[Public Version]

2020 Integrated Resource Plan

Redwood Coast Energy Authority

Standard Load Serving Entity Plan

October 15, 2021

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I. Introduction and Executive Summary

a. Introduction

Description of 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.

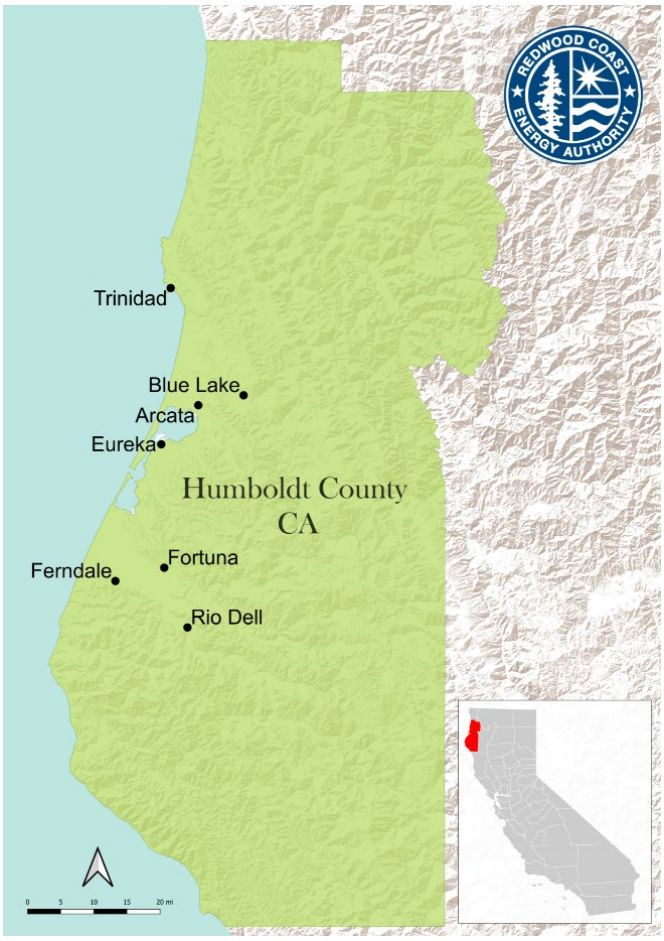
As a JPA RCEA is a local government agency. RCEA is governed by a nine-member board composed of representatives of its member local governments. Through these representatives RCEA is controlled by and accountable to the communities RCEA serves. RCEA operates several programs, including its Community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



As of July 2020, RCEA served 53,156 residential accounts and 9,475 commercial and industrial accounts. 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 136,373 (U.S. Census estimate for 2018), the majority of which live in households or work at businesses that receive generation service from RCEA. In 2019, RCEA had a peak load of 117 MW, and a total 2019 energy usage of 636 GWh.

Based on current information, RCEA anticipates no changes to its service territory in the 2020-2030 timeframe.

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, 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 and needs preferences are embodied in a number of procurement goals adopted by RCEA's governing board:

- **Minimize Greenhouse Gas Emissions Associated with RCEA's CCA Program**. Procure a power mix that by 2025 has zero greenhouse gas emissions as counted under the California Air Resources Board's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, other than emissions from resources meeting California's Renewable Portfolio Standard.[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.** 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 grid-connected renewable energy and storage systems as core strategies toward achieving environmental, economic, and community stability/resilience goals.[5]
- **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 Sections 366.2(a)(5) and 454.52 (b)(3),[9] all procurement by RCEA, including the portfolios set forth in this IRP, must strive for consistency with these board-adopted goals.

[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.
[6] Ibid, Strategy 2.4.3.
[7] Ibid, Strategy 4.2.1
[8] Ibid, Strategy 4.3.1
[9] All further citations to statute are to the California Public Utilities Code unless otherwise noted.

Introduction to RCEA's IRP

In accordance with the requirements of California Public Utilities Code Sections 454.51 and 454.52 and Commission Decisions ("D.") 18-02-018, D.19-11-016, and D.20-03-028, 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 38 million metric ton (MMT) resource data spreadsheet
- RCEA's 46 MMT resource data spreadsheet
- RCEA's 38 MMT clean system power calculator
- RCEA's 46 MMT clean system power calculator
- RCEA's Senior Executive Attestation re: D.19-11-016 Incremental Capacity Procurement

As demonstrated by the significant differences between the Commission's 2017-2018 RSP and its 2019-2020 RSP, projecting resource need over the time horizon covered by the IRP is an inexact matter. The future resources identified in RCEA's IRP represent RCEA's best 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 changed circumstances, and the ultimate resource mix that RCEA actually procures may differ from what is reflected in the plan due to a number of variables including availability of supply, price of supply and/or other market or regulatory considerations.

As directed in D.20-03-028, RCEA is submitting two portfolios in this IRP, one based on the Commission's 38 MMT greenhouse gas (GHG) reduction benchmark[10] and associated 38 MMT reference system portfolio ("RSP") but with emissions that are below RCEA's allocated share of the 38 MMT benchmark (thus "sub-38 MMT"), and a second based on the Commission's 46 MMT benchmark and RSP.

RCEA's governing board has approved RCEA's sub-38 MMT portfolio as RCEA's official board approved preferred portfolio ("BAPP"). The BAPP reflects RCEA's actual planned procurement, and RCEA's board has authorized additional resource planning efforts and resource procurement based on the BAPP.

RCEA is also submitting a 46 MMT preferred conforming portfolio ("PCP") as part of this IRP. In preparing this portfolio, RCEA followed the Energy Division's direction requiring that each LSE's 46 MMT portfolio include emissions equal to, but not lower than, its assigned load-proportional share of

[10] Throughout this plan narrative, 38 MMT and 46 MMT are used to refer to two planning scenarios used by the CPUC in its IRP process where total state electric sector GHG emissions in 2030 are 38 and 46 million metric tons, respectively.

the 46 MMT emissions benchmark (the "equal-to requirement").[11] But for the equal-to requirement, RCEA would have submitted a 46 MMT portfolio that fully conformed to the resource mix, procurement timing, and other reliability and operational characteristics of the Commission's 46 MMT RSP while also achieving GHG emissions *significantly* lower than RCEA's assigned share of the 46 MMT benchmark. To develop a 46 MMT PCP that satisfies the equal to requirement, RCEA had to increase its portfolio's emissions and significantly reduce its procurement of new renewable generation. In fact, to comply with the energy division's guidance RCEA had to develop a portfolio that increases RCEA's GHG emissions between now and 2030. RCEA's current (2019) portfolio has GHG emissions of 0.006 MMT[12], while RCEA's 46 MMT PCP has GHG emissions of 0.111 MMT.

RCEA believes that the emissions increases needed to comply with the 46 MMT "equal to" requirement is inconsistent with the spirit and letter of the IRP Statute, the Commission's IRP Decisions, and RCEA's own board-adopted procurement policies.

In light of these concerns, RCEA's governing board has approved its 46 MMT PCP *as a planning/modeling exercise and compliance submission only*. RCEA asks that the Commission use its BAPP in all statewide planning and portfolio consolidation, regardless of whether the Commission decides to use the 38 MMT or 46 MMT scenario as the basis for its Preferred System Portfolio ("PSP"). In support of this request, this narrative provides analysis demonstrating that RCEA's BAPP is consistent with the 46 MMT RSP's resource mix and quantities, procurement timing, and other operational attributes, and that RCEA's BAPP can be "plugged in" to either a 38 MMT statewide portfolio or a 46 MMT statewide portfolio and still contribute more than RCEA's share of reliability, renewable integration, and other shared resource requirements.

Board Approval of IRP

In compliance with Public Utilities Code Section 454.52(b)(3), this IRP was formally submitted to RCEA's governing board for approval based on the IRP's compliance with Sections 454.51 and 454.52 (the "IRP Statute") and all relevant procurement requirements adopted by RCEA's governing board. On August 27, 2020 RCEA's board issued Resolution 2020-5, which formally approves this IRP, adopts RCEA's sub-38 MMT portfolio as RCEA's BAPP for use as the basis for future procurement activities, and approves RCEA's 46 MMT PCP as a planning exercise and compliance submission. In Resolution 2020-5 RCEA's board also makes the following determinations:

[11] See "Filing Requirements Questions and Answers," Version 8/11/2020, at 11 ("A conforming portfolio for the 46 MMT GHG target needs to achieve emissions *equal to* the LSE's proportional share of the 46 MMT GHG target, and a conforming portfolio for the 38 MMT GHG target needs to achieve emissions that are equal to or less than the LSE's proportional share of the 38 MMT target.") (*emphasis added*).

[12] RCEA's 2019 emissions factor was estimated by RCEA staff using a methodology consistent with The Climate Registry's Electric Sector Protocol, but has not been verified by a third party.

Regarding RCEA's BAPP:

- RCEA's governing board approves RCEA's BAPP as RCEA's actual procurement plan and authorizes procurement efforts based on this plan.
- RCEA's BAPP achieves economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in Section 454.52(a)(1)(A-I).
- RCEA's BAPP includes a diversified procurement portfolio consisting of both short-term and long-term electricity and electricity-related demand reduction products.
- RCEA's BAPP achieves the resource adequacy requirements established pursuant to Public Utilities Code Section 380.
- RCEA's BAPP is consistent with the procurement timing, resource mix, and operational attributes of both the Commission's 38 MMT RSP and the Commission's 46 MMT RSP.
- RCEA's BAPP is fully compliant with all RCEA board-adopted procurement directives.

Regarding RCEA's 46 MMT PCP:

- RCEA's 46 MMT PCP achieves emissions that are equal to, but not lower than, RCEA's load-proportional share of the 46 MMT GHG reduction target.
- RCEA's 46 MMT PCP achieves economic, reliability, and other benefits and performance characteristics consistent with the goals set forth in Section 454.52(a)(1)(A-I).
- RCEA's 46 MMT PCP was developed in accordance with the Energy Division's direction that 46 MMT PCPs must achieve GHG emissions equal to, but not less than, each LSE's assigned share of the 46 MMT target.
- To comply with the equal-to requirement, RCEA had to develop a 46 MMT portfolio that does not reflect the needs and values of the communities served by RCEA and does not reflect RCEA's procurement preferences, planned procurement, and intended GHG reduction performance,
- RCEA's 46 MMT PCP does not fully comply with the following board-adopted policies and requirements:
    - 100% clean and renewable portfolio by 2025
    - 100% local renewable portfolio by 2030
    - GHG reduction
    - Other RePower strategies
- RCEA's 46 MMT PCP is approved for submission to meet the Commission's compliance requirements and for use in the Commission's statewide planning and modeling, but does not reflect RCEA's actual planned procurement.

A copy of Resolution 2020-5 is attached to this IRP Narrative and is identified as Attachment A.

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."[13] Likewise, the Legislature has granted CCAs autonomy in setting their own rates and managing interactions with their customers.[14] The Commission has three primary interests in the CCA IRP process:

- Ensuring that CCA IRPs provide the CCA procurement information that the Commission needs in order to develop its statewide plan.[15]
- Ensuring that CCAs' current and planned procurement is consistent with the resource adequacy ("RA") requirements established pursuant to Public Utilities Code Section 380.[16]
- Ensuring that CCAs' current and planned procurement satisfies the CCA's share of renewables integration resource identified in the Commission's Reference System Portfolio ("RSP"), and that the CCA either self-provides or pays for IOU procurement for its share of any renewable integration shortfall.[17]

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.

b. Executive Summary

This narrative provides a detailed description of the development and content of RCEA's sub-38 MMT BAPP and its 46 MMT PCP, each portfolio's compliance with applicable requirements, and an action plan detailing RCEA's planned next steps.

RCEA developed its IRP through the following steps:

[13] Public Utilities Code Section 366.2(a)(5).
[14] 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").
[15] 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…").
[16] Section 454.52(b)(3)(C).
[17] Section 454.51.

1. RCEA compiled its contracted and owned resources, RA capacity contracts, and share of capacity for CAM resources.
2. RCEA compiled the resources for which it is currently negotiating long-term energy and capacity contracts.
3. RCEA compiled its near-term resource procurements that have been authorized by RCEA's Board through solicitation mechanisms such as its Feed-In Tariff program and Distributed RA RFP.
4. RCEA identified its short energy position in the IRP planning years of 2022, 2026 and 2030 by comparing the forecasted generation of the above resources with its assigned load.
5. To fill its energy position, RCEA referred to its Board-adopted RePower Humboldt Comprehensive Action Plan for Energy ("Strategic Plan"), and selected candidate resources that were also compatible with the CPUC's RSP.
6. RCEA added generic future contracts with existing resources to help fill its short position in advance of the anticipated online dates of candidate resources.
7. RCEA evaluated five candidate sub-38 MMT portfolios for financial performance and reliability, and selected one for further analysis, based on the most favorable combination of cost, reliability, and compatibility with RCEA's Board's procurement directives expressed in the Strategic Plan.
8. RCEA populated its Resource Data Template with all contracts described in steps 1-3 above.
9. RCEA used the Commission's CSP Calculator Tool to check the GHG emissions associated with the resulting portfolio to ensure that these emissions are lower than RCEA's assigned share of the 38 MMT benchmark.
10. RCEA identified the resulting portfolio as its 38 MMT portfolio, and further populated its 38 MMT Resource Data Template with the additional existing and candidate resources in steps 5-6 above.
11. Using the 38 MMT portfolio as a starting point, RCEA replaced planned renewable procurement in the CSP Calculator Tool with system power until the portfolio had emissions equal to RCEA's assigned share of the 46 MMT GHG benchmark.
12. RCEA identified the resulting portfolio as its 46 MMT portfolio, and modified its 46 MMT Resource Data Template accordingly.
13. RCEA checked both its 38 MMT portfolio and its 46 MMT portfolio for reliability by evaluating portfolio performance against projected resource adequacy requirements and comparing expected generation with forecasted peak demand.
14. RCEA checked both its 38 MMT portfolio and its 46 MMT portfolio by comparing each portfolio's resource mix and procurement timing to projected resource costs.

RCEA reached the following findings regarding its BAPP:

1. RCEA's BAPP includes the procurement of the following new resources:

- 100 MW Sandrini Sol 1 Solar Park
- 2.2 MW Redwood Coast Airport Microgrid plus 2.2 MW/8.8 MWh battery energy storage system (BESS)
- 6.5 MW of Feed-In Tariff 1.0 projects, plus 6 MW of co-located, short-duration storage capacity
- 6 MW of Feed-In Tariff 2.0 projects, plus 6 MW of co-located, short-duration storage capacity
- 40 MW of Redwood Coast Offshore Wind
- 8 MW of new small hydro
- 7 MW of long-duration energy storage
- 6.3 MW of behind-the-meter (BTM) distributed energy storage
- 2.5 MW of Tierra Buena BESS
- 5.5 MW of Leap Demand Response Aggregation

2. RCEA's BAPP provides for the following overall resource mix in 2030:
    - 115 MW of solar
    - 40 MW of offshore wind
    - 13 MW of biomass
    - 14 MW of small hydro
    - 23 MW of short-duration storage
    - 7 MW of long-duration storage
3. The discretionary procurement to be undertaken following the submittal of this IRP in RCEA's BAPP is consistent with procurement timing, resource quantities, and general resource attributes identified in the 38 MMT RSP.
4. RCEA's BAPP would have 2030 emissions of 0.069 MMT according to CSP tool calculations. This is 22% lower than RCEA's assigned 2030 GHG emissions benchmark net BTM combined heat and power (CHP) of 0.089 MMT.
5. RCEA's BAPP meets all relevant reliability metrics, including exceeding RCEA's expected peak demand and forecasted generation needs during the California system's summer peaking months and meeting the majority of RCEA's peak demand and forecasted generation needs during the winter and shoulder months.
6. RCEA's BAPP provides more than RCEA's load-proportional share of renewable integration resources.
7. RCEA's BAPP is also consistent with the Commission's 46 MMT RSP and can be used in either a 38 MMT or 46 MMT consolidated statewide portfolio.

RCEA reached the following findings regarding its 46 MMT portfolio:

1. The discretionary procurement in RCEA's 46 MMT portfolio conforms to the procurement timing, resource quantities, and general resource attributes identified in the 46 MMT RSP.

2. RCEA would have been able to provide a reliable, cost-effective, renewables-driven portfolio that conforms to the procurement timing, resources quantities, and general resource attributes identified in the 46 MMT RSP and achieves GHG emissions reductions significantly greater than RCEA's load-proportional share of the 46 MMT benchmark.
3. In order to comply with the equal-to requirement, RCEA had to significantly increase its emissions by taking the following steps:
    - Reducing its renewable energy generated in 2030 by 20%.
    - Reducing its long-duration energy storage by 14% of procured capacity.
    - Increasing its reliance on unspecified system power by about 100 GWh in 2030.
4. RCEA's 46 MMT portfolio includes the procurement of the same new resources as the 38 MMT portfolio, except the following differences:
    - 15 MW of Redwood Coast Offshore Wind
    - 0 MW of new small hydro
    - 6 MW of long-duration energy storage
5. RCEA's 46 MMT portfolio provides for the following overall resource mix in 2030:
    - 115 MW of solar
    - 15 MW of offshore wind
    - 13 MW of biomass
    - 6 MW of small hydro
    - 23 MW of short-duration storage
    - 6 MW of long-duration storage
6. RCEA's 46 MMT portfolio would have 2030 emissions of 0.111 MMT. As required by the Energy Division, this is equal to, but not lower than, RCEA's assigned share of 2030 emissions net BTM CHP.

RCEA's Board of Directors selects its 38 MMT portfolio as its Board-approved preferred conforming portfolio, as it is most consistent with RCEA's program goals and board directives, while contributing RCEA's share of renewables integration and reliability at a forecasted cost that is affordable by RCEA customers. To implement its BAPP, RCEA is adopting the action plan described in section IV, below. This action plan consists of the following steps, many of which are already underway:

- Procure local BTM storage capacity
- Continue development and implementation of RCEA's Feed-In Tariff (FIT) and add energy storage to FIT 2.0
- Pursue development of local small hydropower
- Procure long-duration storage capacity
- Continue to procure local biomass power
- Continue to pursue development of local offshore wind power
- Reduce reliance on unspecified system power

- Ensure best outcomes for disadvantaged communities

All of these steps would also be undertaken or continued to implement RCEA's 46 MMT portfolio, with the exception of the small hydropower development effort.

II. Study Design

a. Objectives

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

1. Identify a 38 MMT portfolio with emissions equal to or lower than RCEA's proportional share of the 38 MMT GHG reduction benchmark, as determined using the Commission's emissions calculator.
2. Identify a 46 MMT portfolio with emissions equal to RCEA's proportional share of the 46 MMT GHG reduction benchmark, as determined using the Commission's emissions calculator.
3. Identify 38 and 46 MMT portfolios that achieve economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in Section 454.52(a)(1)(A-I).
4. Identify diverse and balanced 38 and 46 MMT portfolios that include both short-term and long-term electricity and electricity-related and demand reduction products, but that transition to mostly long-term procurements over the planning period.
5. Identify portfolios that achieve the RA requirements established pursuant to Public Utilities Code Section 380 and fully provide RCEA's share of system reliability and renewable integration resources.
6. Identify portfolios that fully comply with all RCEA board-adopted procurement directives.
7. Identify portfolios that are fully compliant with RCEA's obligations under the Renewables Portfolio Standard program.
8. Identify portfolios that are cost-effective and minimize rate impacts on RCEA's customers.

b. Methodology

i. Modeling Tool(s)

RCEA used a suite of modeling tools to test and compare the performance of candidate BAPP resource portfolios: Aurora, HedgeFox, and RCEA's own financial model. First, the Aurora model was used to forecast energy market prices throughout the IRP study horizon. Second, RCEA used the HedgeFox model to generate stochastic load and price scenarios based on the outputs of Aurora. RCEA used this combined output of Aurora and HedgeFox to compare the relative costs of each candidate portfolio. Finally, RCEA evaluated the overall financial impact of its preferred BAPP portfolio on RCEA's financial outlook using its own financial model.

Aurora

Aurora was used to determine the long-term market environment against which each resource would be evaluated over the IRP study horizon. Developed by EPIS, Inc., Aurora simulates the supply and demand fundamentals of the physical power market, and ultimately produces a long-term power price forecast. Using factors such as the economic and performance characteristics of supply resources, regional demand, and zonal transmission constraints, Aurora simulates the WECC system to determine an adequate generation portfolio, constrained by the limitations of the transmission network, that work together to serve load. The model simulates resource dispatch which is used to create long-term price and capacity expansion forecasts. The software includes a database containing information on over 13,600 generating units, fuel prices, and demand forecasts for 115 market areas in the United States.

RCEA created or utilized reputable third-party forecasts of key variables, such as regional load growth rates and planning reserve margins, natural gas prices, hydro generation, and carbon prices. Renewable resource additions were set to correspond to the regional load growth and renewable portfolio standard set by each state. Using a recursive-optimization process, Aurora determines an economically optimal resource expansion path within the given constraints and generates a long-term price forecast for the CAISO region.

HedgeFox

HedgeFox is a Monte Carlo simulation model of markets, resources and portfolios developed by The Energy Authority (TEA). HedgeFox utilizes a combination of methodologies from statistical approaches, data science, machine learning models, and operational research optimization. In RCEA's IRP, HedgeFox was used to take the deterministic price outlook from Aurora and generate a stochastic scenario set around it. This dataset allowed RCEA to value the performance of candidate portfolios under a range of potential price scenarios over the 10-year IRP study horizon.

RCEA Financial Model

RCEA maintains a financial model that provides a 10-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 BAPP integrating the cost of energy, renewables, and resource adequacy into a single portfolio cost. This outcome was compared against current costs and projected future costs based on 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 three tools above to iterate through a number of potential sets of resources for both the BAPP and the 46 MMT portfolio that would allow RCEA to meet its assigned share of GHG emissions in the two portfolios, as well as its share of system reliability, while meeting the broader objectives of the CCA program as determined by its 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 by and incorporated into by the Commission as part of this IRP cycle.

ii. Modeling Approach

Load Forecast

RCEA developed its IRP using its assigned load forecast from Attachment A to the May 20, 2020 *Administrative Law Judge's Ruling Correcting April 15, 2020 Ruling Finalizing Load Forecasts and Greenhouse Gas Benchmarks for Individual 2020 Integrated Resource Plan Filings* ("Load Forecast Ruling"). RCEA's assigned load forecast is as follows:

Table 1: RCEA's 2020-2030 Load Forecast

Year	Load Forecast (GWh)
2020	638
2021	630
2022	627
2023	626
2024	627
2025	627
2026	628
2027	628
2028	628
2029	628
2030	628

Load Shape

In developing its 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 2019 IEPR Mid Baseline Mid AAEE case. These differences are due to the geography of RCEA's service territory and 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 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 the majority 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 17% to 24% (26 to 35 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 4% to 8% (5 to 9 MW) greater than the default winter peak, and a summer peak that is 26% to 32% (38 to 47 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 portfolios against its 2030 load-proportional share of the respective 38 MMT and 46 MMT GHG benchmarks, as assigned in Table 1 of the Load Forecast Ruling, as well as the same GHG benchmarks with allocated BTM CHP emissions netted out, as assigned by CPUC staff in the final version of the CSP Calculator:[18]

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

2030 GHG Benchmark Source	2030 Load (GWH)	Proportion of 2030 Load Within IOU Territory	2030 GHG Benchmark (MMT) – 46 MMT Scenario	2030 GHG Benchmark (MMT) – 38 MMT Scenario
Load Forecast Ruling	628	0.82%	0.128	0.106
Net BTM CHP	628	0.82%	0.111	0.089

Compiling Existing Resources

To initially populate its resource data templates, RCEA added existing resources from the following sources:

- Energy purchase and sales contracts
- Capacity (Resource Adequacy) purchase and sales contracts
- 2020 carbon-free energy allocation from PG&E
- RCEA's assigned share of capacity for Capacity Allocation Mechanism (CAM) and Reliability Must Run (RMR) resources, taken from RCEA's 2021 Year Ahead Initial Resource Adequacy Allocation

Additionally, RCEA included short-term procurements from generic existing wind and large hydro in near-term years (2021-2025), given the long timeline required for the development of selected new resources described below. Lastly, RCEA also included in its analysis an extension of its medium-term contract with an existing biomass facility through the end of the planning period.

Selecting New Resources

To identify its new resource procurement, RCEA referred to its Strategic Plan that was updated in December 2019, as well as the RSP total resource mix and new resource buildout.

RCEA conducted an extensive stakeholder engagement process to develop the portfolio presented in its Strategic Plan, including hosting community workshops, accepting public comments, and integrating feedback from its Community Advisory Committee and Board of Directors. The result of this effort in

[18] Load Forecast Ruling at 5-7 (Table 1).

regards to new supply-side resources was direction by RCEA's Board and Community Advisory Committee 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 evaluated five candidate portfolios across the IRP planning years of 2022, 2026, and 2030, each with a combination of different procurement volumes. In addition to RCEA's existing long-term commitments for hydro, solar, a hybrid resource, and long-term Resource Adequacy procurements, the candidate portfolios included the following resources and procurement levels:

A. Low offshore wind, new local small hydro, low existing biomass
B. Low offshore wind, no new small hydro, high existing biomass
C. High offshore wind, no new small hydro, no existing biomass
D. High onshore wind, no new small hydro, no existing biomass
E. Medium offshore wind, new local small hydro, low existing biomass

The portfolios were analyzed by leveraging the long-term hourly price forecast generated by the Aurora model, as well as generation profiles and pricing for prospective resources that were provided to RCEA by private developers through its power solicitation processes. Each candidate portfolio was ranked on cost, reliability, GHG emissions, feasibility for development, and alignment with RCEA's Board-adopted goals. Candidate portfolio E was ranked the highest for its overall ability to achieve these goals, and its fewer expected barriers to implementation.

Confirming Reliability

RCEA used its 2021 CPUC Year-Ahead Initial RA Allocation as the basis to forecast its RA obligations through the end of the IRP study horizon. RCEA then evaluated the RA position offered by each candidate portfolio using the ELCC Values and Technology Factors provided in the Resource Data Template. RCEA targeted RA positions between 50% and 80% hedged on RA for each candidate portfolio to ensure the majority of its forecasted obligation would be hedged. This 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 WECC reliability.

RCEA also evaluated the performance of each 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 five candidate portfolios and used to favorably weight portfolios with better 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, its final BAPP and its 46 MMT PCP using the Commission's Clean System Power ("CSP") calculator tool. In comparing the emissions associated with each candidate sub-38 MMT 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 two conforming portfolios:

- 38 MMT BAPP that conforms to both the Commission's 38 MMT and 46 MMT RSP
- 46 MMT PCP that conforms to the Commission's 46 MMT RSP and the Energy Division's equal-to GHG emissions requirement

As discussed above, RCEA's BAPP reflects actual planned procurement and should be used for further system modelling regardless of whether the Commission decides to select a consolidated 38 MMT portfolio or a consolidated 46 MMT portfolio.

The 46 MMT PCP that complies with the Energy Division's equal-to requirement has been approved by RCEA's Board of Directors for use as a planning exercise and compliance submission only. RCEA is submitting its 46 MMT PCP in a good faith effort to comply with the Energy Division's equal-to requirement. However, RCEA urges the Commission to use its BAPP in its consolidated statewide portfolio even if the Commission selects a 46 MMT scenario. As set forth below, RCEA's BAPP is consistent with both the Commission's 38 MMT RSP and its 46 MMT RSP, and will fully contribute to a reliable, cost-effective, and renewables-integrated statewide portfolio regardless of the scenario selected by the Commission.

RCEA's BAPP (sub-38 MMT portfolio)

Table 3 provides a summary of RCEA's 2030 BAPP, identifying resources by type, project status and contract status.

Table 3: Specific Projects in RCEA's BAPP

Resource Name	Size (MW)	Project Status	Contract Status
Pacific Lumber Company	13	Existing	Executed through 2024
Cove Hydro	5.6	Existing	Executed
Sandrini Sol 1	100	New, in development	Executed
Redwood Coast Airport Solar Microgrid*	2.2	New, in development	LSE-owned
Hatchery Road Solar A*	0.99	New, in development	Executed
Hatchery Road Solar B*	0.99	New, in development	Executed
Hatchery Road Solar C*	0.99	New, in development	Review
Hatchery Road Solar D*	0.99	New, in development	Review
North Coast Highway Solar 1*	1	New, in development	Executed
North Coast Highway Solar 2*	1	New, in development	Executed
Resource Name	**Size (MW)**	**Project Status**	**Contract Status**
Marshall Ranch Flow Restoration Project	0.43	New, in development	Approved
Feed-In Tariff 2.0-1*	2	New, future	Planned
Feed-In Tariff 2.0-2*	2	New, future	Planned
Feed-In Tariff 2.0-3*	2	New, future	Planned
Tierra Buena BESS	2.5 (of 5 MW total)	New, under	Approved
Leap Demand Response Aggregation	5.5	New, in development	Approved
Redwood Coast Offshore Wind	40 (of ~120 MW total)	New, future	Planned
New Small Hydro	8	New, future	Planned
Long-Duration Storage	7	New, future	Planned
BTM Distributed Storage	6.3	New, future	Negotiation

*Hybrid resource, or anticipated to become a hybrid resource

In summary, to meet RCEA's projected 2030 energy load of 628 GWh, RCEA has selected a 2030 BAPP composed primarily of the following resources:

- Existing biomass (under contract) – 13 MW
- Existing small hydro (under contract) – 5.6 MW
- New solar (owned or under contract) – 107 MW
- Future new solar (planned) – 8 MW
- Future new offshore wind (planned) – 40 MW
- Future new small hydro (planned) – 8 MW
- Future new long-duration storage (planned) – 7 MW
- Future new short-duration storage (planned or approved) – 7 MW
- Future new BTM storage and demand response (planned or approved) – 12 MW

RCEA's portfolio includes a mix of existing and new resources. On a nameplate capacity basis, approximately 10% of RCEA's 2030 portfolio is composed of existing resources, while 90% of its 2030 portfolio is composed of new resources, with this split shifting to 20% existing, 80% new on an expected MWh generation basis. This reflects RCEA's plans to be an active player in the State's development of new renewable resources.

Under D.20-03-028, "LSEs are not required to adhere directly to the exact proportion of resources selected by RESOLVE in the 46 MMT or 38 MMT portfolios, in developing their own portfolios" and "specific resources may be used as proxies for similar resources."[19] The Decision requires that LSEs procure resources in four broad categories defined by their attributes: long-duration storage (8-12 hours); short-duration storage (4 hours or less); hybrid resources; and other resources.[20] Similarly, the Energy Division has stated that "The RSP is meant to guide planning, but LSEs do not have to procure an amount of resources that aligns with their proportional share of resources selected in the RSP. LSEs may submit portfolios that include more or less resources than their share of the RSP as long as those portfolios achieve their emissions goals."[21] Below, RCEA follows this guidance and assesses its BAPP and 46 MMT PCP for general consistency with the Commission's RSPs.

RCEA's BAPP is Consistent with the 38 MMT RSP

The new resources included in RCEA's BAPP are consistent with the 38 MMT RSP's 2030 new resource mix.

As demonstrated in Table 4, RCEA's sub-38 MMT portfolio is generally consistent with RCEA's proportional share of *new procurement* for each of the five "resource types" identified in D.20-03-028

[19] D.20-03-028 at 63

[20] Id.

[21] *See* "Filing Requirements Questions and Answers," Version 8/11/2020, at 19-20 (Answer to Question 34).

Table 4: BAPP New Resource Procurement by Resource Type Compared to 38 MMT RSP

Resource Type	38 MMT RSP New Resources[22]	RCEA Load-Proportional Share of 38 MMT RSP New Resources	RCEA's 38 MMT Portfolio (BAPP)	Explanation of Differences Between Load Share and BAPP
Long-Duration Storage	1,605 MW	4 MW	7 MW	Load share taken from RSP Total Resource Mix instead of New Resource Buildout
Short-Duration Storage	9,714 MW	21 MW	2.5 MW	Additional storage in hybrid and other resources resulting in 23.5 MW total
Renewable Resources	20,274 MW	45 MW	151 MW	Prior solar and small hydro PPAs to meet SB 350 long-term contracting requirement
Hybrid Resources[23]	0 MW	0 MW	14.2 MW	Capacity separated out from Short-Duration Storage and Renewable categories
Other Resources	222 MW	0.5 MW	11.8 MW	Incremental capacity to meet D. 19-11-016 obligation

The differences between RCEA's proportional share of the 38 MMT RSP new resources and the capacities in RCEA's BAPP reflect RCEA's prior resource commitments and Board-adopted goals for renewable energy procurement and local development. In particular, 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 2023. The 2019 RFP was developed to meet RCEA's long-term contracting requirement in RPS Compliance Period 4, as well as its internal clean and renewable energy goals. Selection and negotiation of the solar contract were underway before the CPUC's RSP was finalized.

RCEA's BAPP is also consistent with the 38 MMT RSP's new resource procurement timing, as set forth in Table 8 of D.20-03-028.

[22] D.20-03-028 at 46 (Table 8).

[23] While "hybrid resources" are one of the five resource categories identified in D.20-03-028; the RSP does not identify hybrid resources. RCEA assumes that the separate energy storage and renewable generation quantities identified in the RSP include both stand-alone resources and resources that would be combined as hybrid resources. Consistent with this approach, RCEA has broken down its planned hybrid resource procurement into separate energy storage and renewable generation quantities.

Table 5: BAPP New Resource Timing Compared To 38 MMT RSP Buildout

Year	38 MMT RSP New Build (incremental)	RCEA's Load-Proportional Share of New Build	RCEA's New Resource Procurement
2020	Utility Solar (2,000 MW) Battery Storage (152 MW)	Utility Solar (5 MW) Battery Storage (0.4 MW)	0 MW
2021	Wind (34 MW) Utility Solar (2,000 MW) Battery Storage (2,301 MW) Shed DR (222 MW)	Wind (0.1 MW) Utility Solar (5 MW) Battery Storage (6 MW) Shed DR (1 MW)	Utility Solar (7 MW) Battery Storage (2.2 MW)
2022	Wind (2,890 MW) Utility Solar (2,000 MW)	Wind (7 MW) Utility Solar (5 MW)	Utility Solar (2 MW) Shed DR (6 MW) Battery Storage (2.5 MW)
2023	Utility Solar (2,000 MW)	Utility Solar (5 MW)	Utility Solar (102 MW) Battery Storage (3 MW)
2024	Wind (887 MW) Battery Storage (654 MW)	Wind (2 MW) Battery Storage (2 MW)	Utility Solar (2 MW) Battery Storage (3 MW)
2026	Utility Solar (684 MW) Battery Storage (1,929 MW) Pumped Storage (1,605 MW)	Utility Solar (2 MW) Battery Storage (4 MW) Pumped Storage (4 MW)	Wind (40 MW) Utility Solar (4 MW) Small Hydro (8 MW) Battery Storage (6 MW) Pumped Storage (7 MW)
2030	Wind (1,468) OOS Wind (3,000 MW) Utility Solar (3,311 MW) Battery Storage (4,678 MW)	Wind (3 MW) OOS Wind (7 MW) Utility Solar (7 MW) Battery Storage (10 MW)	0 MW

Generally, RCEA's timeline for new resource procurement under its sub-38 MMT portfolio aligns with the gradual annual increase of each resource category outlined in the 38 MMT RSP new resource buildout. The three major exceptions to this are 1) RCEA's prior commitment to contract for a 100 MW solar facility that is to be online in 2023, which was an outcome of RCEA's 2019 RPS solicitation as described above, 2) RCEA's planned 40 MW offshore wind procurement in 2026, which is the soonest that RCEA anticipates offshore wind development to occur, and 3) procurement of 8 MW of new small hydro in 2026, as a result of RCEA's recently launched effort to investigate promising opportunities for development in watersheds within and near RCEA's service area.

Procuring exactly according to the timing and proportional share of the RSP is infeasible for RCEA given its small size and thus small annual incremental resource shares. The resource timing outlined in RCEA's BAPP layers in contracts of varying sizes to account for the pricing benefit associated with larger projects, while still allowing for smaller procurements (e.g. RCEA's Feed-In Tariff).

RCEA's BAPP is Consistent with the 46 MMT RSP

RCEA's BAPP is also fully consistent with the Commission's 46 MMT RSP as adopted in D.20-03-028.[24] The Commission should use RCEA's BAPP even if the Commission selects a 46 MMT scenario.

As demonstrated in the Table 6, RCEA's BAPP is generally consistent with RCEA's proportional share of 46 MMT RSP new procurement for each of the four "resource types" identified in D.20-03-028.

Table 6: BAPP New Resource Procurement by Resource Type Compared to 46 MMT RSP

Resource Type	46 MMT RSP New Resources[25]	RCEA Proportional Share of 46 MMT RSP New Resources	RCEA's sub-38 MMT Portfolio (BAPP)
Long-Duration Storage	973 MW	2 MW	7 MW
Short Duration Storage (4 hours or less)	8,873 MW	20 MW	2.5 MW
Renewable Resources	14,460 MW	32 MW	151 MW
Hybrid Resources[26]	0 MW	0 MW	14.2 MW
Other Resources	222 MW	0.5 MW	6 MW

The differences between RCEA's raw proportional share of the 46 MMT RSP New Resources and the resources amounts in RCEA's BAPP reflect RCEA's prior resource commitments and Board-adopted goals for renewable energy procurement and local development, as described above in reference to Table 4.

RCEA's BAPP is also consistent with the 46 MMT RSP's new resource procurement timing, as set forth in Table 5 of D.20-03-028.

[24] While RCEA's 38 MMT portfolio does not comply with the Energy Division's "equal to" requirement, RCEA notes that this requirement is Energy Division guidance and was not adopted or approved in any Commission Decision or ALJ Ruling. To the contrary, the requirement appears to be inconsistent with the IRP Statute and existing Commission Decisions encouraging LSEs to plan for ambitious GHG reductions.

[25] D.20-03-028 at 41 (Table 5).

[26] *See* FN. 23.

Table 7: BAPP New Resource Timing Compared To 46 MMT RSP Buildout

Year	46 MMT RSP New Build (incremental)	RCEA's Load-Proportional Share of New Build	RCEA's New Resource Procurement – BAPP
2020	Utility Solar (2000 MW) Battery Storage (152 MW)	Utility Solar (5 MW) Battery Storage (0.4 MW)	0 MW
2021	Wind (34 MW) Utility Solar (2000 MW) Battery Storage (2301 MW)	Wind (0.1 MW) Utility Solar (5 MW) Battery Storage (6 MW) Shed DR (1 MW)	Utility Solar (7 MW) Battery Storage (2.2 MW)
2022	Wind (1916 MW) Utility Solar (2000 MW) Battery Storage (846 MW) Shed DR (222 MW)	Wind (5 MW) Utility Solar (5 MW)	Utility Solar (2 MW) Shed DR (6 MW) Battery Storage (2.5 MW)
2023	Utility Solar (2000 MW)	Utility Solar (5 MW)	Utility Solar (102 MW) Battery Storage (3 MW)
2024	Wind (787 MW)	Wind (2 MW) Battery Storage (2 MW)	Utility Solar (2 MW) Battery Storage (3 MW)
2026	Battery Storage (2828 MW) Pumped Storage (973 MW)	Battery Storage (7 MW) Pumped Storage (2 MW)	Wind (40 MW) Utility Solar (4 MW) Small Hydro (8 MW) Battery Storage (6 MW) Pumped Storage (7 MW)
2030	Wind (100 MW) OOS Wind (606 MW) Utility Solar (3,017 MW) Battery Storage (2,746)	Wind (0.2 MW) OOS Wind (1 MW) Utility Solar (7 MW) Battery Storage (6 MW)	0 MW

RCEA's timeline for new resource procurement under its sub-38 MMT portfolio aligns with the gradual annual increase of each resource category outlined in the 46 MMT RSP new resource buildout, with a few exceptions as noted above in reference to Table 5.

RCEA's 46 MMT PCP

Table 8 provides a summary of the differences between RCEA's 2030 BAPP and 46 MMT PCP, with all other resources listed in Table 3 being the same across the two portfolios.

Table 8: Specific Project Differences Between RCEA's 46 MMT PCP and BAPP

Resource Name	46 MMT Size (MW)	BAPP Size (MW)	Project Status	Contract Status
Redwood Coast Offshore Wind	15	40	New, future	Planned
New Small Hydro	0	8	New, future	Planned
Long-Duration Storage	6	7	New, future	Planned

In summary, to meet RCEA's projected 2030 load of 628 MW, RCEA has selected a 2030 46 MMT PCP composed primarily of the following resources:

- Existing biomass (under contract) – 13 MW
- Existing small hydro (under contract) – 5.6 MW
- New solar (owned or under contract) – 107 MW
- Future new solar (planned) – 8 MW
- Future new offshore wind (planned) – 15 MW
- Future new long-duration storage (planned) – 6 MW
- Future new short-duration storage (planned or approved) – 7 MW
- Future new BTM storage and demand response (planned or approved) – 12 MW

RCEA's 46 MMT PCP includes a mix of existing and new resources. Approximately 10% of RCEA's 46 MMT 2030 PCP is composed of existing resources, while 90% of its 2030 portfolio is composed of new resources. This reflects RCEA's plans to be an active player in the State's development of new renewable resources.

As demonstrated in the Table 9, RCEA's 46 MMT PCP is generally consistent with RCEA's proportional share of new procurement for each of the five "resource types" identified in D.20-03-028.

Table 9: 46 MMT PCP New Resource Procurement by Resource Type Compared to 46 MMT RSP

Resource Type	46 MMT RSP New Resources[27]	RCEA Proportional Share of 46 MMT RSP New Resources	RCEA's 46 MMT PCP
Long-Duration Storage	973 MW	2 MW	6 MW
Short Duration Storage (4 hours or less)	8,873 MW	20 MW	2.5 MW
Renewable Resources	14,460 MW	32 MW	118 MW
Hybrid Resources[28]	0 MW	0 MW	14.2 MW
Other Resources	222 MW	0.5 MW	6 MW

[27] D.20-03-028 at 41 (Table 5).

[28] *See* FN. 23.

The differences between RCEA's raw proportional share of the 46 MMT RSP New Resources and the resources amounts in RCEA's 46 MMT PCP reflect RCEA's prior resource commitments and Board-adopted goals for renewable energy procurement and local development, as described above in reference to Table 4.

RCEA's 46 MMT PCP is also generally consistent with the 46 MMT RSP's new resource procurement timing, as set forth in Table 5 of D.20-03-028.

Table 10: 46 MMT PCP New Resource Timing Compared To 46 MMT RSP Buildout

Year	46 MMT RSP New Build (incremental)	RCEA's Load-Proportional Share of New Build	RCEA's New Resource Procurement – 46 MMT PCP
2020	Utility Solar (2000 MW) Battery Storage (152 MW)	Utility Solar (5 MW) Battery Storage (0.4 MW)	0 MW
2021	Wind (34 MW) Utility Solar (2000 MW) Battery Storage (2301 MW)	Wind (0.1 MW) Utility Solar (5 MW) Battery Storage (6 MW) Shed DR (1 MW)	Utility Solar (7 MW) Battery Storage (2.2 MW)
2022	Wind (1916 MW) Utility Solar (2000 MW) Battery Storage (846 MW) Shed DR (222 MW)	Wind (5 MW) Utility Solar (5 MW)	Utility Solar (2 MW) Shed DR (6 MW) Battery Storage (2.5 MW)
2023	Utility Solar (2000 MW)	Utility Solar (5 MW)	Utility Solar (102 MW) Battery Storage (3 MW)
2024	Wind (787 MW)	Wind (2 MW) Battery Storage (2 MW)	Utility Solar (2 MW) Battery Storage (3 MW)
2026	Battery Storage (2828 MW) Pumped Storage (973 MW)	Battery Storage (7 MW) Pumped Storage (2 MW)	Wind (15 MW) Utility Solar (4 MW) Battery Storage (6 MW) Pumped Storage (6 MW)
2030	Wind (100 MW) OOS Wind (606 MW) Utility Solar (3,017 MW) Battery Storage (2,746)	Wind (0.2 MW) OOS Wind (1 MW) Utility Solar (7 MW) Battery Storage (6 MW)	0 MW

RCEA's timeline for new resource procurement under its 46 MMT portfolio aligns with the gradual annual increase of each resource category outlined in the 46 MMT RSP new resource buildout, with a few exceptions as noted above in reference to Table 5.

RCEA's BAPP is Reliable Under Both the 38 MMT and 46 MMT Scenarios

In its Revised Filing Requirements document, the Energy Division asks LSEs with 38 MMT portfolios that achieve less than the LSE's share of the 38 MMT GHG emissions target to "explain whether and how that portfolio might operate differently, from a reliability perspective, depending on whether other LSEs procure in a manner consistent with a 46 MMT or 38 MMT target."[29] In the August Filing Requirements Questions and Answers Document, the Energy Division elaborated on this request, stating that:

> "The LSE with a low GHG portfolio should explain how its portfolio will provide the energy to meet its load with its own resources and not system power for most hours of the year. If the LSE expects to rely on system power for more than a handful of hours, then the LSE should explain how it will guarantee that the system power is available to serve its load, e.g. through RA and/or tolling contracts with firm, dispatchable resources."

In response to this request, RCEA's BAPP is reliable from both an RCEA-specific and systemwide perspective under both the 38 MMT and 46 MMT Scenarios.

RCEA's BAPP is reliable from an RCEA-specific perspective given the larger California system reliability dynamics. RCEA's BAPP portfolio provides the energy to meet (and exceed) its load for the most constrained hours of the year on California's electrical system. Using RCEA's custom load shape, RCEA estimates that its 2030 portfolio will be able to fully supply RCEA's internal demand for approximately 43 percent of the year, including the critical summer months for California's grid, with RCEA relying on a relatively small amount of system power in the other hours. Notably, RCEA's BAPP portfolio is expected to generate in excess of 114% of its monthly energy need during summer months of May through September and as much as 141% of RCEA's peak demand in those months. This was determined by comparing RCEA's forecast hourly load against the combined hourly generation profiles for each resource in RCEA's BAPP. RCEA expects to require system power to fully meet its load in 2030 during the shoulder and winter months, as it is one of the few winter-peaking LSEs within California. These are periods in which California and the larger WECC region generally have sufficient generation (or even overgeneration concerns) to meet demand.

As a practical matter, whether or not RCEA's portfolio meets RCEA's load requirements will not be impacted by other parties' ability to procure consistent with the 38 MMT or 46 MMT target. While ELCC is a useful metric for large-scale systemwide measures, from RCEA's perspective, a 1 MW 4-hour battery provides 4 MWh, regardless of how much energy storage other LSEs have installed. RCEA looks forward with interest to the development of the Preferred System Plan during this IRP cycle and the resulting larger system reliability considerations and conclusions. If necessary, RCEA will consider

[29] Available at: ftp://ftp.cpuc.ca.gov/energy/modeling/Filing_Requirements_Overview.pdf

additional contracting, such as through firm imported carbon-free energy, to ensure adequate power is available to meet its winter needs.

b. Preferred Conforming Portfolios

BAPP

RCEA's BAPP consists of a combination of:

- Utility-Scale Solar
- Community-Scale Solar
- Offshore Wind
- Biomass
- Small Hydro
- Short-Duration Storage
- Long-Duration Storage
- BTM Storage and Demand Response

A summary of the new resources required to achieve RCEA's BAPP is provided in Figure 2.

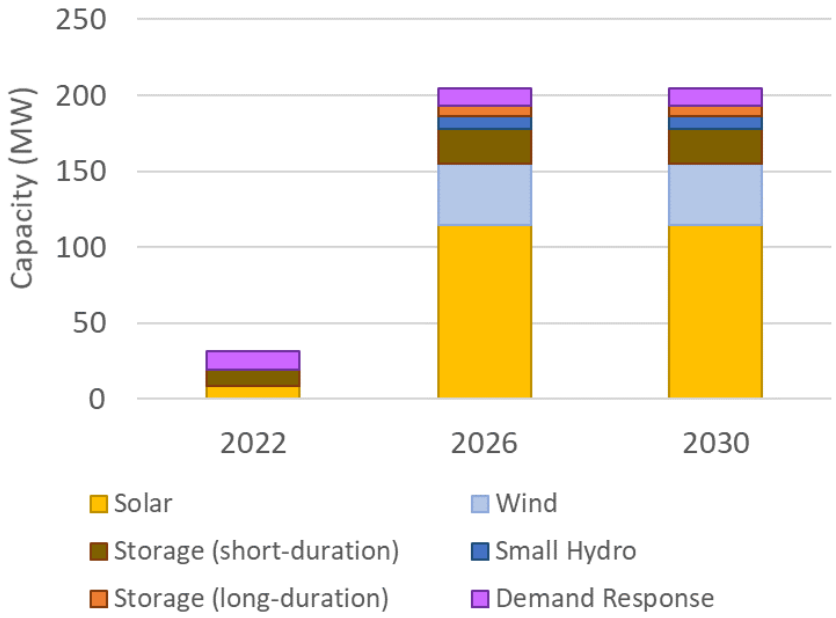


Figure 2: RCEA 38 MMT BAPP New Resource Capacity Buildout

As stated above, in accordance with Section 454.51(b)(3), RCEA's governing board has determined that the resource mix in its BAPP achieves "economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in Section 454.51(a)(1)." These benefits and characteristics are discussed as follows.

GHG Reduction Goals

RCEA's BAPP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(A) goal of meeting the Commission's 38 MMT GHG reduction benchmark. The 2030 emissions from RCEA's BAPP are substantially lower than RCEA's load-proportional share of the 38 MMT emissions benchmark, which is 0.106 MMT and 0.089 MMT with BTM CHP emissions netted out.[30] According to the CSP calculator, RCEA's BAPP would account for 0.069 MMT of 2030 emissions, beating the benchmark net BTM CHP by 0.02 MMT.

Renewable Energy

RCEA's BAPP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(B) goal of ensuring that portfolios are composed of at least 50% eligible renewable resources. In 2030, RCEA's 38 MMT overall BAPP portfolio would consist of 100%eligible renewable generation, well in excess of the 50% target.

Minimizing Bill Impact

RCEA's BAPP achieves results and performance characteristics consistent with the 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 biomass and small hydro, as RCEA recognizes the benefits of having a diverse portfolio, 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 modelling supports their inclusion in the portfolio.

Based on the modeling described in Section II.b.ii., RCEA's BAPP 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.

In addition, RCEA compared five potential BAPP portfolios on the basis of net cost through 2030. The portfolio that was eventually selected to become RCEA's BAPP was chosen for its cost, reliability performance, alignment with RCEA's Board-adopted goals, and likelihood for implementation.

Ensuring System and Local Reliability

RCEA's BAPP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(E) goal of ensuring system and local reliability. Specifically, the portfolio is expected to generate 114% of RCEA's forecast total load in the summer months and 73% in the winter months during 2026 and 2030. From a peak demand perspective, the portfolio is also expected to provide

30

139% of RCEA's forecasted peak demand in summer months in 2026 and 2030, as is further described in Section III.f.

RCEA's BAPP places strong emphasis on developing new local resource capacity in Humboldt County, as well as preserving existing capacity via continued local biomass procurement. About 44% of the total capacity in the 2030 portfolio is expected to come from resources within the Humboldt local reliability area, which could reduce the future need for gas-fired generation within the region, especially if coupled with sufficient transmission infrastructure upgrades.

RCEA's BAPP also emphasizes a diverse portfolio that includes several dispatchable resources to complement the intermittent solar and wind in the portfolio. Although these have been some of RCEA's more expensive procurements, their contribution to system and local reliability outweighs their above-market cost.

Demand-Side Energy Management

RCEA's BAPP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(G) goal of enhancing demand-side management (DSM). The associated load implications of energy efficiency, building and vehicle electrification, and BTM customer solar are incorporated into RCEA's BAPP via demand-side assumptions in the 38 MMT CSP Calculator from the CEC's 2019 IEPR Mid Baseline Mid AAEE case. A summary of these load modifiers is presented in Table 11.

Table 11: 38 MMT CSP Summary of Demand Modifiers

Demand Inputs (GWh)	2020	2022	2026	2030
Managed Retail Sales Forecast (assigned)	638	627	628	628
Baseline Demand, non-C&I	450	430	445	455
Baseline Demand, C&I	288	311	322	330
Electric Vehicle Load	13	20	33	43
Other Electrification	1	1	3	5
Building Electrification	-	-	-	-
Energy Efficiency	(4)	(10)	(23)	(33)
BTM PV	(59)	(76)	(102)	(122)
Demand (before T&D losses)	689	676	677	677

Minimizing Localized Air Pollutants with Emphasis on DACs

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

minimizes RCEA's reliance on unspecified system power, instead opting for renewable generation procurement and development whenever feasible.

46 MMT PCP

As stated above, in accordance with Section 454.51(b)(3), RCEA's governing board has selected its sub-38 MMT portfolio, not its 46 MMT portfolio, as RCEA's BAPP. RCEA's BAPP reflects RCEA's actual planned procurement. The purpose of the IRP Statute is to encourage GHG reductions equal to or greater than the GHG benchmarks set by the Commission, and both the IRP statute and relevant Commission Decisions clearly allow for the submission of IRPs that "outperform" the benchmark by achieving lower emissions.[31] However, the Energy Division has issued clear guidance instructing LSEs to submit 46 MMT portfolios that achieve GHG emissions equal to, *but not lower than*, each LSE's load-proportional share of the 46 MMT benchmark.

But for the Energy Division equal-to requirement, RCEA would have submitted a 46 MMT PCP with a resource composition and other characteristics similar to its sub-38 MMT portfolio. As established above, RCEA's BAPP is fully consistent with the resource mix, procurement timing, and operational attributes of the 46 MMT RSP.

Developing a 46 MMT PCP that complies with the equal-to requirement was a particular challenge for RCEA. RCEA's load-proportional share of the 2030 46 MMT benchmark is 0.128 MMT, and 0.111 with BTM CHP emissions netted out. These are greater than RCEA's current (2019) GHG emissions of 0.006 MMT[32]. Problematically, in order to develop a 46 MMT portfolio consistent with the equal-to requirement, RCEA had to produce a 46 MMT PCP with significantly increased GHG emissions when compared to both current and planned portfolios. RCEA produced this PDP by substituting planned renewables procurement with unspecified system power until its emissions were high enough to meet its 46 MMT share.

RCEA has provided its 46 MMT PCP solely to meet its obligations to the Commission. While the PCP hypothetically satisfies the minimum requirements established by the Commission, discussed below, RCEA does not intend to procure according to its 46 MMT portfolio, as doing so would result in a less-reliable and higher GHG portfolio. The resulting emissions increase is inconsistent with the spirit and letter of the IRP statute and RCEA's mandatory board policies requiring 100% clean and renewable power in RCEA's portfolio by 2025.

31

[32] RCEA's 2019 emissions factor was estimated by RCEA staff using a methodology consistent with The Climate Registry's Electric Sector Protocol, but has not been verified by a third party.

GHG Reduction Goals

RCEA's 46 MMT PCP achieves emissions within 1% of RCEA's proportional share of the 46 MMT benchmark with BTM CHP emissions netted out, which is 0.111 MT. According to the Commission's emissions calculator, RCEA's 46 MMT portfolio would account for 0.111 MMT in 2030 emissions. This minimal compliance results in a portfolio with significantly greater GHG emissions than RCEA's preferred portfolio and planned procurement.

Renewable Energy

RCEA's 46 MMT portfolio achieves results and performance characteristics that are consistent with the Section 454.52(a)(1)(B) goal of ensuring that portfolios are composed of at least 50% eligible renewable resources. In 2030 RCEA's 46 MMT portfolio would consist of 80% eligible renewable generation, well in excess of the 50% target, and 100% of the new generation included in RCEA's 46 MMT portfolio would be eligible renewable generation.

Minimizing Bill Impact

RCEA's 46 MMT portfolio achieves results and performance characteristics consistent with the Section 454.52(a)(1)(D) goal of minimizing the impact of planned procurement on ratepayers' bills. The specified resources in RCEA's 46 MMT portfolio are comprised 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. Similar to RCEA's BAPP, its 46 MMT portfolio also includes more expensive RPS resources such as biomass and small hydro, whose cost impacts are a reasonable tradeoff for their better alignment with RCEA's load and contribution to a diverse portfolio.

RCEA evaluated the potential financial impacts of the 46 MMT scenario by modifying its existing financial model to incorporate all expected contracts in the 46 MMT scenario. Based on this modeling, the 46 MMT scenario is expected to maintain load-weighted annual costs within 1% of RCEA's calendar-year 2019 expenses throughout the modeling horizon after accounting for changes in the market prices of energy.

Ensuring System and Local Reliability

RCEA's 46 MMT portfolio achieves results and performance characteristics consistent with the Section 454.52(a)(1)(E) goal of ensuring system and local reliability. As shown in the tables in section III.f. the portfolio performs similarly to that of the 38 MMT scenario in terms of fulfilling forecasted RA requirements. However, RCEA notes that in order to increase its emissions to the 46 MMT threshold, RCEA had to replace significant amounts of specified source renewable power with unspecified system power. RCEA believes that this results in a substantially less robust and reliable portfolio than its BAPP.

Demand-Side Energy Management

RCEA's 46 MMT portfolio achieves results and performance characteristics consistent with the Section 454.52(a)(1)(G) goal of enhancing demand-side energy management. The associated load implications of energy efficiency, building and vehicle electrification, and BTM customer solar are incorporated into RCEA's 46 MMT PCP via demand-side assumptions in the 46 MMT CSP Calculator from the CEC's 2019 IEPR Mid Baseline Mid AAEE case. These load modifiers are the same as in the 38 MMT CSP, as presented in Table 11.

Minimizing Localized Air Pollutants with Emphasis on DACs

RCEA's 46 MMT portfolio achieves results and performance characteristics consistent with the Section 454.52(a)(1)(H) goal of minimizing localized air pollutants and other GHG emissions with early priority on disadvantaged communities. However, RCEA notes that because it was required to produce a 46 MMT portfolio with emissions equal to but not lower than its assigned benchmark, its 46 MMT portfolio results in significantly greater emissions impacts than RCEA's actual planned procurement reflected in its BAPP.

c. GHG Emissions Results

RCEA used its load-based proportional share of the 38 and 46 MMT benchmarks' net BTM CHP to determine the emissions compliance for its BAPP and its 46 MMT PCP, as described in Section III.d. RCEA's BAPP would result in total 2030 GHG emissions that are 22 percent lower than its assigned GHG benchmark, as shown in Figure 3.

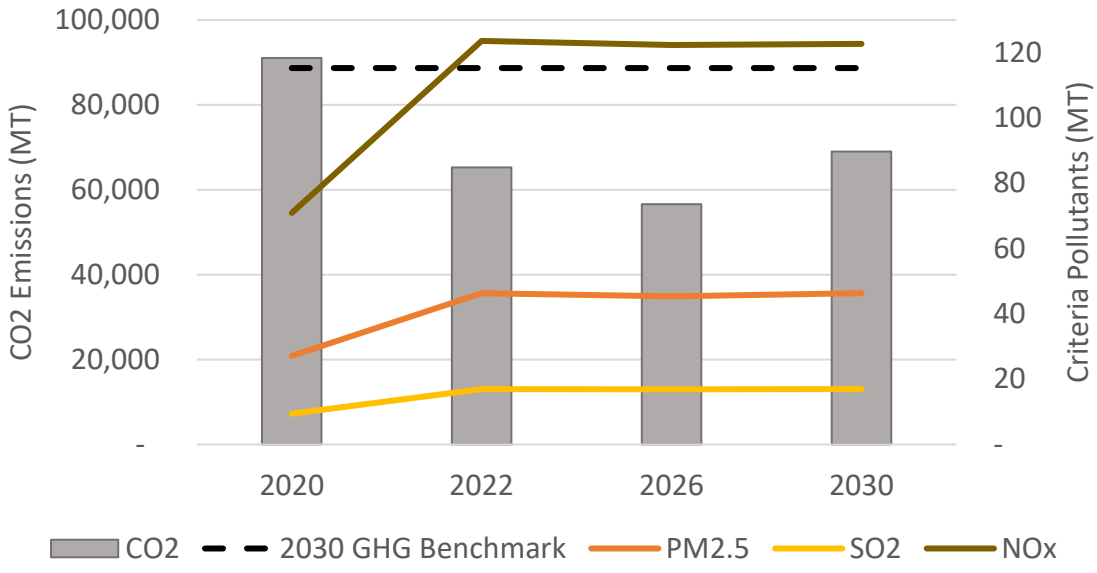


Figure 3: RCEA BAPP CSP Calculator Results

RCEA's 46 MMT portfolio would result in total 2030 GHG emissions nearly equal to its assigned load-proportional share of the 46 MMT benchmark, as shown in Figure 4. RCEA intended to submit a 46 MMT portfolio with significantly lower GHG emissions, but to comply with the Energy Division's guidance prohibiting the submission of higher-performing 46 MMT portfolios, RCEA substituted unspecified system power for planned renewables and energy storage procurement until its portfolio was carbon-intensive enough to meet this requirement.

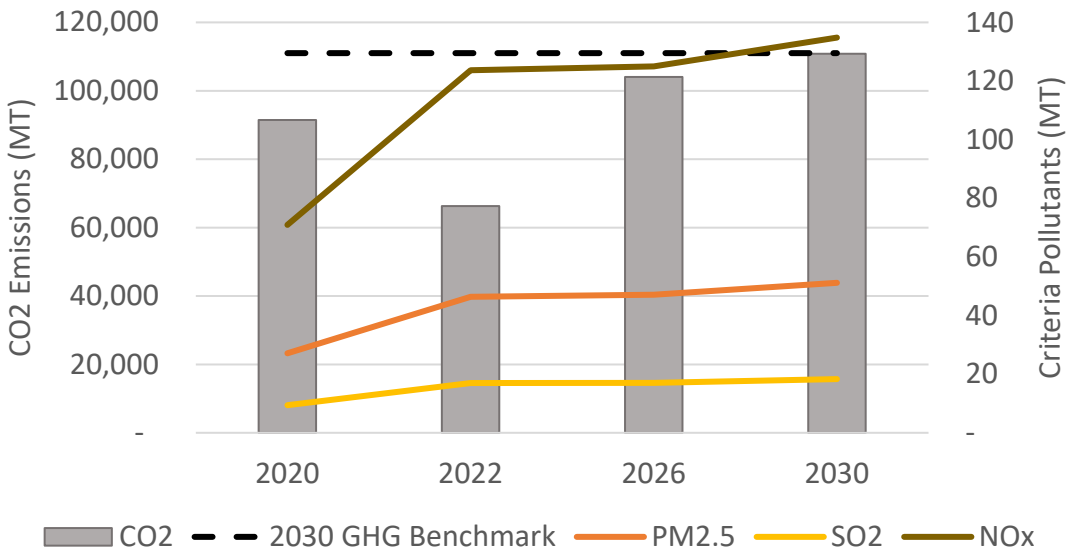


Figure 4: RCEA 46 MMT PCP CSP Calculator Results

RCEA used a custom hourly load shape for analyzing GHG emissions in the CSP tool. Historical load data from June 2017 through February 2019 was obtained from RCEA's data manager and from March 2019 through Jan 2020 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 uses localized load profiles instead of PG&E system profiles beginning March 1, 2019. This dataset is reflective of realized customer opt-out rates. An hourly regression model was then created using temperatures at the Arcata, CA weather station, days of the week, holidays, sine/cosine terms, and other inputs as variables. This hourly forecast model is used in the day-ahead scheduling process and is periodically recalibrated to align with recent SQMD. To project 2020 loads, the model was run with normalized weather inputs. A monthly scaling factor was applied based on the EIA Short Term Energy Outlook for US Regional Electricity Retail Sales - Pacific Contiguous Region as published 5/12/2020. 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

The 38 MMT version of the CSP calculator estimates the following 2030 emissions associated with RCEA's BAPP:

- NOx: 123 MT
- PM 2.5: 46 MT
- SO2: 17 MT

The criteria air pollutant increases from 2020 to 2022 shown in Figure 3 are a result of RCEA's sale of 50 GWh of biomass power in 2020, but are otherwise steady throughout the IRP planning period.

The 46 MMT version of the CSP calculator estimates the following 2030 emissions associated with RCEA's 46 MMT portfolio:

- NOx: 132 MT
- PM 2.5: 50 MT
- SO2: 18 MT

As described in RCEA's Action Plan below, RCEA intends to reduce its reliance on system power by procuring the renewable resources identified in its BAPP in lieu of the system power that was added to its 46 MMT portfolio to increase its emissions to meet the 46 MMT emissions requirement.

ii. Focus on Disadvantaged Communities

CalEnviroScreen 3.0's mapping tool shows that no part of Humboldt County, 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 CalEnviroScreen 3.0 criteria. Nonetheless, RCEA recognizes poverty and low household income are widespread in Humboldt County, as shown by other criteria. For example, of RCEA's 62,000 electric accounts, approximately 14,000 are residential CARE-eligible accounts. RCEA is dedicated to minimizing local air pollution and recognizes that lower income residents can be the most vulnerable.

RCEA's BAPP includes approximately one-fifth of its 2030 energy mix from a biomass plant within RCEA's service territory. 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 biomass plant is the only specified source of NOx, SO_2 or $PM_{2.5}$ emissions associated with RCEA's BAPP. Since the portfolio contemplates steady biomass procurement from the same facility, the

resulting criteria pollutants are expected to remain constant over time as is shown in the CSP Calculator results.

As previously stated, RCEA's Board adopted a policy of transitioning to 100% clean and renewable power by 2025. With the exception of resource adequacy, RCEA intends to develop or contract exclusively with renewable and GHG-free generation resources, as well as energy storage resources. Neither RCEA's sub-38 MMT preferred portfolio nor its 46 MMT portfolio include energy contracts for gas generators, including those located within or adjacent to DACs. RCEA's BAPP 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 short-term energy needs, which is an issue RCEA looks forward to addressing along with the CPUC and other LSEs over the IRP planning horizon.

e. Cost and Rate Analysis

RCEA's sub-38 MMT and 46 MMT portfolios are both reasonable from a cost perspective. In selecting resources for its BAPP, RCEA carefully considered the cost implications of specific resource selections and procurement timing. This analysis was informed by forward price projections generated using the Aurora and HedgeFox models (see Modeling Tools section above).

In general, RCEA sought to balance the need to procure resources with enough lead time to meet RCEA's LSE-specific procurement shortfalls and the Commission-identified overall system new resource need with the cost-saving benefits of waiting to procure renewable and storage resources with downward sloping cost projections.

RCEA's BAPP in particular takes advantage of the rapidly falling cost of solar, wind, and battery storage resources. RCEA's BAPP also takes advantage of the fact that, compared to IOUs, CCAs have significantly shorter generation project development timelines, in part due to the fact that 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.

To ensure that its BAPP and its 46 MMT PCP are cost-effective, RCEA ran two simulations of its financial model that included all contracts in the portfolios. Based on this modeling, the BAPP is expected to maintain load-weighted annual cost within 6% of RCEA's calendar-year 2019 expenses throughout the modeling horizon after accounting for forecasted changes in the market prices of energy. The 46 MMT PCP is expected to maintain load-weighted annual costs within 1% of RCEA's calendar-year 2019 expenses throughout the modeling horizon after accounting for changes in the market prices of energy.

RCEA's 46 MMT PCP also reflects RCEA's preference for low-cost renewable and storage resources, but substitutes in unspecified system power in place of a portion of those renewables in order to increase RCEA's emissions to meet the Energy Division's required emissions threshold.

Both RCEA's 46 MMT PCP and its BAPP reflect its Board's larger commitment to developing renewable resources within the local region, which is, in turn, a reflection of the broader community and RCEA customers' prioritization to reduce their climate change footprint. 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, RCEA believes that the cost impact of its BAPP 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.

f. System Reliability Analysis

Both of RCEA's conforming portfolios are reliable and contribute RCEA's fair share to system reliability. To confirm this for RCEA's BAPP, RCEA assessed the portfolio on the basis of annual RA position, total seasonal generation, and hourly generation during system peak hours. For total generation, RCEA's BAPP is expected to generate 114% of RCEA's forecast load in the summer months (May through September) and 73% in the winter months (October through April) during 2026 and 2030. During peak hours, RCEA's BAPP, including the 35 MW of planned storage and demand response capacity, is expected to provide 139% of RCEA's forecasted peak demand in summer months in 2026 and 2030. In the winter and shoulder months, the BAPP is expected to generate an average of 75% of RCEA's forecast peak demand in 2026 and 2030.

RCEA intentionally developed its BAPP 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 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 lessened in other parts of the state. Additional transmission infrastructure or upgrades to existing infrastructure would likely be required to maximize RCEA's contribution to system reliability via capacity resources developed in Humboldt County, given the transmission-constrained nature of the region.

The effective capacity of RCEA's BAPP is provided in the following "System Reliability Progress Tracking Table" from the 38 MMT Resource Data Template dashboard (note that the rows containing RCEA's system RA requirement and portfolio position are confidential and are excluded from the table):

System Reliability Progress Tracking Table (NQC MW) for month of September by contract status, 38 MMT portfolio	ELCC type	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
online	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
online	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
online	biomass	6	26	15	15	-	-	-	-	-	-	-
online	cogen	-	-	-	-	-	-	-	-	-	-	-
online	geothermal	4	4	4	-	-	-	-	-	-	-	-
online	hydro	11	-	-	-	-	-	-	-	-	-	-
online	thermal	45	91	95	8	8	8	8	8	8	8	8
online	battery	-	-	-	-	-	-	-	-	-	-	-
online	nuclear	-	-	-	-	-	-	-	-	-	-	-
online	solar	6	-	-	-	-	-	-	-	-	-	-
online	psh	-	-	-	-	-	-	-	-	-	-	-
online	unknown	12	-	-	-	-	-	-	-	-	-	-
development	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
development	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
development	biomass	-	-	-	-	-	-	-	-	-	-	-
development	cogen	-	-	-	-	-	-	-	-	-	-	-
development	geothermal	-	-	-	-	-	-	-	-	-	-	-
development	hydro	-	-	-	-	-	-	-	-	-	-	-
development	thermal	-	-	-	-	-	-	-	-	-	-	-
development	battery	-	-	-	-	-	-	-	-	-	-	-
development	nuclear	-	-	-	-	-	-	-	-	-	-	-
development	solar	-	-	-	14	12	11	9	8	7	6	5
development	psh	-	-	-	-	-	-	-	-	-	-	-
development	unknown	-	-	-	-	-	-	-	-	-	-	-
review	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
review	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
review	biomass	-	-	-	-	-	-	-	-	-	-	-
review	cogen	-	-	-	-	-	-	-	-	-	-	-
review	geothermal	-	-	-	-	-	-	-	-	-	-	-
review	hydro	-	-	-	-	-	-	-	-	-	-	-
review	thermal	-	-	-	-	-	-	-	-	-	-	-
review	battery	-	-	3	3	3	3	3	2	2	2	2
review	nuclear	-	-	-	-	-	-	-	-	-	-	-
review	solar	-	-	-	-	-	-	0	0	0	0	0
review	psh	-	-	-	-	-	-	-	-	-	-	-
review	unknown	-	-	-	-	-	-	-	-	-	-	-
planned_existing	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
planned_existing	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
planned_existing	biomass	-	-	-	-	15	15	15	15	15	15	15
planned_existing	cogen	-	-	-	-	-	-	-	-	-	-	-
planned_existing	geothermal	-	-	-	-	-	-	-	-	-	-	-
planned_existing	hydro	-	-	-	-	-	-	-	-	-	-	-
planned_existing	thermal	-	-	-	-	-	-	-	-	-	-	-
planned_existing	battery	-	-	-	-	-	-	-	-	-	-	-
planned_existing	nuclear	-	-	-	-	-	-	-	-	-	-	-
planned_existing	solar	-	-	-	-	-	-	-	-	-	-	-
planned_existing	psh	-	-	-	-	-	-	-	-	-	-	-
planned_existing	unknown	-	-	-	-	-	-	-	-	-	-	-
planned_new	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
planned_new	wind_high_cf	-	-	-	-	-	-	33	33	33	33	33
planned_new	biomass	-	-	-	-	-	-	-	-	-	-	-
planned_new	cogen	-	-	-	-	-	-	-	-	-	-	-
planned_new	geothermal	-	-	-	-	-	-	-	-	-	-	-
planned_new	hydro	-	-	-	-	-	-	6	6	6	6	6
planned_new	thermal	-	-	-	-	-	-	-	-	-	-	-
planned_new	battery	-	-	-	2	4	6	13	13	13	12	12
planned_new	nuclear	-	-	-	-	-	-	-	-	-	-	-
planned_new	solar	-	-	-	-	-	-	-	-	-	-	-
planned_new	psh	-	-	-	-	-	-	-	-	-	-	-
planned_new	unknown	-	-	-	-	-	-	-	-	-	-	-
TOTAL supply, NQC MW		84	121	117	42	42	43	86	85	84	83	81

As demonstrated in the table above, RCEA's BAPP contributes a significant amount of RA in seven of the ten IRP years and significantly hedges RA requirements across the entire period. This high level of reliability demonstrates that RCEA's preferred resource selections work together to effectively and reliably integrate a renewables-heavy portfolio, thus meeting and exceeding RCEA's share of any systemwide renewable integration resource requirement.

The effective capacity of RCEA's 46 MMT PCP is provided in the following "System Reliability Progress Tracking Table" from its 46 MMT Resource Data Template dashboard (note that the rows containing RCEA's system RA requirement and portfolio position are confidential and are excluded):

System Reliability Progress Tracking Table (NQC MW) for month of September by contract status, 46 MMT portfolio	ELCC type	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
online	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
online	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
online	biomass	6	26	15	15	-	-	-	-	-	-	-
online	cogen	-	-	-	-	-	-	-	-	-	-	-
online	geothermal	4	4	4	-	-	-	-	-	-	-	-
online	hydro	11	-	-	-	-	-	-	-	-	-	-
online	thermal	45	91	95	8	8	8	8	8	8	8	8
online	battery	-	-	-	-	-	-	-	-	-	-	-
online	nuclear	-	-	-	-	-	-	-	-	-	-	-
online	solar	6	-	-	-	-	-	-	-	-	-	-
online	psh	-	-	-	-	-	-	-	-	-	-	-
online	unknown	12	-	-	-	-	-	-	-	-	-	-
development	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
development	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
development	biomass	-	-	-	-	-	-	-	-	-	-	-
development	cogen	-	-	-	-	-	-	-	-	-	-	-
development	geothermal	-	-	-	-	-	-	-	-	-	-	-
development	hydro	-	-	-	-	-	-	-	-	-	-	-
development	thermal	-	-	-	-	-	-	-	-	-	-	-
development	battery	-	-	-	-	-	-	-	-	-	-	-
development	nuclear	-	-	-	-	-	-	-	-	-	-	-
development	solar	-	-	-	14	13	11	9	9	9	9	9
development	psh	-	-	-	-	-	-	-	-	-	-	-
development	unknown	-	-	-	-	-	-	-	-	-	-	-
review	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
review	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
review	biomass	-	-	-	-	-	-	-	-	-	-	-
review	cogen	-	-	-	-	-	-	-	-	-	-	-
review	geothermal	-	-	-	-	-	-	-	-	-	-	-
review	hydro	-	-	-	-	-	-	-	-	-	-	-
review	thermal	-	-	-	-	-	-	-	-	-	-	-
review	battery	-	-	3	3	3	2	2	2	2	2	2
review	nuclear	-	-	-	-	-	-	-	-	-	-	-
review	solar	-	-	-	-	-	-	0	0	0	0	0
review	psh	-	-	-	-	-	-	-	-	-	-	-
review	unknown	-	-	-	-	-	-	-	-	-	-	-
planned_existing	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
planned_existing	wind_high_cf	-	-	-	-	-	-	-	-	-	-	-
planned_existing	biomass	-	-	-	-	15	15	15	15	15	15	15
planned_existing	cogen	-	-	-	-	-	-	-	-	-	-	-
planned_existing	geothermal	-	-	-	-	-	-	-	-	-	-	-
planned_existing	hydro	-	-	-	-	-	-	-	-	-	-	-
planned_existing	thermal	-	-	-	-	-	-	-	-	-	-	-
planned_existing	battery	-	-	-	-	-	-	-	-	-	-	-
planned_existing	nuclear	-	-	-	-	-	-	-	-	-	-	-
planned_existing	solar	-	-	-	-	-	-	-	-	-	-	-
planned_existing	psh	-	-	-	-	-	-	-	-	-	-	-
planned_existing	unknown	-	-	-	-	-	-	-	-	-	-	-
planned_new	wind_low_cf	-	-	-	-	-	-	-	-	-	-	-
planned_new	wind_high_cf	-	-	-	-	-	-	33	33	33	33	33
planned_new	biomass	-	-	-	-	-	-	-	-	-	-	-
planned_new	cogen	-	-	-	-	-	-	-	-	-	-	-
planned_new	geothermal	-	-	-	-	-	-	-	-	-	-	-
planned_new	hydro	-	-	-	-	-	-	-	-	-	-	-
planned_new	thermal	-	-	-	-	-	-	-	-	-	-	-
planned_new	battery	-	-	-	2	4	6	12	12	12	12	12
planned_new	nuclear	-	-	-	-	-	-	-	-	-	-	-
planned_new	solar	-	-	-	-	-	-	-	-	-	-	-
planned_new	psh	-	-	-	-	-	-	-	-	-	-	-
planned_new	unknown	-	-	-	-	-	-	-	-	-	-	-
TOTAL supply, NQC MW		84	121	117	42	42	43	80	80	80	80	80

In comparison to the 38 MMT resource data dashboard above, this table shows slightly less RA supply in the later years of the planning period. Although this high level of reliability demonstrates that RCEA's 46 MMT PCP still meets RCEA's share of any systemwide renewable integration resource requirement, its contribution to reliability is less robust than RCEA's BAPP.

As noted above, RCEA's BAPP provides the energy to meet and exceed RCEA's load for the most constrained hours of the year on California's electrical system. Specifically, RCEA's BAPP is expected to generate in excess of 114% of its monthly energy need during summer months and as much as 141% of RCEA's peak demand in those months. This was determined by comparing RCEA's forecast hourly load against the combined hourly generation profiles for each resource in the portfolio.

g. Hydro Generation Risk Management

In developing its portfolios, 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 (2020-2025), recognizing 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 2017-2018 IRP portfolio, RCEA's BAPP and 46 MMT PCP rely on significantly less in-state hydroelectric generation. These portfolios also show a transition away from utilizing out-of-state hydroelectric generation from the larger WECC region, reducing RCEA's dependence on this technology type in the case of a WECC-wide drought event. Both the 38 and 46 MMT RSPs include 7 GW of in-state large hydro and 2.8 GW of imported large hydro throughout the IRP planning period. Although RCEA's conforming portfolios do include their share of large hydro procurement in the earlier IRP years (2020-2025), RCEA plans to phase this out starting in 2026 when new renewable resources are anticipated to be online.

At the same time, RCEA recognizes the important role small RPS hydro, both existing and new projects, can play in RCEA's 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 recently engaged a consultant to investigate potential for development of new RPS small hydro projects in and near Humboldt County, as a first step in procurement of this resource included in RCEA's BAPP.

h. Long-Duration Storage Development

The Commission's 38 MMT RSP calls for 1,605 MW of new long-duration storage (LDS) to be developed and operational by 2026, while the 46 MMT RSP calls for 973 MW of new long-duration storage to be operational by 2026. RCEA recognizes that the potential for development of pumped storage resources is inherently constrained by a limited number of viable project sites, long lead times, and relatively high

up-front capital costs. Given these limitations and the procurement timelines in question, RCEA believes that collaborative, multi-buyer approaches to pumped storage are best. In response to the CPUC's analysis, RCEA and twelve other CCAs (the Joint CCAs) issued a request for information ("RFI") on long-duration storage in June 2020. This RFI defined long-duration storage resources as those with the capability to discharge at full capacity for at least 8 hours. The RFI requested the following types of information: (1) storage technology and commercial history; (2) project specifics, including location, permitting, financing and development risks; (3) contracting terms and preferences, including indicative pricing.

The Joint CCAs received responses from 31 entities representing numerous types of chemical, mechanical and thermal long-duration storage technologies, such as: lithium-ion batteries; vanadium redox and other flow batteries; used electric vehicle batteries; waste to fuels via ultrasound; hydrogen storage; pumped storage hydro; geomechanical pumped storage; crane and stacked blocks; compressed air; flywheels; and molten salt and other thermal storage technologies. Moreover, the respondents identified 25 specific projects that represent more than 9,000 MW of capacity, two thirds of which is advertised as able to achieve commercial operation by 2026.

RCEA, along with a sub-set of the CCAs that participated in the RFI, intend to issue a joint RFO later this year. These same CCAs are exploring the formation of a new joint-powers authority to enable the procurement of a LDS resource resulting from the RFO. Joint procurement will allow for better economies of scale, while reducing project development, technology and regulatory risk. While the results from the RFI appear promising from a technical potential basis, RCEA and the other CCAs remain concerned about the costs, benefits and regulatory risk and will look to the results of the future RFO and discussions with developers and the CPUC to inform future procurement decisions for long-duration storage.

For its part, RCEA is committed to procuring its share of the CPUC's 1,605 MW target, which translates to 4 MW of long-duration storage online by 2026. However, since RCEA does not currently contract for LDS and does not plan to procure from an existing LDS resource, RCEA's IRP contemplates its share of the 38 MMT RSP total resource mix as a single procurement from a new resource. Due to the scale and complexity of these projects, successful development will depend on efficient collaboration among numerous entities including load-serving entities, developers, manufacturers, market operators, regulators and environmental stakeholders.

i. Out-of-State Wind Development

The Commission's 38 MMT RSP calls for 3000 MW of new out-of-state wind generation ("OOS Wind") to be developed and operational by 2030, while the 46 MMT RSP calls for 606 MW of new OOS Wind to be operational by 2030. RCEA understands that the transmission projects needed to connect OOS wind to the CAISO grid require significant lead-times. However, given the fact that OOS Wind is not needed until 2030, RCEA believes that a careful and considered approach to potential OOS Wind projects is best. Consequently, RCEA does not intend to initiate any OOS Wind procurement or project

development in this IRP cycle. Instead, RCEA plans to help form a CCA working group on OOS Wind. This working group will solicit input from developers and stakeholders to more closely evaluate potential OOS Wind projects.

j. Transmission Development

In identifying resource locations for its BAPP, RCEA was guided by the following preferences:

- Renewable resources located within RCEA's service area and the communities it serves.
- Projects in locations that can utilize existing transmission infrastructure with minimal upgrade/modification costs.
- Low-impact projects that provide economic benefit to DACs and local labor unions within communities in proximity to the project.

Unlike the IOUs, RCEA is not a transmission and distribution ("T&D") system operator. RCEA does not enjoy the benefits of a granular knowledge of PG&E's T&D system, and RCEA is not in the best position to identify optimal resource locations. As such, RCEA's identified resource locations should be treated as general preferences based on the above-listed considerations, not set-in-stone selections, unless specified as having no preferred alternative location in the table below. RCEA looks forward to working with the Commission to refine its resource location planning.

RCEA's BAPP includes a total of 198 MW[33] of new resources to be built at the locations identified in RCEA's 38 MMT Resources Data Template. Table 12 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.

[33] Generator and battery capacities of hybrid resources are additive here, while they are not in Table 12.

Table 12: RCEA BAPP New Resource Locations

New Resource	Size (MW)	Selected Location	Preferred Alternative Location
Sandrini Sol 1	100	Kern County	none
Redwood Coast Airport Microgrid	2.2	Humboldt County	none
Hatchery Road Solar A	0.99	Humboldt County	none
Hatchery Road Solar B	0.99	Humboldt County	none
Hatchery Road Solar C	0.99	Humboldt County	none
Hatchery Road Solar D	0.99	Humboldt County	none
North Coast Highway Solar 1	1	Humboldt County	none
North Coast Highway Solar 2	1	Humboldt County	none
Marshall Ranch Flow Restoration Project	0.43	Humboldt County	none
Feed-In Tariff 2.0-1	2	Humboldt County	none
Feed-In Tariff 2.0-2	2	Humboldt County	none
Feed-In Tariff 2.0-3	2	Humboldt County	none
Tierra Buena BESS	2.5 (of 5 MW total)	Sutter County	none
Leap Demand Response Aggregation	5.5	In CAISO	none
Redwood Coast Offshore Wind	40 (of ~120 MW total)	Humboldt Bay Offshore	Diablo Canyon Offshore
New Small Hydro	8	Humboldt County	Trinity County
Long-Duration Storage	7	In CAISO	Outside of CAISO
BTM Distributed Storage	6.3	Humboldt County	none

RCEA's 46 MMT PCP includes a total of 159 MW[34] of new resources that are the same as those in Table 12, except no New Small Hydro and reduced offtake of Redwood Coast Offshore Wind at 15 MW instead of 40 MW.

IV. Action Plan

a. Proposed Activities

RCEA intends to conduct the following activities in the course of implementing its BAPP:

- **Procure local BTM storage capacity.** In April 2020, RCEA released a BTM Distributed Resource Adequacy Request for Proposals (DER RFP), for which responses were due in late May. The DER RFP aligned with several goals articulated in RCEA's RePower Humboldt Strategic Plan such as

[34] Again, generator and battery capacities of hybrid resources are additive here.

integration of distributed energy resources (DER) and the deployment of microgrids. The solicitation also sought solutions that will provide energy resiliency to critical facilities and vulnerable customers in the event of future grid outages. Lastly, the RFP responded to the California Public Utilities Commission's (CPUC) November 2019 mandate for load-serving entities to procure new resource adequacy capacity to be online in 2021-2023. As a result of this solicitation, RCEA is currently negotiating contracts for 6.3 MW of BTM RA with two developers, which is reflected in RCEA's Resource Data Templates and Clean System Power Calculators (as Shed DR).

- **Continue development and implementation of FIT and add energy storage to FIT 2.0**. This program 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. The tariff was launched in 2019 with a program capacity of 6 MW, which is now approaching full subscription with five contracts approved by RCEA's Board and multiple projects in the County permitting pipeline. In 2020 the Board approved adding 6 MW to the program capacity along with making modifications to the program, and staff are now planning for these enhancements, which may include a downward adjustment in the base price, increased allowed project capacity, and optional or required co-located storage coupled with a resource adequacy price adder. Applicants may also be required to demonstrate progress in project permitting at the time of application to address risk of permitting failure. Combined with RCEA's LSE-owned Redwood Coast Airport Microgrid generating asset, the FIT program will meet RCEA's local solar development goal for 2030 once fully subscribed.
- **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 has recently hired a consultant to perform an updated assessment of local hydropower potential, develop a detailed plan for RCEA to facilitate development of this resource, and begin an engagement with community stakeholders and developers, with the intent of having new resources online as early as 2026.
- **Procure long-duration storage capacity.** As discussed above in section III.j, RCEA participated in issuing a joint request for information (RFI) on long-duration storage with twelve other CCAs. As a next step, RCEA is participating in the creation of a joint CCA joint powers authority (JPA) to enable group procurement, deemed essential given the needed scale of procurement and the expected favorable economics of procuring jointly from one or more large-scale projects. In parallel with creation of this JPA, RCEA will join a subset of the RFI participants in developing a solicitation to procure long-duration storage resources, with the hope that the JPA will be set up in time to allow for joint CCA procurement using that newly created entity.

- **Continue to procure local biomass power.** RCEA currently procures local biomass power under contracts with two suppliers. One contract expires at the end of 2020, and renewal is uncertain in light of ongoing operational viability challenges for the plant. The other PPA expires in February 2024, and RCEA has assumed this contract will be renewed or renegotiated to continue taking power from the plant throughout the IRP planning period.
- **Continue to pursue development of local offshore wind power.** RCEA is leading the development of offshore wind in California. In April 2018, RCEA and a diverse team of community members selected a consortium of companies composed of Principle Power, EDPR Offshore North America, and Aker Solutions to enter into a public-private partnership to pursue the development of this project, expected to have a capacity of approximately 120 MW, with RCEA expected to be a principal off-taker of the power. RCEA and the consortium have since submitted an unsolicited lease application to the Bureau of Ocean Energy Management (BOEM) and are continuing to plan the project until BOEM's initiation of the competitive lease auction process.
- **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 both its BAPP and 46 MMT PCP.
- **Ensure best outcomes for disadvantaged communities.** RCEA's service area does not include any disadvantaged communities (DACs) according to how CalEnviroscreen 3.0 defines DACs. However, Humboldt County is a rural community with high indices of poverty and unemployment. Some community members have expressed concern about unequitable impacts on lower income residents living in close proximity to local biomass power plants, who may be disproportionately exposed to criteria pollutants emitted by these plants. RCEA has engaged a consultant to work in the coming year to examine local impacts associated with dependency on biomass as an RPS component of RCEA's portfolio and propose mitigations. RCEA is also concerned with impacts that energy generation for RCEA's customers could have on communities outside RCEA's service area that host new or existing facilities providing power to RCEA. RCEA will incorporate local and global environmental impacts as one of its evaluation criteria in future resource solicitations. RCEA staff will continue to participate in ongoing engagement between CCAs and environmental justice advocates to identify concerns and solutions involving DACs and RCEA's energy procurement needs.

b. Procurement Activities

Table 13 indicates timelines for the proposed activities described in section IV.a. above.

Table 13: RCEA BAPP Action Plan Procurement Activities

Activity	Expected Solicitation Issuance Date	Expected Commercial Operation Date
Continue development and implementation of Feed-In Tariff and launch FIT 2.0	Tariff currently in place, multiple projects under contract, FIT 2.0 launch in Q1 2021	Multiple projects, CODs late 2021-2026
Pursue development of local small hydropower	2025	2026
Procure long-duration storage capacity	Late 2020	2026
Procure local behind-the-meter storage capacity	Issued, contract execution expected Q4 2020	2022
Activity	**Expected Solicitation Issuance Date**	**Expected Commercial Operation Date**
Continue to procure local biomass power	Contract renewal or renegotiation in 2024	Currently in service
Pursue development of local offshore wind power	2024	2026
Ensure best outcomes for disadvantaged communities	N/A	N/A

c. Potential Barriers

In making procurement decisions, RCEA considers potential barriers including the following:

Regulatory and legislative barriers

- Assignment of unexpected and unplanned resources (for example, through CAM, RMR, CPM)
- Legislative and regulatory changes which remove the value of existing contracts (for example, if existing long-term resource adequacy contracts are not fully valued by a central procurement entity) - uncertainty on this point has resulted in challenging contract negotiations for recent RA procurement by RCEA
- The timing of CPUC decisions about mandatory or voluntary allocations of PCIA resources to RCEA, which could occur too late to allow timely procurement and compliance
- Federal trade policy decisions, including new barriers to importation of materials from China and other countries
- Federal homeland security considerations affecting use of Chinese and other imported technology

Market barriers

- Construction timelines, especially considering expectations for COVID-related construction delays.
- The risk of CAISO curtailments of solar and wind resources that exceed current forecasts.
- The risk of long-term resource procurement without any certainty of cost recovery

Technology-specific barriers

- 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
- Costs of transmission upgrades needed to enable development of north coast offshore floating wind projects
- Uncertainty regarding schedule and participation costs of federal lease auction for offshore wind projects
- Uncertainty regarding environmental compliance and permitting needed to develop new local small hydropower
- Technical, economic, and regulatory feasibility of emerging long-duration storage technologies

These potential barriers are in addition to the common procurement barriers such as interconnection approval, counterparty credit risk, and project permitting.

d. Commission Direction or Actions

RCEA requests that the Commission provide clear direction at the earliest possible date 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 current incremental reliability procurement mandate (D.19-11-016), especially in meeting the first procurement milestone of having capacity in place by August 1, 2021. 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.

e. Diablo Canyon Power Plant Replacement

The single largest capacity resource being added to RCEA's portfolio over the IRP planning horizon is the new-build 100 MW Sandrini solar project, coming online in late 2022, well ahead of Diablo Canyon Power Plant's (DCPP) closure. Despite its large capacity and being an emissions-free resource, this solar-only project does not add firm or flexible capacity. The Redwood Coast Airport Microgrid, coming online in early 2022, is a solar plus storage resource that will provide firm and flexible dispatchable capacity, albeit at a more modest scale of 2.2 MW.

Two other important new resources, offshore wind and local small hydropower, are planned for 2026 online dates, leaving a lag of approximately one year after the final closure of DCPP. Neither of these is a firm year-round resource; while offshore wind is an intermittent resource, its daily availability profile matches RCEA's load much better than solar and it shows less seasonal variability than solar. Small

hydro projects will be run-of-the-river with no seasonal storage, meaning projects typically will provide peak generation in winter and spring, with reduced or zero generation in late summer and fall, but during their generating season will provide essentially constant diurnal output on any given day. RCEA's planned additions of front-of-the-meter short- and long-duration storage and behind-the-meter short-duration storage will mitigate the intermittency of these resources, collectively providing firm and flexible capacity additions.

f. D.19-11-016 Incremental Procurement

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 RCEA's contribution to system reliability and renewable integration needs, RCEA has committed to self-providing its assigned share of the identified system capacity need.

RCEA's assigned share of the system capacity need is 10.7 MW[35], 50% of which must be online by August 1, 2021, 75% of which must be online by August 1, 2022, and 100% of which must be online by August 1, 2023.

On February 18, 2020, RCEA notified the Commission of its intent to self-provide its share of this requirement.[36] In IRP-filing years, D.19-11-016 further requires LSEs to include an update on incremental procurement activities in their biennial IRPs, including an attestation of compliance by a senior executive. As instructed by the Commission, this attestation is being provided as part of RCEA's IRP submission. Detailed information regarding RCEA's procurement towards the D.19-11-016 requirement is provided in RCEA's resource data templates.

RCEA Is Working to Finalize the Procurement of All Needed Capacity to Meet Its 2021 Requirement

RCEA is required to have 50% of its capacity procurement, or 5.4 MW, online by August 1, 2021. RCEA's Board has approved contract language that has been negotiated by RCEA and Leapfrog Power, Inc. for adequate incremental capacity to meet this requirement, with contract execution expected no later than mid-September 2020. RCEA's contract with Leapfrog Power, Inc. for RA from aggregated demand response will provide 5.5 MW of capacity towards this requirement. The performance period for this agreement runs for ten years starting no later than August 1, 2021. This capacity is from a resource identified in D.19-11-016 as incremental.

RCEA Is Working to Finalize the Procurement of All Needed Capacity to Meet Its 2022 Requirement

RCEA is required to have 75% of its capacity procurement requirement, or 8.0 MW, online by August 1, 2022. RCEA's contract with Leapfrog Power, Inc. listed above, will provide 5.5 MW of this capacity. The remaining capacity is expected to be provided through a contract with Ormat/Viridity to procure 2.5

[35] D.19-11-016, Ordering Paragraph 3.

[36] *Redwood Coast Energy Authority 2020 IRP Procurement Progress Report,* served February 17, 2020

MW of battery energy storage capacity from the Tierra Buena project currently under development in Sutter County, CA. RCEA's Board has approved contract language that has been negotiated by RCEA and Ormat/Viridity, with contract execution expected no later than mid-September 2020. The performance period for this agreement runs for ten years starting no later than August 1, 2022. This capacity will be incremental, as it is from a new resource. Together, these contracts will provide a total of 8.0 MW of capacity by August 1, 2022, fully satisfying RCEA's 2022 requirement.

RCEA Has Procured All Needed Capacity to Meet Its 2023 Requirement

RCEA is required to have 100% of its capacity procurement, or 10.7 MW, online by August 1, 2023. On May 4, 2020, RCEA executed a contract to procure 100 MW of capacity from EDPR's Sandrini Sol 1 solar project in Kern County, CA. The period for this agreement runs for fifteen years with a guaranteed commercial operation date of December 31, 2022. This capacity is incremental, as it is from a new resource. Based on current ELCC values for stand-alone solar projects, the incremental RA from the Sandrini Sol 1 project, combined with the projects described above for 2021 and 2022 compliance, will be more than adequate to ensure RCEA's 2023 compliance.

V. Lessons Learned

Lessons learned by RCEA in developing this IRP fall in two categories:

- Modifications to methods and procedures that RCEA staff will incorporate in the next biennial IRP cycle
- Suggestions for the CPUC on how the IRP requirements, templates, and other resources provided might be modified in the next biennial IRP cycle to allow for more flexibility and better alignment between LSE procurement goals and state requirements for reliability, affordability, renewable power development, and emissions reductions.

These lessons are detailed below.

Modifications to RCEA methods and procedures

- RCEA's planned 2030 portfolio has its origins in a California Energy Commission-funded study performed under the CEC's Renewable Energy Secure Community program, concluding in 2013.[37] 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 hydro power, 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 feasible by RCEA's relatively light load and a rich natural resource supply in RCEA's service area. In short, RCEA's portfolio planning to

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

date has generally been top-down in nature, setting targets and procuring to meet them. For the next IRP cycle RCEA intends to supplement this approach with a parallel bottom-up approach starting from production cost modeling that serves RCEA's load at the least cost while meeting state regulatory compliance as the main objectives, if for no other purpose to better understand the cost tradeoffs for the choices included in its Strategic Plan, as compared with other portfolio options that meet regulatory compliance but may compromise on RCEA's own targets.

- On the demand side, RCEA's Strategic Plan includes aggressive targets for fuel switching through building electrification and deployment of electric vehicles and charging infrastructure. These targets are not reflected in the IEPR RCEA load forecast used in the IRP. As a community-based organization providing DSM services to its CCA customers in addition to electric supply, RCEA is well-equipped to make realistic projections of local DSM potential, as well as to deliver the services that achieve this potential. RCEA will work with Commission staff in the next IRP cycle on how to accurately capture RCEA's DSM potential in its plan.

<u>Suggestions for CPUC on IRP requirements, resources, and templates</u>

- In general, RCEA encourages the Commission to seek ways to reconcile central state-level planning for grid needs with the local government interests and local resource planning that CCAs with their increasing load share represent. Specifically, the RSP is made up of a set of resources selected by the Commission, sometimes leaving out key resources included in CCAs' strategic plans.
- As an example of the above, RCEA found it challenging to account for our planned new small RPS-eligible hydropower in the IRP, as this is not a new-build resource category in the RSP. RCEA asks that CPUC include a greater diversity of resource categories in the RSP, or alternatively provide a catch-all "other" category to allow LSEs to report any RPS-eligible resource.
- The RSP used in the next IRP cycle should emphasize 2024 and 2025 portfolios and include a 2025 RSP, as Diablo Canyon Power Plant will shut down its two generating units in those years, making it critical from a reliability perspective to plan for adequate new capacity to come online with the correct timing.
- Ordered procurement and the baseline resource lists associated with such ordered procurement should be timed carefully so that LSE's that are ahead of the curve in reliability procurement are not penalized for their foresight. The existing system tends to unintentionally reward lagging and disincentivize advance planning.
- The default assumption in the IRP that each LSE will procure RSP resources in proportion to that LSE's load share is challenging for smaller LSEs, resulting in impractically small resources for which to execute long-term contracts. The Commission might consider setting minimum procurement thresholds below which procurement of a given resource would be excused in place of increased procurement of another resource.
- The Commission should recognize that some procurement decisions are made out of necessity for compliance with other regulatory mandates outside the IRP. For example, RCEA's procurement of long-term solar from the Sandrini Sol project was determined to be the only pathway to timely SB 350 compliance resulting from RCEA's 2019 RPS solicitation but resulted

in over-procurement of this resource relative to both RCEA's own procurement targets and the RSP.

- LSEs are instructed by the Commission not to make plans based on assumptions about future regulatory changes, such as allocations related to the PCIA or CAM. In 2020, RCEA would have ended up long on carbon-free energy had it procured without taking this year's allocation of IOUs' carbon-free resources into account. It is rational to plan for future allocations if they appear likely, and LSEs should be encouraged to reflect this in their IRPs. RCEA encourages the Commission to coordinate the timing of future allocation decisions so LSEs have certainty in developing their IRPs.
- A closer relationship between the Commission's RA Program procurement requirements and the reliability needs of the system as viewed by the IRP process is needed in order to ensure that LSEs are able to know that they are providing their fair share of system reliability by procuring resources up to their expected RA requirement. For example, RCEA expects to do a more detailed analysis of potential procurement of storage resources in its next IRP, but is concerned that simply meeting its forecasted RA requirements via increased procurement of short-duration and long-duration storage will not provide sufficient reliability to the grid. 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. 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 IRPs may be out of proportion to the benefit the many resulting small-scale IRPs contribute to state-level resource planning. The Commission may wish to re-consider alternative IRP requirements for smaller LSEs such as it has made available in the past.
- Emissions accounting for biomass in the CSP model doesn't align with state emissions data for the specific plants RCEA procures from. The model assumes zero emissions from biomass, ignoring the non-biogenic emissions tracked by the California Air Resources Board (CARB) and included in RCEA's reporting to The Climate Registry in keeping with state protocols for biomass emissions reporting. RCEA encourages the Commission to quantify biomass emissions in the CSP Calculator consistently with how they are accounted for by CARB.
- RCEA encourages the Commission to improve coordination between its IRP and RPS groups and consider timing in what these two groups require from LSEs. In the current cycle, the RPS Procurement Plan effectively required results from IRP modeling months ahead of when the LSEs had all the guidance needed from the Commission to complete their IRPs.
- FAQs issued by the Commission were helpful; however, with dozens of pages of new guidance issued just three weeks before IRPs were due, it was challenging to digest and incorporate this

guidance in time to complete the portfolios and narrative and obtain our Board's review and approval.

Glossary of Terms

Alternative Portfolio: *LSEs are permitted to submit "Alternative Portfolios" developed from scenarios using different assumptions from those used in the Reference System Plan. 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, formerly "Clean Net Short") methodology*: the methodology used to estimate GHG 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 Benchmark, use of the LSE's assigned load forecast, use of inputs and assumptions matching those used in developing the Reference System Portfolio, as well as other IRP requirements including the filing of a complete Narrative Template, a Resource Data Template and Clean System Power Calculator*.

***Effective Load Carrying Capacity**: a percentage that expresses how well a resource is able 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.*

***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.*

***Net Qualifying Capacity:** 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 plRCEA 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.*

***Reference System Plan:** the Commission's integrated resource plan that includes an optimal portfolio (Reference System Portfolio) of resources for serving load in the CAISO balancing authority area and meeting multiple state goals, including meeting GHG reduction and reliability targets at least cost.*

***Reference System Portfolio**: the multi-LSE portfolio identified by staff for Commission review and adopted/modified by the Commission as most responsive to statutory requirements per Pub. Util. Code 454.51; part of the Reference 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).*

ATTACHMENT A