(a)(ix).

viii. Other energy efficiency not described above

RCEA implements and administers numerous energy efficiency programs, some funded directly by RCEA's CCA program and others via CPUC rate-payer dollars. Energy efficiency falls under the larger umbrella of demand side management, and regardless of the funding source, RCEA's general framework for demand side management is to first evaluate opportunities for energy efficiency to decrease load, then assess opportunities for renewable generation resources to provide energy for the remaining load.

RCEA's CCA-funded energy efficiency programs are implemented by its in-house Demand Side Management department, the key offering being the Public Agency Solar Program. The Public Agency Solar Program provides the following services at local government facilities: electric load analysis, energy efficiency upgrade options, solar site assessments, project feasibility studies, identification of funding sources, and contracting assistance. RCEA also offers a building decarbonization rebate program for heat pump space heaters and heat pump water heaters, and helps local organizations access additional funding opportunities.

RCEA's CPUC rate-payer funded energy efficiency programs are intended to complement the CCA-funded initiatives. These include services and rebates administered in its role as an Elect-to-Administer PA and a LGP contractor for PG&E. In its PA capacity, RCEA provides technical assistance and incentives to customers for installing energy saving or demand reducing measures that result in sufficient quantifiable energy savings at low enough cost to pass the applicable total resource cost test. In its LGP capacity, RCEA provides "non-resource" services (services not associated with a specific energy savings target) including assistance with benchmarking and Energy Star certification of buildings, workshops and training, services for hard-to-reach customers, and referral of customers to PG&E "resource" programs (programs that do have quantified energy or peak demand saving targets).

RCEA also has a pending application to form a RuralREN program, which will provide energy efficiency services to hard-to-reach and underserved customers across rural regions in California. The CPUC is set to issue a decision on the approval of the RuralREN by Q4 of 2023.

Barriers to maximizing energy efficiency in the region are exacerbated, if not caused, by Humboldt County's rural and remote geography. Challenges include limited skilled workforce in the region, lack of equipment stocked locally, minimal implementation and enforcement of Title 24 and other energy code regulations by building developers and officials due to lack of training, and high cost of travel to remote homes and businesses. Humboldt County's aged and diverse building stock also makes it challenging to widely replicate energy efficiency measures. RCEA's existing energy efficiency programs aim to address these barriers, and the proposed RuralREN would provide funding to develop the robust local resources necessary to maximize energy efficiency gains in RCEA's service territory.

ix. Other distributed generation not described above

As described in Section III(b) above, RCEA has partnered with Swell Energy to develop a customer program for dispatchable BTM energy storage. This Community Grid program, authorized by RCEA's Board of Directors in May 2021, aims to provide multiple benefits of 1) RA value to RCEA's portfolio, 2) critical energy resilience to host customers, 3) utility cost savings to host customers 4) GHG emissions reductions, and 5) improved grid operability. The program

leverages Self-Generation Incentive Program (“SGIP”) incentives to improve economics. The program is to deliver a minimum of 300 kW to a maximum of 3 MW of battery storage to be installed by Swell, or through Swell achieving operational control of systems already installed by other developers. The capacity will be aggregated as a virtual power plant (“VPP”) to supply RA capacity or load modification. The batteries will also be dispatched to reduce peak time-of-use charges for customers, while reserving 20% of battery capacity at all times for customer use during power outages. In addition to the SGIP incentives, customers will receive an incentive payment from Swell for participating in the dispatchable VPP. Contract terms call for 100% of customers to be enrolled by February 2023 and initial delivery to begin by May 2023.

A barrier to successful deployment of BTM battery storage via RCEA’s Community Grid program is the potential inability to realize full capacity of the program due to limited customer participation and competition for SGIP funding. To participate in the program, customers must sign Swell’s grid services agreement, which authorizes operation of the battery in accordance with the dispatch plan in RCEA and Swell’s contract. This is a deterrent for some customers, either because they don’t understand what their battery would be used for or are concerned that signing the agreement will result in unavailability of backup power when they need it. In addition, SGIP funding could limit program enrollment, as the pot of available money becomes fully subscribed.

On the operational side, other barriers facing the program are the cost and complexity involved with registering the VPP as a proxy demand resource to supply RA, as well as the uncertainty of realizing load modification value via the state’s load forecast and RA allocation process. RCEA and Swell’s contract is structured as an RA agreement with the option to transition to load modification should the RA product become uneconomic. Both pathways pose risk to RCEA. In particular, the cost and complexity of the Load Impact Protocol requirement for DR RA resources is a major barrier to establishing a supply side DR. Also, the maximum cumulative capacity limitation on DR capacity that can count toward an LSE’s RA requirement poses a barrier to increased distributed resource deployment in general. Lastly, lack of transparency as

to how demand modifiers submitted with an LSE's load forecast are factored into its allocated RA obligation makes it difficult to accurately estimate the value of such demand side resources.

x. Transportation electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

As noted in Section III(g) above, RCEA's Strategic Plan calls for transportation electrification through adoption of electric vehicles and deployment of public, workplace and residential electric vehicle charging infrastructure. Coupled with targeted reduction of vehicle miles traveled, this is expected to reduce GHG emissions from transportation by over 65% by 2030, with a trajectory to eliminate fossil fuels for transportation, and thus transportation-related emissions, by 2050.

Working with the CEC and other partners, RCEA has produced three transportation-focused regional readiness plans, and has made progress on implementation of these plans: a *North Coast Plug-in Electric Vehicle Readiness Plan* (2014)³³, a *Northwest California Alternative Fuels Readiness Plan* (2016)³⁴, and a *Regional Hydrogen Infrastructure Plan* (2017).³⁵ The *North Coast Plug-in Electric Vehicle Readiness Plan* led to engagement with regional municipalities in a coordinated effort to streamline processes for the permitting and inspection of residential, commercial, and public EVCS; development of streamlined EVCS installation processes and detailed regional siting assessments, and engagement with potential site hosts; and education and outreach to promote PEV adoption through profile raising campaigns and installation of trailblazing signage for existing EVCS.

The Northwest California Alternative Fuels Readiness Project, which covered Humboldt and four surrounding counties, was led by RCEA, and launched to develop an established and engaged network of public and private stakeholders throughout the Northwest California

³³ <https://redwoodenergy.org/wp-content/uploads/2021/03/FINAL-North-Coast-EV-Readiness-Plan-1.pdf>

³⁴ https://redwoodenergy.org/wp-content/uploads/2017/08/ARV-13-012_Readiness-Plan-FINAL_2017-02-23-small.pdf

³⁵ https://redwoodenergy.org/wp-content/uploads/2017/08/10_19_17.FINAL_FCEV_Infrastructure_Plan.pdf

region that can foster the successful introduction of alternative fuel vehicles, wise and effective deployment of alternative fuels infrastructure, and the development of a robust market for alternative fuels.

The North Coast and Upstate Fuel Cell Electric Vehicle (“FCEV”) Readiness Plan laid the groundwork to prepare nine of California’s northernmost counties for the introduction of FCEVs by launching a multi-county public engagement campaign to boost awareness of FCEV technology amongst a variety of stakeholder groups (e.g., general public, planners, fleet managers, state agencies), identify fueling infrastructure needs and ideal sites through stakeholder collaboration, modeling, and analysis.

The Humboldt Transit Authority was recently awarded a \$38.7 million grant (total project cost \$65.2 million) from the California State Transportation Agency’s Transit and Intercity Rail Capital Program to purchase 11 hydrogen buses and construct a fueling facility for these vehicles. The station will also support hydrogen car fueling. It is anticipated that hydrogen for this project will initially be transported into the area from an industrial hydrogen producer, likely made from reforming of natural gas. A future transition to local production of this hydrogen via electrolysis could increase demand for locally generated renewable electricity for transportation.

Hurdles to electric vehicle adoption include limited vehicle inventory and a lack of affordable local options due to supply chain issues and Humboldt’s remote geographic location. Akin to the rest of the state, FCEV adoption in RCEA’s service area is limited due to the absence of retail hydrogen stations to provide fuel for these vehicles.

While RCEA owns and operates REVNet, it does not own and operate all the stations in its territory. For stations that are not incorporated into REVNet, station providers are often delayed in responding to mechanical charging station malfunctions due to Humboldt’s remote geographic location. Additionally, Humboldt County has an especially old building stock. For this reason, panel and wiring upgrades are often required to accommodate charging station infrastructure at residences and businesses. These upgrades are expensive which presents a further barrier to widespread transportation electrification.

Finally, the southern Humboldt grid constraint issues described in Section III(n) could be a barrier to achieving RCEA's transportation electrification actions identified in this plan. RCEA is still working to understand the extent of how the constraints on PG&E's grid will impact the planned additional load anticipated from adoption of EVs and installation of charging infrastructure.

xi. Building electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

As detailed in Section III(g), building electrification is a key pillar of RCEA's Strategic Plan which seeks to *"reduce greenhouse gas emissions from fossil fuel use in buildings by 20% by 2030 and maintain a trajectory to reduce emission from natural gas by 90% by 2050."*

Under its current PA funding, RCEA is operating an EHPIC promoting non-residential and residential heat pump installations for space and water heating. This program is funded through June 2023. RCEA also offers incentives for direct install of a broad range of energy efficiency and fuel substitution measures including refrigeration, lighting, and kitchen equipment. This program is funded through June 2023. RCEA also offers rebates for residential heat pump installations and other energy efficient equipment.

Beginning in 2023 pending funding, RCEA will implement a TECH Quick Start grant focused on identifying and addressing barriers to electrification faced by users of unregulated fuels. These unregulated fuels make up an especially large fraction of fuel use in the rural, forested area served by RCEA, where fuelwood is widely available and propane is distributed by numerous retailers, while natural gas infrastructure is limited to communities in the central, more densely populated part of the county.

RCEA's proposed RuralREN is also a funding source that will lead to building electrification investments above and beyond what is included in the IEPR; details regarding the RuralREN building electrification program offerings as well as the programs mentioned above can be found in Section III(g).

A substantial barrier to building electrification in RCEA's service area, like transportation, is the southern Humboldt grid constraints described in Section III(g). These constraints are hampering the addition of new electrical load and transmission capacity must be expanded to accommodate successful building electrification. Costs of electrical panel upgrades in older buildings and replacement of gas appliances prior to end of life are consumer disincentives to building electrification that are especially acute in RCEA's economically disadvantaged service area. Other barriers to building electrification mirror those described in Section IV(d)(viii).

xii. Other

Other Actions

Unlike most other CCAs in California, RCEA existed as a community-based energy services agency for many years prior to taking on its role as a CCA. Consequently, RCEA's current version of its Strategic Plan, last updated in 2019 with extensive community engagement and input, describes many other energy functions the agency plays or intends to play in its Humboldt County service area, some of which complement or contribute secondary benefits to RCEA's role as a load-serving entity. Among many others included in RCEA's Strategic Plan, some key strategies include:

- **Support renewable energy permitting, climate action planning, and countywide strategic energy planning.** Humboldt County's general plan recognizes RCEA as the County's regional energy authority. In this role, RCEA is working with the County and its other member agencies to develop a multijurisdictional climate action plan that relies heavily on RCEA's delivery of emissions-free energy to the community. The climate action plan is still in development and about to undergo the environmental review process. RCEA is also advocating for creation of designated renewable energy production zones by the County planning department to facilitate permitting of future energy projects that can contribute to RCEA's power portfolio.
- **Support upgrade of the electricity transmission and distribution system.** This activity is critical to ensure north coast offshore wind can be developed at a scale that not only contributes to RCEA's own power portfolio but also increases regional grid reliability by

enabling export of offshore wind power beyond the currently transmission-constrained Humboldt Local Reliability Area. Data available from PG&E also show that transmission and distribution within Humboldt County are highly constrained in multiple locations. Resolving these constraints is critical to enabling interconnection of new renewable generation resources as well as being able to serve expanding load and support electrification and fuel switching.

- **Reduce reliance on unspecified system power.** Through the development of new renewable energy resources, energy storage capacity, and customer-sited distributed resources as outlined in this plan and the above actions, RCEA plans to phase out its reliance on unspecified system power, which makes up the majority of the GHG emissions in its Preferred Conforming Portfolio. RCEA also aspires to reduce reliance on RA from combustion gas and other fossil resources, but this has not yet been officially adopted in its Strategic Plan.

Through its broader role as an energy authority in Humboldt County and beyond its status as simply a CCA or LSE, RCEA is empowered to advocate for and facilitate actions that ensure a reliable, locally sourced, decarbonized, and affordable energy portfolio is available to its electric customers.

Other Barriers

In addition to the topic-specific barriers integrated into Sections V(a)(i) through V(a)(xi), RCEA also considers the following potential barriers in its integrated resource planning:

Regulatory and legislative barriers

- Assignment of unexpected and unplanned resources (for example, through CAM, RMR, CPM);
- Legislative and regulatory changes that reduce the value or cost recovery of existing contracts (e.g., reductions of a project's RA value within RCEA's portfolio under the RA restructuring to Slice of Day).
- Shifts in procurement responsibility to the Central Procurement Entity, and potential shortfalls or other future changes to the CPE construct;

- Anticipated change in law and associated regulatory risk have resulted in challenging contract negotiations for recent RA procurement by RCEA;
- The timing of CPUC decisions about voluntary allocations of PCIA resources to RCEA, which could occur too late to allow timely portfolio optimization and compliance; and
- National policy that restricts or penalizes trade with international suppliers (for example, the Department of Commerce’s ongoing “Initiative of Circumvention Inquiry on the Antidumping Duty and Countervailing Duty Orders”).
- Ongoing CPUC microgrid proceedings (R.19-09-009) that may affect cost recovery through tariffs and market participation of microgrids including RCEA’s Redwood Coast Airport Microgrid;

Market barriers

- Construction timelines, especially considering current supply chain delays and issues. Supply chain challenges have already led to delayed COD for multiple projects offered to or under contract to RCEA;
- Commodity and shipping cost increases, especially considering the recent reversal in solar module cost curves and potential industry shifts of these risks from developers to LSEs;
- Federal import tariff issues that affect industry-wide equipment costs;
- The risk of CAISO curtailments of solar and wind resources that exceed current forecasts; and
- The risk of long-term resource procurement without any certainty of cost recovery;
- Depending on preferred ownership models that emerge, Tribes and other candidates for new local decarbonization and reliability development projects may prefer BTM rather than front-of-meter systems, limiting RCEA’s role in bringing some of these resources online to technical assistance.

b. Disadvantaged Communities

RCEA has several current and planned activities to increase equity throughout its region, several already described in previous sections of the narrative:

- Stakeholder engagement to inform RCEA's Strategic Plan
- Draft Racial Justice Plan
- Public Agency Solar Program
- Mobile Home Solar Program
- Supplier Diversity Program
- ETA PA program and LGP program to deliver energy efficiency services to underserved and hard-to-reach customers
- Proposed RuralREN to bring energy efficiency services to rural underserved and hard-to-reach customers across the state

According to CalEnviroScreen 4.0, no Humboldt County census tracts fall within the state's top 25% of impacted census tracts, or census tracts with the highest pollution burden. That said, there are other important indicators of equity such as: income, unemployment, geographic proximity to services such as comprehensive medical care, living on land under tribal ownership, race, and more. Customers within RCEA's service territory fall into categories, which often intersect and result in compounding levels of inequity.

In a rural context, equity in community engagement means including the voices of those who are far-removed from where decisions are made. As described in Section 3(b)(ii), RCEA engaged in extensive stakeholder outreach to inform the 2019 update of its Strategic Plan. RCEA traveled to remote regions of eastern and southern Humboldt County to receive community input on RCEA's goals related to power procurement, transportation electrification, demand side management, and more. In response to community feedback received through these workshops and written comment, RCEA's Board adopted a policy of transitioning to a 100% clean and renewable power portfolio by 2025. Apart from RA resources, RCEA intends to develop or contract exclusively with renewable and GHG-free generation resources, as well as

energy storage resources. RCEA's Preferred Conforming Portfolio does not include energy contracts for gas generators, including those located within or adjacent to DACs.

That said, as described in Section III(d)(ii), community concerns have been raised about air quality and GHG impacts from biomass power. In response to this concern, RCEA and the owners of the HSC biomass plant executed an MOU that calls for annual reporting on fuel use and sources, emissions, and information regarding HSC's consideration of other potential feedstock uses that could result in reduced air quality impacts. RCEA has supplemented this effort through hiring a consultant, per the request of RCEA's CAC, to analyze alternative energy and non-energy uses of biomass.

In terms of evaluation criteria for power solicitations, RCEA considers project location and community benefits when evaluating responses to power solicitations in an effort to contract for projects that benefit racially diverse communities and to avoid projects that are detrimental to those communities. This is one key aspect of the power procurement section of RCEA's draft Racial Justice Plan. Other procurement-related strategies include:

1. Incorporating energy justice best practices and affordability into renewable development and power purchase solicitations and resource planning.
2. Continue to implement its own Supplier Diversity program, in line with General Order 156, to promote participation of Diverse Business Enterprises in the power industry, including encouraging qualified energy suppliers to register themselves in the CPUC's [Supplier Clearinghouse](#).
3. For energy projects in which RCEA takes an active role in inception, development, ownership and/or operation, work with private partners to utilize collaborative and inclusive engagement with local communities throughout the development process, rather than a "decide-announce-defend" approach.
4. Seek partnerships with expert consultants on racially diverse community engagement, especially for large-scale projects such as offshore wind.

RCEA has a long history of partnership with tribes in its service territory and seeks to expand and deepen these partnerships. RCEA has initiated conversations with local tribes located in

high fire threat districts to develop clean substation microgrids and will engage in extensive outreach when the planning process is more advanced. RCEA's aforementioned Public Agency Solar Program and Community Grid Program serve to reduce the use of diesel generators which are disproportionately relied upon in remote, disadvantaged regions of RCEA's service territory that is not served by the HBGS island.

RCEA's draft Racial Justice Plan aims to achieve diversity, equity, and inclusion in program selection design and implementation. One example of such a program is the Mobile Home Solar Program, an idea initially proposed by RCEA's CAC, RCEA is now partnering with the Bear River Band of the Rohnerville Rancheria to provide clean energy to low-income customers living in mobile homes. In looking ahead to offshore wind development, RCEA has contracted with a consultant to assist with tribal outreach to inform responsible development that is done in collaboration and serves the needs and interests of local tribal stakeholders.

Since the inception of its CCA program, RCEA has provided program materials in both Spanish and English. In 2020, RCEA hosted a Certify and Amplify workshop to encourage contractors to achieve supplier diversity certification; this workshop was recorded in both English and Spanish as well.

RCEA plans to improve and expand upon the outreach efforts described above to conduct targeted community outreach for future procurement, programs, and all agency activities.

c. Commission Direction of Actions

Like other CCAs, RCEA encourages the Commission to adopt durable rules and processes to bring greater stability to the regulatory framework within which RCEA and other LSEs must plan and operate. Frequent rule changes disrupt RCEA's ability to execute long-term planning activities and actions based on those activities while minimizing customer costs. Such regulatory changes can also result in duplicative procurement, stranded assets, disproportionately high costs and administrative burdens, which must be either absorbed by LSEs or passed onto customers via rate increases. For example, the Commission is currently

considering a programmatic approach to the IRP and a Slice of Day reform of the RA Program. Each of these changes on their own represent significant regulatory uncertainty, which leads to market uncertainty. These changes together represent a complex, wholesale change to the regulatory landscape, which LSEs cannot reasonably account for in planning and procurement. The Commission should be cognizant that the scope of these reforms may have broad, and somewhat unpredictable, impacts to the market. These market changes will likely alter planned procurement over the long term and may reduce the accuracy of LSE's IRP plans.

On a related note, RCEA requests that the Commission provide clear direction as soon as possible regarding any new procurement mandates emerging from the current IRP cycle. Like other LSEs, RCEA has been challenged to procure resources with online dates early enough to satisfy the earlier compliance tranches of D.19-11-016 and D.21-06-035. Early notification of any future procurement mandates will allow RCEA to identify the largest range of options and carefully select and negotiate for optimal resource solutions. Additionally, RCEA requests that the Commission issue a decision to delay the earliest compliance deadline of an additional procurement mandate beyond 2025 to avoid the current market challenges that are driving up incremental resource costs and delaying development schedules.

RCEA also requests that the Commission issue guidance that states energy-only resources which are contractually obligated and on-track to obtain full or partial capacity deliverability status qualify for IRP procurement mandates at the time of commercial operation. Given that award of deliverability status can lag behind the generator interconnection process, there could be operational incremental capacity that is not accounted for in monitoring procurement pursuant to these mandates.

To further improve the efficacy of IRP-related procurement, RCEA supports an approach that is technologically neutral, and values resources based on their cost, emissions, and capacity impacts, while allowing LSEs to simultaneously prioritize other customer benefits such as economic development and resiliency if in a position to do so. Giving LSEs the autonomy to select the resource mix to meet their share of statewide reliability and environmental objectives in tandem with their own constituents' objectives, fosters more innovation (as

evidenced through RCEA's floating offshore wind initiative) and creates productive competition between developers and proposed technologies.

The CPUC should also take steps to ensure that it does not structurally discourage excess procurement pursuant to incremental capacity orders. One such step is allowing excess procurement to count towards future orders. Careful timing of ordered procurement and the baseline resource analysis associated with those orders will help ensure proactive LSEs are not penalized for their foresight in reliability procurement. The existing system tends to unintentionally reward lagging procurement and disincentivize advance planning.

As it contemplates the reform of the IRP program via the recent *Administrative Law Judge's Ruling Seeking Comments on Staff Paper on Procurement Program and Potential Near-Term Actions to Encourage Additional Procurement* (issued after the cut-off date for content to include in this IRP), RCEA encourages the Commission to decide on a programmatic framework that will improve coordination between Energy Division's IRP and RPS branches and consider timing in what they each require from LSEs. In the last few cycles, the RPS Procurement Plan effectively required results from IRP modeling months ahead of when the IRPs were due, at a time when LSEs didn't even have all the guidance needed from the Commission to conduct their modeling. These shifts will ultimately reap gains in administrative efficacy.

Finally, as alluded to in various sections above, RCEA requests that the ultimate base case Preferred System Portfolio and associated busbar map the CPUC submits to the CAISO for the 2024-2025 Transmission Planning Process prioritize transmission projects that will enable the full-scale build-out of the 1.6 GW of offshore wind that the Humboldt offshore wind areas are capable of producing. This full build-out is necessary to achieve Assembly Bill 525 policy goals, one of the objectives in developing the PSP.

V. Lessons Learned

RCEA's lessons learned and suggested changes to the IRP process for consideration by the Commission that would facilitate the ability of the Commission and LSEs to achieve state policy goals are detailed below.

- It is challenging to keep abreast of IRP requirements and instructions as they are modified and updated in the months leading up to the submission deadline, as this information is dispersed across the 2022 IRP guidance documentation, IRP ruling and slide decks, question and answer documents, and emails issued subsequently by the Energy Division. It would be helpful if the Commission and Energy Division staff were to issue comprehensive guidance at one time, and only to make changes when absolutely necessary. If changes to IRP guidance are needed, RCEA suggests consolidating those in successive versions of a single comprehensive and authoritative document for each required filing document, showing redline changes from the prior version.
- A central database where the CPUC stores procurement data provided by LSEs and uses it to auto-populate templates would provide efficiency by ensuring consistent information is used in the various regulatory filings required, and sparing LSE staff from having to re-compile the same data in different formats for each filing. The IRS's use of centrally stored taxpayer data to auto-populate tax returns or the Department of Education's system for completing income fields in the FAFSA student financial aid form using IRS taxpayer data are models to consider emulating.
- Like many CCAs, RCEA is a small organization with lean staffing, in which staff responsible for resource planning are the very same staff tasked with procurement and contract management contemplated in the plans. The CPUC's IRP model came into being in an era when most load was served by a few large IOUs with the staffing and resources to conduct extensive analysis in developing their plans – plans that would each contribute hundreds or thousands of MWs of potential new procurement to the state-level resource planning. For smaller LSEs like RCEA, the effort entailed in developing CPUC IRPs may be out of proportion to the benefit the many resulting small-scale IRPs contribute to state-level resource planning. RCEA encourages the Commission to reconsider alternative IRP requirements that reduce administrative burden for smaller LSEs such as it has made available in the past.
- Emissions accounting for biomass and geothermal resources in the CSP calculator doesn't align with state emissions accounting methodologies. The model assumes zero

GHG emissions from all renewables. In the case of biomass, this ignores the non-biogenic emissions tracked by the CARB and included in RCEA's reporting to The Climate Registry for the specific plants RCEA procures from in keeping with state protocols for biomass emissions reporting. RCEA encourages the Commission to quantify incidental GHG emissions, such as those from ancillary use of fossil fuels in biomass facilities in the CSP calculator consistently with how they are accounted for by CARB.

Glossary of Terms

Alternative Portfolio: LSEs are permitted to submit “Alternative Portfolios” developed from scenarios using different assumptions from those used in the Preferred System Plan with updates. Any deviations from the “Conforming Portfolio” must be explained and justified.

Approve (Plan): the CPUC’s obligation to approve an LSE’s integrated resource plan derives from Public Utilities Code Section 454.52(b)(2) and the procurement planning process described in Public Utilities Code Section 454.5, in addition to the CPUC obligation to ensure safe and reliable service at just and reasonable rates under Public Utilities Code Section 451.

Balancing Authority Area (CAISO): the collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.

Baseline resources: Those resources assumed to be fixed as a capacity expansion model input, as opposed to Candidate resources, which are selected by the model and are incremental to the Baseline. Baseline resources are existing (already online) or owned or contracted to come online within the planning horizon. Existing resources with announced retirements are excluded from the Baseline for the applicable years. Being “contracted” refers to a resource holding signed contract/s with an LSE/s for much of its energy and capacity, as applicable, for a significant portion of its useful life. The contracts refer to those approved by the CPUC and/or the LSE’s governing board, as applicable. These criteria indicate the resource is relatively certain to come online. Baseline resources that are not online at the time of modeling may have a failure rate applied to their nameplate capacity to allow for the risk of them failing to come online.

Candidate resource: those resources, such as renewables, energy storage, natural gas generation, and demand response, available for selection in IRP capacity expansion modeling, incremental to the Baseline resources.

Capacity Expansion Model: a capacity expansion model is a computer model that simulates generation and transmission investment to meet forecast electric load over many years, usually with the objective of minimizing the total cost of owning and operating the electrical system. Capacity expansion models can also be configured to only allow solutions that meet specific requirements, such as providing a minimum

amount of capacity to ensure the reliability of the system or maintaining greenhouse gas emissions below an established level.

Certify (a Community Choice Aggregator Plan): *Public Utilities Code 454.52(b)(3) requires the CPUC to certify the integrated resource plans of CCAs. “Certify” requires a formal act of the Commission to determine that the CCA’s Plan complies with the requirements of the statute and the process established via Public Utilities Code 454.51(a). In addition, the Commission must review the CCA Plans to determine any potential impacts on public utility bundled customers under Public Utilities Code Sections 451 and 454, among others.*

Clean System Power (CSP) methodology: *the methodology used to estimate GHG and criteria pollutant emissions associated with an LSE’s Portfolio based on how the LSE will expect to rely on system power on an hourly basis.*

Community Choice Aggregator: *a governmental entity formed by a city or county to procure electricity for its residents, businesses, and municipal facilities.*

Conforming Portfolio: *the LSE portfolio that conforms to IRP Planning Standards, the 2030 LSE-specific GHG Emissions Benchmarks, use of the LSE’s assigned load forecast, as well as other IRP requirements including the filing of a complete Narrative Template, a RDT and CSP calculator.*

Effective Load Carrying Capacity: *a percentage that expresses how well a resource is able to avoid loss-of-load events (considering availability and use limitations). The percentage is relative to a reference resource, for example a resource that is always available with no use limitations. It is calculated via probabilistic reliability modeling, and yields a single percentage value for a given resource or grouping of resources.*

Effective Megawatts (MW): *perfect capacity equivalent MW, such as the MW calculated by applying an ELCC % multiplier to nameplate MW.*

Electric Service Provider: *an entity that offers electric service to a retail or end-use customer, but which does not fall within the definition of an electrical corporation under Public Utilities Code Section 218.*

Filing Entity: *an entity required by statute to file an integrated resource plan with CPUC.*

Future: *a set of assumptions about future conditions, such as load or gas prices.*

GHG Benchmark (or LSE-specific 2030 GHG Benchmark): the mass-based GHG emission planning targets calculated by staff for each LSE based on the methodology established by the California Air Resources Board and required for use in LSE Portfolio development in IRP.

GHG Planning Price: the systemwide marginal GHG abatement cost associated with achieving a specific electric sector 2030 GHG planning target.

Integrated Resources Planning Standards (Planning Standards): the set of CPUC IRP rules, guidelines, formulas and metrics that LSEs must include in their LSE Plans.

Integrated Resource Planning (IRP) process: integrated resource planning process; the repeating cycle through which integrated resource plans are prepared, submitted, and reviewed by the CPUC

Long term: more than 5 years unless otherwise specified.

Load Serving Entity: an electrical corporation, electric service provider, community choice aggregator, or electric cooperative.

Load Serving Entity (LSE) Plan: an LSE's integrated resource plan; the full set of documents and information submitted by an LSE to the CPUC as part of the IRP process.

Load Serving Entity (LSE) Portfolio: a set of supply- and/or demand-side resources with certain attributes that together serve the LSE's assigned load over the IRP planning horizon.

Loss of Load Expectation (LOLE): a metric that quantifies the expected frequency of loss-of-load events per year. Loss-of-load is any instance where available generating capacity is insufficient to serve electric demand. If one or more instances of loss-of-load occurring within the same day regardless of duration are counted as one loss-of-load event, then the LOLE metric can be compared to a reference point such as the industry probabilistic reliability standard of "one expected day in 10 years," i.e. an LOLE of 0.1.

Maximum Import Capability: a California ISO metric that represents a quantity in MWs of imports determined by the CAISO to be simultaneously deliverable to the aggregate of load in the ISO's Balancing Authority (BAA) Area and thus eligible for use in the Resource Adequacy process. The California ISO assesses a MIC MW value for each intertie into the ISO's BAA and allocated yearly to the LSEs. A LSE's RA import showings are limited to its share of the MIC at each intertie.

Net Qualifying Capacity (NQC): *Qualifying Capacity reduced, as applicable, based on: (1) testing and verification; (2) application of performance criteria; and (3) deliverability restrictions. The Net Qualifying Capacity determination shall be made by the California ISO pursuant to the provisions of this California ISO Tariff and the applicable Business Practice Manual.*

Non-modeled costs: *embedded fixed costs in today's energy system (e.g., existing distribution revenue requirement, existing transmission revenue requirement, and energy efficiency program cost).*

Nonstandard LSE Plan: *type of integrated resource plan that an LSE may be eligible to file if it serves load outside the CAISO balancing authority area.*

Optimization: *an exercise undertaken in the CPUC's Integrated Resource Planning (IRP) process using a capacity expansion model to identify a least-cost portfolio of electricity resources for meeting specific policy constraints, such as GHG reduction or RPS targets, while maintaining reliability given a set of assumptions about the future. Optimization in IRP considers resources assumed to be online over the planning horizon (baseline resources), some of which the model may choose not to retain, and additional resources (candidate resources) that the model is able to select to meet future grid needs.*

Planned resource: *any resource included in an LSE portfolio, whether already online or not, that is yet to be procured. Relating this to capacity expansion modeling terms, planned resources can be baseline resources (needing contract renewal, or currently owned/contracted by another LSE), candidate resources, or possibly resources that were not considered by the modeling, e.g., due to the passage of time between the modeling taking place and LSEs developing their plans. Planned resources can be specific (e.g., with a CAISO ID) or generic, with only the type, size and some geographic information identified.*

Qualifying capacity: *the maximum amount of Resource Adequacy Benefits a generating facility could provide before an assessment of its net qualifying capacity.*

Preferred Conforming Portfolio: *the conforming portfolio preferred by an LSE as the most suitable to its own needs; submitted to CPUC for review as one element of the LSE's overall IRP plan.*

Preferred System Plan: *the Commission's integrated resource plan composed of both the aggregation of LSE portfolios (i.e., Preferred System Portfolio) and the set of actions necessary to implement that portfolio (i.e., Preferred System Action Plan).*

Preferred System Portfolio: *the combined portfolios of individual LSEs within the CAISO, aggregated, reviewed and possibly modified by Commission staff as a proposal to the Commission, and adopted by the Commission as most responsive to statutory requirements per Pub. Util. Code 454.51; part of the Preferred System Plan.*

Short term: *1 to 3 years (unless otherwise specified).*

Staff: *CPUC Energy Division staff (unless otherwise specified).*

Standard LSE Plan: *type of integrated resource plan that an LSE is required to file if it serves load within the CAISO balancing authority area (unless the LSE demonstrates exemption from the IRP process).*

Transmission Planning Process (TPP): *annual process conducted by the California Independent System Operator (CAISO) to identify potential transmission system limitations and areas that need reinforcements over a 10-year horizon.*