

Redwood Coast Energy Authority
2018 INTEGRATED RESOURCE PLAN

APPROVED BY RCEA BOARD ON JULY 23, 2018

SUBMITTED TO THE CPUC ON AUGUST 1, 2018

Table of Contents

Executive Summary..... 3

 Conforming Portfolio..... 3

 Action Plan 5

Study Design 7

 Objectives..... 7

 Methodology 8

 Modeling Tools 8

 Modeling Approach..... 9

 Required Portfolio 9

 Assumptions 11

 Load Forecast..... 11

 Energy Prices 12

 Resource Adequacy, GHG, and REC Pricing..... 12

Study Results..... 13

 Portfolio Results 13

 Local Air Pollutant Minimization 15

 Cost and Rate Analysis..... 18

 Resource Adequacy 19

Action Plan 20

 Barrier and Risk Analysis 21

 Lessons Learned..... 22

Glossary of Terms 23

Attachment A 25

Attachment B 30

 ORAL COMMUNICATIONS..... 30

Executive Summary

[Attachment A to D.18-08-018, Page 3]

Use this section to provide an overview of the process used by the LSE to develop its plan and summarize the LSE's findings, including a brief overview of the LSE's Preferred Portfolio and Action Plan.

Redwood Coast Energy Authority (RCEA) launched its Community Choice Aggregation Program (CCA or Program) on May 1, 2017 with the core goal of maximizing the use of local renewable energy while providing competitive rates to customers.

Specific to the Program, the following objectives were adopted by the RCEA Board of Directors (BoD) ("Launch Period Guidelines", see Attachment A):

- A renewable energy mix (as defined by state law) at least 5 percent above Pacific Gas and Electric's (PG&E's) power mix
- A greenhouse gas (GHG) emissions rate at least 5 percent below PG&E's power mix
- Maximization of the use of local renewable energy to the extent technically and economically feasible and prudent
- Strong support of energy efficiency and conservation towards achieving the program's environmental, economic, and community goals

RCEA worked to achieve these goals in the first year of operations and attained a power mix comprised of 89 percent GHG-free power and 44 percent renewable power, as reflected in the 2017 Power Content Label. RCEA contracted with a local biomass facility that delivered 11 percent of RCEA's power in the 12-month period beginning May 2017.

In addition to assuming responsibility as load serving entity (LSE) for the ratepayers within Humboldt County, RCEA also has responsibility to contribute to the State of California's goals for addressing climate change and reducing GHG emissions, as required under SB 350. Specific to this Integrated Resource Plan (IRP), RCEA is required to consider the state's Reference Plan, present a Conforming Portfolio, and then adopt an action plan for implementing the Conforming Portfolio.

This study analyzes the 42 million metric ton (42 MMT) Reference Portfolio as established by the CPUC and determines that RCEA's load share of these incremental generation resources will be insufficient to meet 2030 GHG and RPS targets. The IRP team developed an alternate Conforming Portfolio that establishes the minimum baseline resource strategy that RCEA will need to implement to meet statewide goals. In future IRPs, RCEA will consider Alternative Portfolios that remain consistent with making, or exceeding, a proportional contribution to the State's Reference Portfolio which also include implementation of Program objectives.

Conforming Portfolio

This IRP evaluates the state's Reference Portfolio and then creates a Conforming Portfolio. The IRP team relied on the data developed from the tools made available by the CPUC to complete this study.

RCEA's current portfolio does not include long-term (at least 10 year) contracts. RCEA recognizes that within the next two years it will need to procure long-term renewable energy from existing and/or new generation capacity for at least 65 percent of its state mandated renewable purchases beginning in 2021. Figure ES-1 displays the annual quantity of renewable energy that RCEA will need to procure under long-term contract.

Figure ES-1: Minimum Long-term Renewable Generation Contract Requirements

	2018	2022	2026	2030
Load (MWh)	695,773	646,143	633,983	623,060
Minimum RPS Compliance (%)	29%	36%	43%	50%
Minimum RPS Compliance (MWh)	201,774	235,196	273,881	311,530
Required Contracted Quantity (MWh)	0	152,877	178,022	202,494

RCEA expects to continue its target of 80 percent carbon-free procurement for the foreseeable future. Doing so will place RCEA on a trajectory to comply with its share of the 2030 statewide GHG emissions quota. The Conforming Portfolio, shown in Figure ES-2, was developed under the following conditions:

1. Existing contracts for power (Biomass through 2022)
2. Small hydroelectric – 2 MW 2022 through 2030 (RCEA Launch Period Guidelines)
3. 80% GHG-free power (RCEA Launch Period Guidelines)
4. Battery storage – 2 MW 2022 through 2030 (Airport Microgrid, RCEA Launch Period Guidelines)
5. Additional Renewable Portfolio Standard (RPS)-eligible power content category (PCC) 1 power to meet minimum RPS compliance (fulfilled with new solar, wind, and geothermal)

The annual generation volumes that comprise the Conforming Portfolio in Figure ES-2 do not reflect a policy commitment for procurement. The volumes in this portfolio also make no affirmative statement on future contracts. Annual generation volumes for Local Biomass reflect only existing contracts. The volumes for Batteries reflect planned construction that is not yet under contract. Annual generation volumes for all other resource types (Small Hydro, Solar, Wind, Geothermal, NW Hydro) are projections, and are not based on any existing resource-specific contracts or commitments. See Attachment A which outlines the RCEA BoD approved Program Launch Guidelines for energy generation strategies and targets through April 2022. RCEA BoD express their concerns with the annual generation volumes in the Conforming Portfolio in the Board Minutes (Attachment B).¹

¹ Final Board approved minutes will be available after August 20, 2018: <https://redwoodenergy.org/about/board-of-directors/>

Figure ES-2: RCEA Conforming Portfolio

	2018	2022	2026	2030
Load (MWh)	695,773	646,143	633,983	623,060
Minimum RPS Compliance (%)	29%	36%	43%	50%
Minimum RPS Compliance (MWh)	201,774	235,196	273,881	311,530
Required Contracted Quantity (MWh)	0	152,877	178,022	202,494

Annual Generation (MWh)	2018	2022	2026	2030
Existing Local Biomass	163,188	48,018	0	0
Existing Local Small Hydro	0	17,520	17,520	17,520
Solar	0	76,439	89,011	101,247
Wind	0	76,439	89,011	101,247
Batteries	0	1,822	1,577	1,507
Geothermal	0	0	0	4,424
Short Term PCC1 REC Contract	0	0	8,291	7,702
Short Term PCC2 REC Contract	38,586	14,958	68,470	77,882
Additional Carbon Free (NW Hydro)	393,430	296,677	301,776	264,800
System Power	100,568	114,270	58,326	46,729
Total MWh	695,773	646,143	633,983	623,060
GHG Emissions (metric tons)	65,260	56,154	61,867	58,640

The expected 2030 emissions, assuming 80 percent carbon-free power with the remainder filled with system power is forecasted to be under 56,000 metric tons CO₂. The Conforming Portfolio will also allow RCEA to meet the 50 percent renewable energy mandate by 2030, with 65 percent of the renewable supply procured under long-term contracts. Residual energy needs will be procured under short term purchases. The Conforming Portfolio is also the Preferred Portfolio.

Action Plan

The IRP identifies RCEA's need for new resources and investigates different generic resource types with an objective of presenting both quantitative and qualitative analysis of the benefits of pursuing different resource technologies to fulfill RCEA's load through RPS and GHG requirements. RCEA's action plan addresses resource acquisitions and other concerns that appeared over the course of this IRP analysis.

- ✓ RCEA's program goals ("Launch Period Guidelines") largely align with a proportional share of the Conforming Portfolio.
 - RCEA will begin to solicit offers for long-term contracts for the already existing local biomass, local small hydro generators and explore acquisition options for new solar and wind generators.
 - Along with partners in the Schatz Energy Research Center and PG&E, RCEA will be pioneering a solar plus storage microgrid project at the Arcata-Eureka Airport. It will consist of a 2.3 MW solar array attached to a 2MW/8MWh battery and is the first announced solar and battery resource for RCEA
 - RCEA will continue to contribute to the development of new renewable energy resources as it explores opportunities to acquire offshore wind resources

- ✓ Continuing with the current 80 percent GHG-free procurement goals are forecasted to keep RCEA under its quota of 111,000 metric tons of GHG emissions in the 2030 42 million metric ton scenario.
- ✓ RCEA will continue to monitor the RA environment and act accordingly to comply with the RA program.
- ✓ RCEA will continue to monitor energy economic fundamentals to ensure that its resource strategy provides rate payers with a maximum amount of local renewable energy at a competitive cost.
 - Wholesale market prices 2026 and beyond are a point of concern, as the rapidly rising GHG planning prices drive power prices towards \$100/MWh. If it is both more economically and environmentally effective to reduce dependence on the wholesale market and rely more upon RCEA owned or contracted resources, RCEA will explore resource acquisitions incremental to the Preferred Portfolio beyond 2026 to remain cost competitive.

Study Design

[Attachment A to D.18-08-018, Page 3]

Use this section to describe how the LSE approached the process of developing its LSE Plan.

Redwood Coast Energy Authority's (RCEA or the Program) 2018 Integrated Resource Plan (IRP) lays out a strategy for meeting RCEA's energy and resource adequacy needs, as well as meeting California's renewable portfolio standard (RPS) and greenhouse gas (GHG) emission obligations over a planning horizon stretching from 2018 through 2030. The goal of this IRP is to provide a framework for measuring the effectiveness of an array of resources towards meeting these goals. The IRP provides guidance towards strategies that will provide local, clean, and cost competitive electricity to RCEA ratepayers.

Objectives

[Attachment A to D.18-08-018, Page 7]

Provide a description of the LSE's objectives for the analytical work it is documenting in the IRP.

The objectives of this IRP are to demonstrate to the CPUC that RCEA has a plan for procurement and resource integration that will supply the load forecasted in the CEC 2017 IEPR through 2030, and to demonstrate that this plan meets the 2030 GHG Emissions Benchmark of 0.111 MMT using the CPUC GHG Calculator Clean Net Short methodology.

RCEA cautions against relying on the results in this IRP alone for statewide planning, as they are based on CPUC templates and methodologies that may not be appropriate for each load serving entity (LSE). A list of key concerns are in Figure 1.

Figure 1: RCEA Concerns with CPUC IRP Assumptions

Category	CPUC IRP Assumption	RCEA Concern
Annual Load Forecast	CEC 2017 IEPR Mid Baseline mid AAEE mid AAPV Form 1.1c	Does not incorporate local and LSE-specific forecasts
Hourly Load Profile	Provided by CPUC in GHG Calculator for IRP v1.4.5	Assumes same profile for all LSEs
Hourly Resource Profile	Provided by CPUC in GHG Calculator for IRP v1.4.5	Assumes same profile for all generation resources
GHG Emissions Calculation	Calculation done using the CPUC's GHG Calculator for IRP v1.4.5	This calculator does not recognize PCC2 resources as GHG-free, even when the imported physical energy is from a GHG-free resource
Renewables Portfolio Standard (RPS) Target	No specific RPS target stated	RCEA has committed to at least 5% more RPS than PG&E
RPS Calculation	No RPS calculation stated	GHG methodology is inconsistent with RPS program

Methodology

RCEA utilized the California Public Utilities Commission (CPUC) Reference Plan as the framework to create the RCEA Conforming Portfolio, developing a strategy for RCEA to meet those stated goals while still achieving RCEA's primary target of maximizing the use of local renewable energy while providing competitive rates to customers. Acquisition targets from the RCEA Launch Period Guidelines include:

- A renewable energy mix (as defined by state law) at least 5 percent above Pacific Gas and Electric's (PG&E's) power mix
- A GHG emissions rate at least 5 percent below PG&E's power mix
- Maximization of the use of local renewable energy to the extent technically and economically feasible and prudent
- Strong support of energy efficiency and conservation towards achieving the program's environmental, economic, and community goals

To meet its program objectives, RCEA is open to the procurement of both existing and new resources. In 2018, RCEA expects to obtain approximately 26 percent of its energy needs from biomass generators located in Humboldt County. Future procurement goals include:

- Procurement of 2MW of RPS power from an existing small hydro plant in northwest California
- Solicitation of a feed-in tariff program to encourage the development of up to 6 MW in new local small-scale solar (projects of 1 MW or smaller)
- Procurement of 15 MW of wholesale or community/utility scale solar by 2022

The IRP team established a Conforming Portfolio through an iterative process of adding increasing quantities of carbon-free generation until the targets were met.

Modeling Tools

[Attachment A to D.18-08-018, Page 7]

Name all modeling software used by LSE to develop its IRP, if any, and include the vendor and version number. Provide an explanation of differences between the LSE's modeling tool and RESOLVE, and an explanation of how those differences should be considered during evaluation of the LSE's portfolio(s).

The IRP team relied heavily on the tools made available by the CPUC. This IRP adopted the load forecast contained in the CEC's 2017 IEPR Form 1.1c for the mid Baseline, mid AAEE, and mid AAPV scenario for years 2022, 2026, and 2030. The load forecast for 2018 comes from actual load forecasted by the IRP team. The additional achievable energy efficiency (AAEE) used in this forecast came from the 2017 IEPR and estimates an incremental energy savings of almost 28,200 GWh/year by 2030 relative to the 2017 baseline. The IEPR also estimates an additional achievable behind the meter photovoltaic (AAPV) of just over 33,600 GWh/yr by 2030 compared to 2017. Net annual consumption by end users, which includes forecasts for incremental transportation electrification consumption as well as savings resulting from energy efficiency and customer-owned behind the meter generation, is forecasted to continue at an average rate of -0.51 percent per year through the end of the study period.

GHG emission forecasts were determined by entering RCEA loads and resources into the CPUC's Clean Net Short calculator.

Two of the most significant input variables to electricity price simulation, natural gas and GHG prices, were set by the CPUC. As a result, the IRP team judged that independent production cost modeling would not have provided materially different results than that of the CPUC model. For that reason, the IRP team used the power price forecast derived in the CPUC 42 million metric ton statewide annual electric sector emissions, mid AAEE scenario for 2030.

Modeling Approach

[Attachment A to D.18-08-018, Page 7]

Describe the LSE's overall approach to developing the scenarios it evaluated, and explain why each scenario was considered. Also describe any calculations, including post-processing calculations, used to generate metrics for portfolio analysis.

A long term integrated financial and energy position model ("Financial Model") was created by the IRP team to forecast RCEA's annual wholesale power costs of the Conforming Portfolio presented in this report for selected years of the study period. The Financial Model used the results from previous sections, including forecasted loads, power prices, forecasted generation resources, and the output from generation resources. The Financial Model also includes additional wholesale requirements and costs such as GHG-free energy, RPS, and resource adequacy. The output from the Financial Model measured the portfolio cost in a single metric: retail power cost per MWh. The model simulated the annual costs of 2018, 2022, 2026, and 2030 reflecting the data provided by the CPUC.

Required Portfolio

[Attachment A to D.18-08-018, Page 3-4]

Each LSE must produce at least one portfolio, deemed the "Conforming Portfolio," that uses the assigned load forecast and is demonstrated to be consistent with the Reference System Portfolio according to the following criteria:

- *Use of either the GHG Planning Prices in Table A or the LSE-Specific 2030 GHG Emissions Benchmark assigned to the LSE in an ALJ ruling.*
- *Use of inputs and assumptions (e.g., baseline generating fleet, candidate resource cost assumptions, financial assumptions, etc.) matching those used in developing the Reference System Portfolio*

The portfolio analysis applies results from the CPUC staff recommended statewide annual electric sector GHG Planning Target emissions of 42 MMT in 2030 ("Reference Portfolio"), which is consistent with meeting the statewide 2030 emissions reduction target.

The Reference Portfolio recommends RCEA pursue in-state construction of 22 MW solar, 3 MW wind, 0.5 MW geothermal, and 5 MW battery storage of incremental generation capacity by 2030, based on load-weighted share of the statewide Reference Portfolio. As forecasted in the 2017 Integrated Energy Policy Report (IEPR) Form 1.1c, RCEA represents approximately 0.25 percent of statewide electricity consumption across the study period. The IRP team applied RCEA's percentage of total load for each respective study year in the RESOLVE model to determine the Program's proportional share of the Recommended Portfolio.

Figure 2 displays both the statewide resource needs and RCEA's proportional share of generation capacity.

Figure 2: 42 Million Metric Ton Annual GHG Emission Reference Portfolio Generation Capacity Additions by Year and RCEA Proportional Share (MW)

42MMT Reference Portfolio (MW)	2018	2022	2026	2030
Wind	1,145			
Solar		8,828		
Battery			161	1,830
Geothermal				202
Total	1,145	8,828	161	2,032

RCEA Share (MW)	2018	2022	2026	2030
Wind	3			
Solar		22		
Battery			0.4	5
Geothermal				1
Total	3	22	0.4	5

Using the assumptions for capacity factor listed in the RESOLVE model (Figure 3) Figure 4 is the cumulative energy output of new resources for each year of the study period.²

Figure 3: Generation Resource Capacity Factor Assumptions

Resource	2018	2022	2026	2030
Wind	29%	29%	29%	29%
Solar	30%	30%	30%	30%
Battery	7%	10%	9%	9%
Geothermal	80%	80%	80%	80%

Figure 4: Cumulative Annual Energy Output of New Resources (MWh)

Cumulative New Resource Generation (MWh)	2018	2022	2026	2030
42 MMT Reference Portfolio	3,259,815	28,006,465	29,205,271	44,301,922
RCEA Share	7,272	65,272	68,269	105,873

RCEA's proportional share of the 42 million metric ton GHG total emissions goal is 111,000 metric tons.³ The Program's load share of incremental generation resources of the Reference Portfolio will be insufficient to meet 2030 GHG and RPS targets.

To meet the GHG total emissions goal, the IRP team developed an alternate Conforming Portfolio that establishes the minimum baseline resource strategy that RCEA will need to implement. RCEA intends to procure additional carbon-free resources under long-term contracts in accordance with its program objectives. The alternate Conforming Portfolio was built on the following conditions:

1. Existing contracts for power (Biomass through 2022)
2. Small hydroelectric – 2 MW 2022 through 2030 (RCEA Launch Period Guidelines)
3. 80% GHG-free power (RCEA Launch Period Guidelines)
4. Battery storage – 2 MW 2022 through 2030 (Airport Microgrid, RCEA Launch Period Guidelines)

² As defined in the RESOLVE Documentation: CPUC 2017 IRP Inputs and Assumptions (Draft). July 2017. http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPowerProcurementGeneration/irp/17/RESOLVE_CPUC_IRP_Inputs_Assumptions_2017-07-19_clean.pdf

³ As recorded in Rulemaking 16-02-007 ALJ/JF2/jt2, 5/28/2018

5. Additional Renewable Portfolio Standard (RPS)-eligible power content category (PCC) 1 power to meet minimum RPS compliance (fulfilled with new solar, wind, and geothermal)

Among the program objectives in 2017 and 2018 was a goal to serve 80 percent of its load with carbon-free energy. This was accomplished through a resource mix of contracting with local biomass, Portfolio Content Category 1 (PCC1), and PCC2 generators, as well as purchasing carbon-free power from Northwest large hydro facilities. Under the current RPS rules, PCC2 Renewable Energy Certificates (RECs) are considered carbon-free, though that will not be the case under the adopted CNS rules. Since RCEA is not considering the addition of any GHG-emitting resources, the GHG planning price is not used in the portfolio analysis.

RCEA is a partner in the Arcata-Eureka Airport solar plus storage (2MW/8MWh battery) microgrid project. The Program intends to meet the energy storage target of 1 percent of demand with this project and is expected to meet the legislative timeframe of being under contract by 2020 and operational by 2021.

RCEA is in the process of creating a public-private partnership with the goal of developing an offshore wind project off the Humboldt County coast. The project is envisioned as having a total capacity of 100 to 150 MW. Due to the expected high levelized cost of energy (LCOE) from the project, RCEA expects to be the off-taker for a small portion of this capacity to balance its portfolio with less expensive renewable and unspecified resources. Through a competitive process in early 2018, RCEA selected project partners with technical and financing capabilities to develop the project. RCEA and its partners have commissioned an interconnection study by the California Independent System Operator (CAISO) and are preparing to apply for a lease for the project area through the Bureau of Ocean Energy Management (BOEM). The anticipated project timeline to commercial operation date is five to seven years (2023-2025). Studies to date of the offshore wind resource show an expected capacity factor of greater than 50%.

The final RCEA Conforming Portfolio constraints are presented in Figure 5, and the annual volumes of the Conforming Portfolio are presented in Study Results, Figure 8.

Figure 5: Conforming Portfolio Scenario

RCEA Conforming Portfolio	2018	2022	2026	2030
Load Forecast (MWh)	2018 Budget Load	IEPR	IEPR	IEPR
Renewable Resources	Proportional share of RESOLVE 42MMT mid Scenario + long term contract with lowest cost resource to meet 65% of RPS needs			
RPS	Minimum PG&E Renewable mix + 5%			
GHG-Free	Minimum 5% less GHG intensive than PG&E			

Assumptions

[Attachment A to D.18-08-018, Page 7]

Describe any inputs or assumptions used by the LSE that differ from the corresponding assumption used by the Commission to prepare the Reference System Plan. Each differing assumption must include a rationale for use of this assumption and any intermediate calculations used to develop the assumption and source data with citations. Include a side-by-side comparison of the original assumption data from the Reference System Plan and the LSE's differing assumption data. Report data according to the requirements in the Data section below.

RCEA did not apply any different assumptions than the ones described in the 42 MMT Reference Plan.

Load Forecast

[Attachment A to D.18-08-018, Page 3]

For projecting load across the IRP Planning Horizon (i.e., until 2030, for the purposes of IRP 2017-18), LSEs shall use the “mid Baseline mid AAEE mid AAPV” version of Form 1.1c of the CEC’s adopted 2017 IEPR forecast, unless a new load projection is assigned to the LSE in an Administrative Law Judge (ALJ) ruling.

RCEA does not have an independent forecast of behind the meter solar or EV penetration, thus it cannot effectively project how the adoption of those technologies will affect total consumption or hourly shapes. The IRP team used the RCEA board approved 2018 load forecast adopted for the 2018 study year. For the remainder of the study period, the IRP team relied on the load forecast provided by the 2017 IEPR without any further modifications. GHG emissions were also calculated using the CNS calculator default settings for the same reasons. With a relatively flat load forecast through 2030, resource adequacy needs are assumed to be consistent with 2018 quantities.

Energy Prices

The IRP team assumed forward prices as marked on the InterContinental Exchange (ICE) for the 2018 price forecast, as the year is well underway. For the remainder of the study period, input prices came from the RESOLVE model outputs.⁴ Because RESOLVE modeled only 37 representative days of the year, the IRP team assumed that the simulation captures the seasonal fluctuations and its effect on market prices. GHG prices are assumed to be included in the modeling. It is also assumed that liquidity is sufficient such that RCEA will be able to transact at market prices without substantial transaction costs.

Resource Adequacy, GHG, and REC Pricing

[Attachment A to D.18-08-018, Page 5]

LSEs electing to use the GHG Planning Price—rather than the LSE-specific GHG Emissions Benchmark—in developing their portfolio(s) must use the values presented in Table A below. The GHG Planning Price is equivalent to the marginal cost of GHG abatement associated with the 42 MMT Scenario for the years 2018 to 2026 (i.e., a curve that slopes upward from ~\$15/ton to ~\$23/ton), followed by a straight-line increase from ~\$23/ton in 2026 to \$150/ton in 2030. The straight-line increase is intended to fill the gap for the years for which RESOLVE does not produce GHG abatement cost values (i.e., 2027, 2028, and 2029).

TABLE A

GHG Planning Price (\$ per metric ton of CO2e) for use in IRP	
2018	\$15.17
2019	\$16.05
2020	\$16.94
2021	\$17.88
2022	\$18.86
2023	\$19.91
2024	\$21.02
2025	\$22.19
2026	\$23.44
2027	\$55.08
2028	\$86.72
2029	\$118.36
2030	\$150.00

RESOLVE did not explicitly model resource adequacy or GHG-free energy; thus the IRP team relied on internal experience and expertise to estimate future costs of these attributes. The intrinsic value of a PCC1 REC is residual of the levelized cost of a new resource less the value of the brown power, with a floor price of \$0. Because renewable resources continue to decline in costs, the cost of RECs should decline through time as well. With solar expected to be the dominant renewable resource in California, REC forward prices in this IRP were derived by utilizing E3 levelized cost data and energy prices forecasted by RESOLVE. PCC2 REC prices are assumed to be pegged to PCC1 prices multiplied by a

⁴ Used annual load-weighted hourly energy costs for CAISO zone outputs of the 42MMT mid-AAEE, mid-AAPV scenario available in the RESOLVE Model Package on the Preliminary Modeling Results page (<http://www.cpuc.ca.gov/irp/prelimresults2017/>)

ratio of 0.35, then adding the GHG cost of the resource required to firm and shape the REC.⁵ The GHG emissions rate of the firming and shaping resource was assumed to be equal to the average annual system power emissions rate for each respective year. Assumptions for market prices of wholesale energy and its associated attributes are displayed in Figure 6.

Figure 6: Price Assumptions for Wholesale Products

	2018		2022		2026		2030	
Energy (\$/MWh)	\$	41.78	\$	40.53	\$	46.32	\$	87.40
GHG-Free (\$/MWh)	\$	2.50	\$	3.04	\$	3.69	\$	4.49
Resource Adequacy (\$/kW-mo)								
PCC1 REC (\$/REC)	\$	17.00	\$	11.47	\$	22.68	\$	-
PCC2 REC (\$/REC)	\$	6.00	\$	69.69	\$	14.99	\$	36.00

REC price results for 2030 appear anomalous at first glance: a PCC2 REC is more valuable than a PCC1 REC, which has no value. However, power prices are forecasted to be nearly \$90/MWh in 2030, while the levelized cost of building a new solar plant is \$66/MWh. An entity would be better off economically by contracting with or developing a new facility than paying anything for a PCC1 REC. PCC2 RECs are priced as such because of the carbon cost required to firm and shape the resource. The underlying assumption, of course, is that the resource potential of solar power is nearly unlimited.

Study Results

[Attachment A to D.18-08-018, Page 7]

Use this section to present the results of the analytical work described in Section 2: Study Design.

The results of the portfolio analysis are discussed in this section.

Portfolio Results

[Attachment A to D.18-08-018, Page 6/8]

Provide a list of all portfolios developed. Each portfolio's content must be itemized in the Data Template Excel workbooks referenced below. A portfolio clearly identifies:

- *New resources that the LSE plans to invest in. This does not include future contracts with existing resources.*
- *Existing resources that the LSE owns or contracts with. This includes future contracts with existing resources. Existing resources are those on the 3/15/2018 NQC List,6 or projects not yet online but that have secured a contract and may therefore be identified in the Commission's RPS Contracts Database or an Application filed at the Commission, as of January 1, 2018.*

Each LSE must produce a Conforming Portfolio. Alternative Portfolios are also permitted, provided that any deviations from the Conforming Portfolio are explained and justified. The LSE will identify one portfolio as its Preferred Portfolio.

GHG Accounting in IRP Planning

LSEs should use the Clean Net Short Methodology and calculator tool for GHG accounting.

RCEA's share of the Reference Portfolio largely aligns with the broader Program goals, however, its current portfolio does not meet the SB 350 requirement that 65 percent of RCEA's RPS needs must be

⁵The ratio of 0.35 was calculated by dividing 2018 PCC2 REC prices by PCC1 REC prices; the ratio is expected to remain constant for the study period.

⁶ <http://cpuc.ca.gov/irp/filingtemplates/>

met by renewable resources under long-term (at least 10 year) contracts by 2021 (Figure 7). RCEA is committed to meeting this requirement.

Figure 7: Minimum Long-term Renewable Generation Contract Requirements

	2018	2022	2026	2030
Load (MWh)	695,773	646,143	633,983	623,060
Minimum RPS Compliance (%)	29%	36%	43%	50%
Minimum RPS Compliance (MWh)	201,774	235,196	273,881	311,530
Required Contracted Quantity (MWh)	0	152,877	178,022	202,494

RCEA’s guidelines give preference to existing local biomass and small hydro generators, and new on- and offshore wind, solar, and wave generation resources. RCEA is evaluating the option of entering into long-term contracts with existing renewable generators within Humboldt County, small hydro facilities that are in Northern California in nearby counties, as well as the contracting or development of new generation capacity through competitive solicitations in the next two years.

Because RCEA has not issued an RFO for long-term contracts from existing generators, the cost of those contracts is unknown. The levelized cost of energy from new resources, however, was modeled by RESOLVE and is publicly available. For this reason, the IRP team adopted the candidate resource costs from the RESOLVE model in this study.⁷ Wave and offshore wind resources were excluded from portfolio construction. Wave technology is not yet commercially viable and onshore wind is currently more cost effective than offshore wind generation technology. The IRP team decided to add the lowest cost resources from a selection of on-shore wind, utility scale solar, local biomass, and local small hydro in the RCEA Conforming Portfolio.

Utilizing the Clean Net Short (CNS) methodology and RCEA’s proportional share of the Reference Portfolio resources, RCEA forecasts annual emissions of just over 62,000 metric tons for 2018 but rising to over 211,000 metric tons for 2022. RCEA will thus have to procure resources in addition to its pro-rata share of the Reference Portfolio in order to meet its GHG emissions quota of 111,000 metric tons.⁸ The primary reason for the sharp increase in emissions is because RCEA is currently serving a portion of its load with carbon-free resources under contracts that expire in 2022. However, RCEA plans to continue its 80 percent carbon-free procurement for the foreseeable future, which will avert this increase in emissions. The final RCEA Conforming Portfolio is presented in Figure 8.

The annual generation volumes that comprise the Conforming Portfolio in Figure 8 do not reflect a policy commitment for procurement. The volumes in this portfolio also make no affirmative statement on future contracts. Annual generation volumes for Local Biomass reflect only existing contracts. The volumes for Batteries reflect planned construction that is not yet under contract. Annual generation volumes for all other resource types (Small Hydro, Solar, Wind, Geothermal, NW Hydro) are projections, and are not based on any existing resource-specific contracts or commitments. See Attachment A which outlines the RCEA BoD approved Program Launch Guidelines for energy generation strategies and targets through April 2022. RCEA Board of Directors express their concerns with the annual generation volumes in the Conforming Portfolio in the Board Minutes (Attachment B).⁹

⁷ In the RESOLVE Documentation: CPUC 2017 IRP Inputs and Assumptions (Draft). July 2017. http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/Programs/ElectPowerProcurementGeneration/irp/17/RESOLVE_CPUC_IRP_Inputs_Assumptions_2017-07-19_clean.pdf

⁸ As recorded in Rulemaking 16-02-007 ALJ/JF2/jt2, 5/28/2018

⁹ Final Board approved minutes will be available after August 20, 2018: <https://redwoodenergy.org/about/board-of-directors/>

Figure 8: RCEA Conforming Portfolio ¹⁰

	2018	2022	2026	2030
Load (MWh)	695,773	646,143	633,983	623,060
Minimum RPS Compliance (%)	29%	36%	43%	50%
Minimum RPS Compliance (MWh)	201,774	235,196	273,881	311,530
Required Contracted Quantity (MWh)	0	152,877	178,022	202,494

Annual Generation (MWh)	2018	2022	2026	2030
Existing Local Biomass	163,188	48,018	0	0
Existing Local Small Hydro	0	17,520	17,520	17,520
Solar	0	76,439	89,011	101,247
Wind	0	76,439	89,011	101,247
Batteries	0	1,822	1,577	1,507
Geothermal	0	0	0	4,424
Short Term PCC1 REC Contract	0	0	8,291	7,702
Short Term PCC2 REC Contract	38,586	14,958	68,470	77,882
Additional Carbon Free (NW Hydro)	393,430	296,677	301,776	264,800
System Power	100,568	114,270	58,326	46,729
Total MWh	695,773	646,143	633,983	623,060
GHG Emissions (metric tons)	65,260	56,154	61,867	58,640

This portfolio places RCEA on a trajectory to easily meet its 2030 GHG emissions quota of 111,000 metric tons. The expected 2030 emissions of the Conforming Portfolio, assuming 80 percent carbon-free power with the remainder filled with system power, is less than 56,000 metric tons CO₂ as determined by the CNS calculator. It will also allow RCEA to meet the 50 percent renewable energy mandate by 2030, with 65 percent of the renewable supply procured under long-term contracts and the residual procured under short term purchases. The RCEA Conforming Portfolio is also the RCEA Preferred Portfolio.

Local Air Pollutant Minimization

[Attachment A to D.18-08-018, Page 9]

Describe and provide quantitative evidence to support how the LSE's Preferred Portfolio minimizes localized air pollutants and other GHG emissions with early priority on disadvantaged communities.

In order to identify "disadvantaged communities" that are located within its service territory, each LSE must use CalEnviroScreen 3.0 to identify the top 25% of impacted census tracts on a statewide basis and the top 5% of census tracts without an overall score but with highest pollution burden. LSEs must specify:

- *Customers served in disadvantaged communities along with total disadvantaged population number served as a percentage of total number of customers served*
- *What current and planned LSE activities/programs, if any, impact disadvantaged communities or contribute to economic development within disadvantaged communities (e.g. list all individual programs carried out in/for disadvantaged communities, along with description of program)*

¹⁰ All contracted and delivering CEC RPS qualified resources are included in the 2018 supply plan.

- *Estimates of annual emissions of nitrogen oxides and particulate matter¹¹ (NOx and PM2.5, at a minimum), including emissions from normal plant operations and from plant cycling. As stated above, the Commission delegates to staff and the assigned ALJ to define a GHG accounting methodology apportioning responsibility to individual LSEs. The method may also be used to estimate localized pollutants such as nitrogen oxides and particulate matter.*

RCEA's service area includes all of Humboldt County. CalEnviroScreen 3.0's mapping tool shows that no part of Humboldt County includes the state's top 25% of impacted census tracts, or census tracts with the highest pollution burden (Figure 9). Therefore, there are no "disadvantaged communities" in RCEA's service area according to CalEnviroScreen 3.0 criteria. Figure 9 displays the CalEnviroScreen 3.0 results for Humboldt County.

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 pollution and recognizes that lower income residents can be the most vulnerable to pollution.

RCEA will meet approximately one-fourth of its 2018 load using RPS power from two local biomass plants. As part of the solicitation process of procuring these biomass power resources, 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 our Board, RCEA's power purchase agreements with the biomass power providers include clauses that allow the contracts to be canceled on the grounds of non-compliance with applicable laws, including air quality standards.

The two biomass plants providing RPS power for RCEA are the only local sources of NOx or PM2.5 emissions associated with our program. Assuming emission rates per MWh for these pollutants remain constant relative to historic data for the two plants, expected emissions rates are shown in Figure 9.

¹¹ LSEs are encouraged to use factors from the CEC Cost of Generation (2015) and the USEPA AP-42, the EPA's compilation of air emission factors.

Figure 9: CalEnviroScreen Results for Humboldt County

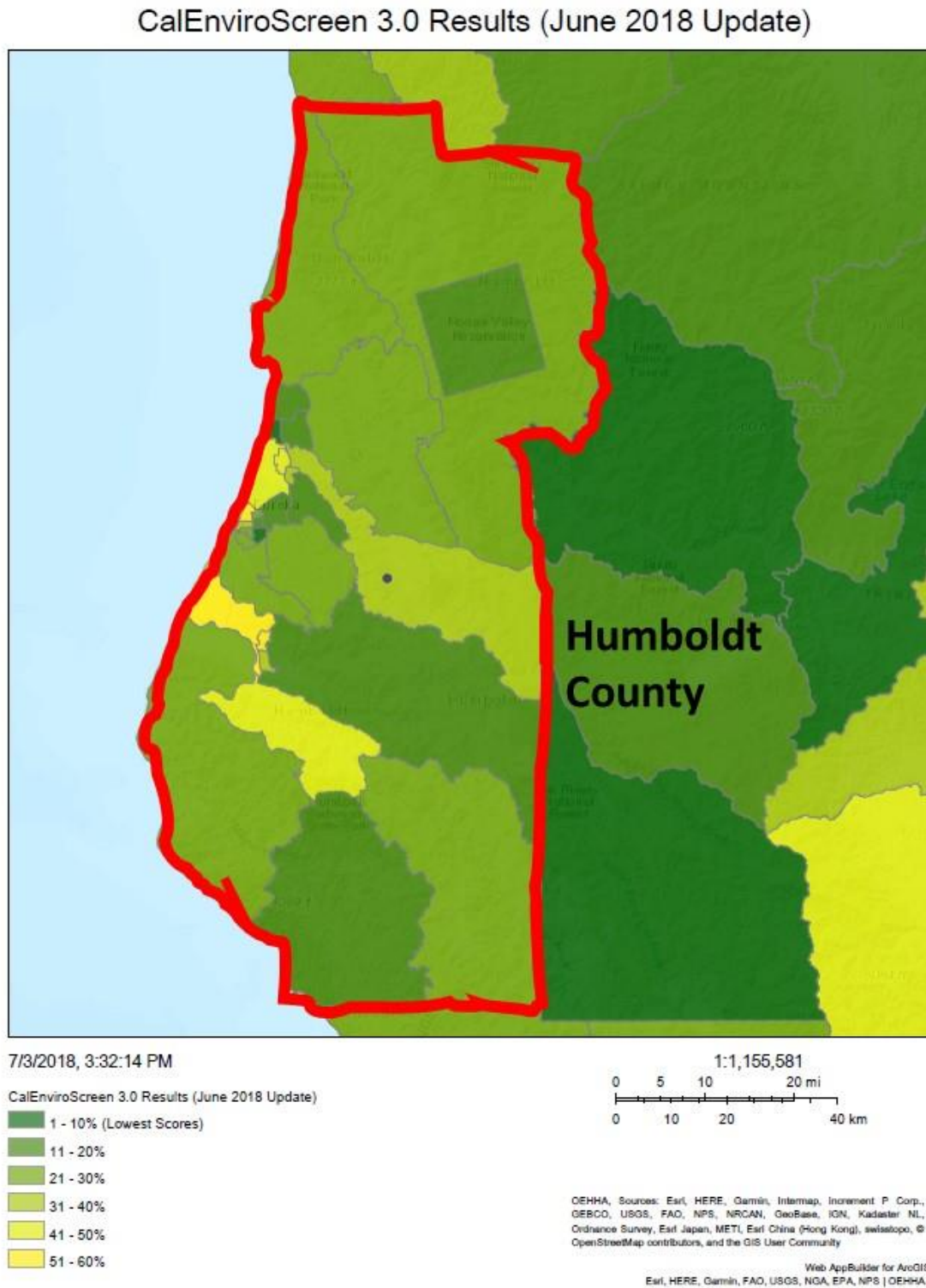


Figure 10: Estimates of annual emissions of nitrogen oxides and particulate matter

	2018	2022	2026	2030
Biomass MWh	177,828	48,018	0	0
Nox (tons)	319	120	0	0
PM2.5 (tons)	61	24	0	0

While it is not a stated objective of RCEA’s guidelines to minimize local air pollutants, RCEA’s long-term program objectives aim to construct a clean generation portfolio through the extensive use of renewable and GHG-free energy. With the exception of resource adequacy, RCEA intends to construct or contract exclusively with renewable or GHG-free generation resources. RCEA will, however, continue to rely on unspecified system power for short-term energy needs. In the first year of operations, RCEA’s default generation portfolio achieved an 89 percent GHG-free and a 44 percent renewable energy mix, resulting in an energy supply that possessed both a greater renewable content and a lower GHG emission rate than that of the incumbent utility. RCEA’s long-term energy procurement strategy is not expected to negatively impact local air quality.

Cost and Rate Analysis

[Attachment A to D.18-08-018, Page 9]

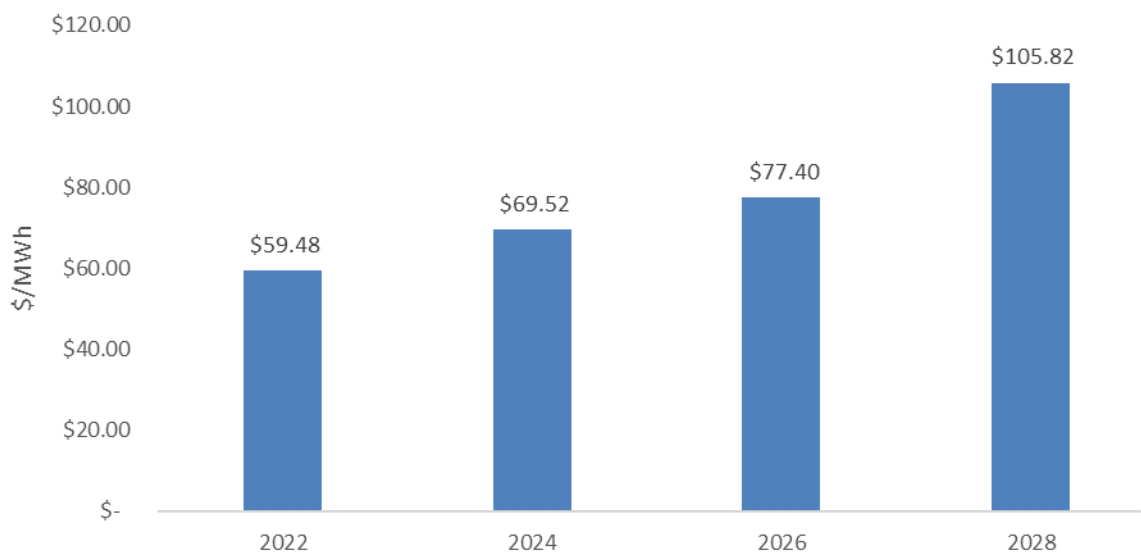
Describe and provide quantitative information to reflect how the LSE anticipates that its Preferred Portfolio will affect the costs for its customers. For this analysis, assume other LSEs procure resources in a manner consistent with the Reference System Plan.

All LSEs should consider cost and rate impacts on their customers when planning and submitting their individual IRPs, and, at a minimum, include a narrative description of their approach in support of this requirement.

Wholesale procurement costs were forecasted using a long-term Financial Model developed by the IRP team that utilized the various inputs discussed in prior sections. Power prices, new resource costs, and resource assumptions were made available through the IRP assumptions and documentation.¹² RA capacity prices and GHG-free energy costs were determined through discussions with market participants. Total wholesale procurement costs are forecasted in Figure 11.

¹² E3. RESOLVE Documentation: CPUC 2017 IRP Inputs and Assumptions (Draft). July 2017. http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPowerProcurementGeneration/irp/17/RESOLVE_CPUC_IRP_Inputs_Assumptions_2017-07-19_clean.pdf

Figure 11: Conforming Portfolio Wholesale Procurement Costs to Serve Retail Load (\$/MWh)



The cost analysis studies only the wholesale supply components of serving retail load; as a CCA, the incumbent IOU is still responsible for transmission and distribution of the energy to the retail level.

Since the 2018 RCEA portfolio relies heavily on market purchases to serve its load, the Program benefitted from lower energy prices earlier on in the year. Market prices in Figure 6 increase modestly between 2018 and 2026, at which point GHG planning prices rise exponentially, with power prices following closely behind. There is a breakthrough in wholesale costs in 2030 with high power prices, but while high prices translate to higher costs for load serving entities, there is a similar benefit for generators that sell into high priced environments. Outside of resources already under contract, incremental RPS compliance costs should decline to near zero.

Resource Adequacy

[Attachment A to D.18-08-018, Page 10]

Additionally, LSE Plans should account for any resources subject to the cost allocation mechanism (CAM) in their portfolios. In estimating the resource adequacy benefits of resources subject to the CAM in its Conforming Portfolio, each LSE should refer to the most recent year-ahead CAM resource list available on the Commission's Resource Adequacy Compliance Materials webpage.¹³ The year-ahead CAM list itemizes the resource adequacy value benefiting all LSEs within a given IOU service territory, by month and year. In developing its IRP portfolios, LSEs should assume its future resource adequacy obligations are reduced by its proportional share of the resource adequacy value itemized in the year-ahead CAM list. An LSE's proportional share is determined by its year-ahead share of peak load out of total coincident peak load for the IOU service territory the LSE is located in, as assigned in the Commission's annual resource adequacy process. The LSE's proportional share is assumed static through the IRP planning horizon for the purpose of projecting its share of CAM resource adequacy value, but will be updated each IRP cycle based on the current proportional share assignment from the Commission's annual resource adequacy process. LSEs should not make assumptions or predictions on what resources may be procured on behalf of all load and subject to the CAM in the future.

LSEs that serve load within a CAISO-defined local capacity area must report the LSE's own assessment of how it will meet the local capacity needs projected in the most recent CAISO Transmission Plan.¹⁴ In doing so, LSEs should use the Local Capacity Technical Analysis (LCT) reports for years 2018 and 2022 associated with the CAISO board-approved 2017-18 Transmission Plan

¹³ Refer to the Commission's Resource Adequacy Compliance Materials, available at: <http://cpuc.ca.gov/General.aspx?id=6311>.

¹⁴ CAISO has ten primary local capacity areas (i.e. transmission-constrained load pockets): Humboldt, North Coast North Bay, Sierra, Stockton, Greater Bay, Greater Fresno, Kern, LA Basin, Big Creek Ventura, San Diego Imperial Valley.

when developing the local needs analysis of their Conforming Portfolios. LSEs may use the 2017 IEPR-based final LCT reports for 2019 and 2023 (expected to be available by the end of May 2018 at the latest) to develop a local needs analysis in their Alternative Portfolios.¹⁵ LSEs should use the Commission's resource adequacy program's definition of local capacity areas for the purposes of the local needs analysis. These areas are: Greater Bay Area, Big Creek Ventura, CAISO System, LA Basin, San Diego IV, and Other PG&E.

Resource adequacy (RA) costs are inclusive of the estimated 17 MW resulting from the cost allocation mechanism (CAM).

The RCEA footprint spreads across both the Greater Bay and Humboldt local capacity areas. The 2019 and 2023 Local Capacity Technical Reports both conclude that there will be sufficient capacity available to serve the local capacity area, in large part due to PG&E's repowered Humboldt Bay Generating Station which became commercially operational in September 2010. RCEA assumes it will remain online through this study period.

The contracts that RCEA currently has in place with local biomass generators contributes to reliability in the local capacity area. Additionally, RCEA's focus on the procurement of local resources likely means that the long-term renewable resource procurement will also be located in these local capacity areas. RCEA is currently exploring the development of an offshore wind facility in the next five years that would reduce dependence on the PG&E facility. In coordination with its partners on the project, RCEA submitted an interconnection study request with the California Independent System Operator (CAISO) earlier this year.

RCEA has and will continue to comply with the CPUC RA program.

Action Plan

[Attachment A to D.18-08-018, Page 11]

This section will present all the actions that the LSE proposes to take in the next 1-3 years to implement its LSE Plan.

The IRP defines RCEA's need for new resources and investigates different generic resource types with an objective of presenting both quantitative and qualitative analysis of the benefits of pursuing different resource technologies to fulfill RCEA's load, RPS, and GHG requirements. RCEA's action plan addresses resource acquisitions and other concerns that appeared over the course of this IRP analysis.

- ✓ RCEA's program goals ("Launch Period Guidelines") largely align with a proportional share of the Conforming Portfolio.
 - RCEA will begin to solicit offers for long-term contracts for the already existing local biomass and local small hydro generators and explore acquisition options for new solar and wind generators.
 - Along with partners in the Schatz Energy Research Center and PG&E, RCEA will be pioneering a solar plus storage microgrid project at the Arcata-Eureka Airport. It will consist of a 2.3 MW solar array attached to a 2MW/8MWh battery and is the first announced solar and battery resource for RCEA.
 - RCEA will continue to contribute to the development of new renewable energy resources as it explores opportunities to acquire offshore wind resources.

¹⁵ LCT reports are available at: www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx.

- ✓ Continuing with the current 80 percent GHG-free procurement goals will keep RCEA under its quota of 111,000 metric tons of GHG emissions in the statewide 2030 42 million metric ton scenario.
- ✓ RCEA will continue to monitor the RA environment and act accordingly to comply with the RA program.
- ✓ RCEA will continue to monitor energy economic fundamentals to ensure that its resource strategy provides rate payers with a maximum amount of local renewable energy at a competitive cost.
 - Wholesale market prices 2026 and beyond are a point of concern, as the rapidly rising GHG planning prices drive power prices towards \$100/MWh. If it is both more economically and environmentally effective to reduce dependence on the wholesale market and rely more upon RCEA owned or contracted resources, RCEA will explore resource acquisitions incremental to the Preferred Portfolio beyond 2026 to remain cost competitive

Barrier and Risk Analysis

[Attachment A to D.18-08-018, Page 12]

Identify any market, regulatory, financial, or other barriers or risks associated with the LSE acquiring the resources identified in the Preferred Portfolio. Include an analysis of any risks associated with potential retirement of existing resources on which the LSE intends to rely in the future.

RCEA foresees a number of risks to successfully implementing its Preferred Portfolio. Risks associated with market volatility can be managed with a risk management program. These risks include power prices, natural gas prices, and loads. All of these variables are interconnected, and any number of events, such as a major transmission/gas pipeline outage or severe weather can cause a spike in power prices. These events are uncontrollable, but not necessarily unforeseeable. Weather, which is strongly correlated to loads, can be forecasted. RCEA's risk management program continually monitors conditions, keeping RCEA in a position to take action when necessary. In developing its CCA program, RCEA's Board adopted a risk management policy¹⁶ and established a risk management team that meets monthly to review and act on risk-related information.

RCEA is expected to be exposed to the wholesale market even after its resource acquisitions. A hedging program allows RCEA to lock in energy prices at a level that provides price and supply certainty and reduces exposure to market volatility.

California set aggressive targets with respect to renewable energy and GHG emissions. Meeting these targets is predicated on technology continuing to evolve and costs continuing to decline. While renewable energy penetration and cost reductions have exceeded nearly all forecasts, it is possible that the opposite will also occur. If renewable energy and battery price projects do not decline as they are anticipated to, the cost of RPS and GHG compliance will put upward pressure on rates.

Regulatory risk is perhaps the most uncertain. The adoption or repeal of a piece of legislation can entirely overhaul the current RPS and GHG compliance targets. Remaining cost competitive is in part

¹⁶ RCEA Energy Risk Management Policy: <https://redwoodenergy.org/wp-content/uploads/2018/04/RCEA-ERMP-updated-April-2018.pdf>

dependent on where the power charge indifference adjustment (PCIA) replacement charges are set. Too high of a PCIA charge will make it difficult to stay competitive.

Lessons Learned

[Attachment A to D.18-08-018, Page 14]

Document any suggested changes to the IRP process for consideration by the Commission. Explain how the change would facilitate the ability of the Commission and LSEs to achieve state policy goals.

RCEA's IRP team produced several takeaways in this foundational IRP, primarily that the electric utility industry is fluid. Changes have been observed since RCEA's initial feasibility study was produced in 2016 on seemingly all fronts, specifically in the market, in regulatory requirements, and technologically.

The view on the future of the natural gas market is different today than it was just two years ago. Natural gas forward price curves indicate that spot market prices are consistently lower than the commodity prices used in the RESOLVE model, which becomes more pronounced with each successive year.¹⁷ The consequence is that future prices in the model may be overvalued relative to current market expectations, which are presumably the price levels at which LSEs are able to acquire energy today for delivery of energy at a future date. Future price forecasts affect everything from retail rates to the valuation of potential resource acquisitions.

The inauguration of a new administration in 2017 produced many changes on the regulatory front at the Federal level. One of the consequential decisions was effectively rescinding the Clean Power Plan. While the decision is not expected to have a big impact on California's energy policy and future resource mix, it may change how regulators in other states within the Western Interconnect make decisions, which will affect the California market.

The technology of energy efficiency and renewable generation is evolving. RCEA assumed a nominal rate of load growth during its feasibility study; however, the 2017 IEPR mid-AAEE, mid-AAPV scenario now forecasts load loss through time. The technology becomes both more efficient and cost effective as it progresses, but the IRP assumes a single trajectory for the pace of technology development. Any change in that development can have a large effect on demand, the efficacy of energy efficiency, and the expansion of renewable energy development.

Future plans resulting from integrated resource planning must be continually monitored and updated as the planning environment evolves.

¹⁷ This phenomenon is also acknowledged in the IRP Filing Requirements Reference Guide version May 25, 2018.

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.

Conforming Portfolio – Each LSE must produce a “Conforming Portfolio” that is demonstrated to be consistent with the Reference System Portfolio according to the following criteria: (1) use of either the GHG Planning Prices or the LSE-Specific 2030 GHG Emissions Benchmark, (2) use of input assumptions matching those used in developing the Reference System Portfolio, and (3) consistent with the 2017 IEPR “mid Baseline mid AEE mid AAPV” forecast, unless superseded by Administrative Law Judge ruling.

Data Template – Data provided by the LSE should be reported in the “Baseline Resource Data Template” and the “New Resource Data Template” provided by the Commission. “Baseline” means existing resources and costs. “Existing” includes resources on the 3/15/2018 NQC List, or projects not yet online but that have secured a contract and may therefore be identified in the Commission’s RPS Contracts Database or an Application filed at the Commission, as of January 1, 2018. “New” means any new (incremental to the baseline) resources and costs associated with a particular LSE portfolio.

Disadvantaged Communities – For the purposes of IRP, and consistent with the results of the California Communities Environmental Health Screening Tool Version 3 (CalEnviroScreen 3.0), “disadvantaged communities” refer to the 25% highest scoring census tracts in the state along with the 22 census tracts that score in the highest 5% of CalEnviroScreen’s pollution burden, but which do not have an overall CalEnviroScreen score because of unreliable socioeconomic or health data.

GHG Emissions Benchmark – Each LSE filing a Standard LSE Plan must use either the GHG Emissions Benchmark or GHG Planning Price in developing its Conforming Portfolio. The LSE-specific benchmarks have been provided in an ALJ ruling. If the total emissions attributable to the LSE’s preferred portfolio exceed its GHG Emissions Benchmark for 2030, the LSE must explain the difference and describe additional measures it would take over the following 1 - 3 years to close the gap, along with the cost of those measures.

GHG Planning Price – The GHG Planning Price is equivalent to the marginal cost of GHG abatement associated with the 42 MMT Scenario for the years 2018 to 2026 (i.e., a curve that slopes upward from ~\$15/ton to ~\$23/ton), followed by a straight-line increase from ~\$23/ton in 2026 to \$150/ton in 2030, as shown in Table A. Each LSE must use either the GHG Planning Price or GHG Emissions Benchmark in developing its Conforming Portfolio.

IRP Planning Horizon – The IRP Planning Horizon will typically cover 20 years. However, for the purposes of this IRP 2017-18 cycle, the IRP Planning Horizon will cover only up to the year 2030.

Long term – 10 or more years (unless otherwise specified)

Portfolio – A portfolio is a set of supply and/or demand resources with certain attributes that together serve a particular level of load.

Preferred Portfolio – Among all the portfolios developed by the LSE, the LSE will identify one as the most suitable to its own needs, deemed its “Preferred Portfolio.” Any deviations from the Conforming Portfolio must be justified and explained.

Reference System Plan – The Reference System Plan refers to the Commission-approved integrated resource plan that includes an optimal portfolio (Reference System Portfolio) of future 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 Reference System Plan refers to the Commission-approved portfolio that is responsive to statutory requirements per Pub. Util. Code 454.51; it is part of the Reference System Plan.

Scenario – A scenario is a portfolio together with a set of assumptions about future conditions.

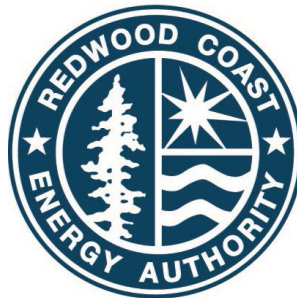
Short term – 1 to 3 years (unless otherwise specified)

Standard LSE Plan – A Standard LSE Plan is the type of integrated resource plan that an LSE is required to file if its assigned load forecast is ≥ 700 GWh in any of the first five years of the IRP planning horizon.

Standard LSE Plan Template – Each LSE required to file a Standard LSE Plan must use the Standard LSE Plan Template according to the instructions provided herein.

(End of Glossary)

GUIDELINES FOR THE REDWOOD COAST ENERGY AUTHORITY COMMUNITY ENERGY PROGRAM LAUNCH-PERIOD STRATEGY AND TARGETS



Adopted September 19, 2016

OVERVIEW & GOALS

The Redwood Coast Energy Authority (RCEA) is proceeding with the launch of a community choice energy program scheduled to commence service to customers in May of 2017. Based on the groundwork established by the RePower Humboldt strategic plan for developing local renewable energy, in June of 2015 the RCEA Board of Directors voted to proceed with developing a community choice energy program for Humboldt County with the following core goal:

Maximize the use of local renewable energy while providing competitive rates to customers.

In addition to this over-arching goal, the program will be designed to pursue the following aspirations and community benefits:

- Environmental Quality
- Local Control and the Ability to Pursue Local Priorities
- Economic Development
- Energy Independence
- Customer Rate-savings, Choice, and Community Programs

Implementing a community choice energy (CCE) program that furthers these goals will be an ongoing and evolving process. Outlined below are targets and objectives for the initial launch phase of the program during years 1-5 of operation. These targets and objectives will have to

be adaptively managed based on market conditions and local considerations, but will be used as a guiding framework for the development of RCEA's CCE Program Implementation Plan, power procurement strategy, and the development of local generation projects and programs.

FINANCIAL TARGETS

- A target of approximately 5% of the available program annual budget will be allocated to customer rate savings (based on parity with PG&E generation rates and with PG&E PCIA fees factored in). This equates to a total customer rate savings that averages at least \$2 million per year over the first 5 years, for a targeted total cumulative customer rate savings of at least \$10 million over the first 5 years of operation.
- The program will target building a rate-stabilization/reserve/contingency fund of \$35 million by the end of year five under projected market conditions. The program will be designed to target a minimum reserve of at least \$10 million even under adverse market conditions.
- Over the first 5 years, the program will aim to retain and/or redirect \$100 million dollars or more of rate-payer dollars back into Humboldt County when taking into consideration local power-procurement, customer rate-savings, local-program spending, and allocations toward building the reserve/contingency fund.

POWER OBJECTIVES

- At least 5% more renewable energy (as defined by state law) than PG&E's power mix.
- At least 5% lower greenhouse gas emission rate than PG&E mix.
- Maximize the use of local renewable energy to the extent technically and economically feasible and prudent.
- Strongly support energy efficiency and conservation as core strategies toward achieving the program's environmental, economic, and community goals.

GENERATION PORTFOLIO TARGETS

Existing Local Biomass

- Issue a Request for Offers targeting power purchase agreements with 1-2 existing facilities.
- Structure overall biomass procurement strategy around local waste-management and forest restoration priorities and needs.
- Include environmental, community, and economic considerations in selection process.
- Contingent on price and market conditions, contract for a target of around 20MW of local biomass energy (about 15% of the total RCEA power portfolio).

Existing Local Small Hydroelectric

- Pursue contracting with a target of 2MW of existing local small hydro.
- Ensure that any contracts are structured to support and prioritize the operators' water-management and environmental quality objectives.

New Local Solar Power

- **Feed-in-tariff power procurement program for small generators**
 - <1MW small/medium renewable generators (solar and other technologies)
 - Eligible projects are designed primarily for wholesale power production (not focused on meeting on-site energy loads).
 - Standardized, upfront purchase price, projected to be in the range of \$80-100/MWh to facilitate project financing.
 - Standardized, upfront, and straightforward contract terms and duration to facilitate project financing.
 - Initial power portfolio allocation to the feed-in-tariff program will be targeted at 6MW.

- **Utility-scale Solar**

In parallel to the feed-in-tariff program RCEA will pursue the development of additional wholesale-generation solar projects, which could be developed by RCEA and/or third parties in pursuit of overall power portfolio solar content targets:

 - Initial target of 5MW of new local wholesale solar online before the end of 2018.
 - Launch-phase target of 15MW of utility-scale/wholesale solar online by the end of year 5 of operations.
 - Focus project development on underutilized/idle public and industrial sites to limit impacts related to other beneficial uses such as agriculture, economic development, habitat, and open space.

Additional Power Resources

To meet and balance over-arching objectives for rates, renewable energy %, and greenhouse gas emissions as well as to match power generation availability to customer loads demands, the launch-period portfolio will incorporate the following additional power sources:

- Renewable generation projects--wind, solar, geothermal, etc--located outside the County.
- California and/or Pacific Northwest hydroelectric power (which is renewable and emissions-free, but cannot be counted toward CA state renewable portfolio standard requirements). This will not include any power from the Klamath River dams.
- Unspecified “system power” from the CAISO power market pool (while power from the pool is not traceable to any specific generator, in northern CA this power is predominantly generation from natural gas and large hydro power facilities).

Future/Long-term Generation

- **New Local On-shore Wind Generation**
 - Assess the possibility for up to 50MW of local on-shore wind energy generation.
 - The most viable site for local on-shore wind is Bear River Ridge west of Rio Dell and South of Ferndale.
 - While there are other possible sites in the area, Bear River Ridge has the best wind resource in the County (it is one of the top wind resource areas in the state), Bear River Ridge property owners are willing and interested in developing a wind project, and there was considerable environmental and technical study and evaluation

previously conducted which, if utilized, would reduce the development costs and timelines of a potential project.

- ***New Local Small-scale Hydroelectric***
 - Evaluate options for the development of new small-scale hydroelectric that would be compatible with environmental and cultural priorities.
- ***Offshore Wind Energy***
 - While not yet deployed in California, offshore wind energy generation is an established technology. The wind resource off of the Samoa Peninsula coastline is one of the best in North America, and the on-shore infrastructure on the peninsula appears well-suited to accommodate offshore wind development.
 - During the initial 5-year launch-phase of Program, RCEA will allocate resources to moving forward with community and stakeholder engagement, site selection, environmental review, and project scoping.
- ***Wave Energy***
 - Wave energy technology is in an early stage of development. During the program launch phase, RCEA will build on the previous WaveConnent and CalWave projects to explore and evaluate opportunities for local wave-energy research, development, and pilot-deployment.

PROGRAMS

Enhanced Solar Net-Energy-Metering (rate-based program)

- Self-generation power credited to customer's bill at retail rate plus \$0.01/kWh (+5-10% above base retail generation rate).
- Excess generation credits roll-over from year to year and never expire.
- Excess generation credits can be cashed-out for full retail value.

100% Renewable Energy Option (rate-based program)

- Voluntary opt-up option for premium price (based on actual cost of service).
- Large hydro and system power components of base RCEA power mix replaced with renewable energy (non-local solar, wind, geothermal, etc).
- Evaluate 100% solar and/or 100% local renewable options in the near-term (in or after 2018, after launch and ramp-up of operations).

Programs budget target of an initial allocation of up to \$1,000,000 per year for:

- ***Solar and Energy-storage Technical Assistance***

Program emphasis will be on public-agency and community facilities, especially critical infrastructure such as water/wastewater treatment and emergency response.
- ***Electric Vehicle Charging Infrastructure***

Supporting the adoption of electric vehicles provides multiple benefits aligned with CCE Program goals: significant reductions in greenhouse gas emission compared to petroleum-powered vehicles; lower \$/mile fuel costs compared to petroleum vehicles, increasing CCE customer-load base, and providing a flexible electricity demand load that has the future potential to be managed to support the integration of renewable energy.

- ***Energy Efficiency and Conservation***
New programs that support and enhance the existing programs offered by RCEA, PG&E, the Redwood Community Action Agency, and others.
- ***Match funding for State, Federal, and Foundation Energy Grants***
The majority of grant funding opportunities require some level of local match funding, so tagging/reserving a flexible component of the CCE program budget to be available as-needed for use as energy-related grant match funding will support bringing resources into Humboldt County to pursue our community energy goals.

Attachment B



Redwood Coast Energy Authority

633 3rd Street, Eureka, CA 95501

Phone: (707) 269-1700 Toll-Free (800) 931-RCEA Fax: (707) 269-1777

E-mail: info@redwoodenergy.org Web: www.redwoodenergy.org

DRAFT BOARD OF DIRECTORS SPECIAL MEETING **MINUTES**

Humboldt Bay Municipal Water District Office
828 7th Street, Eureka, CA 95501

Monday, July 23, 2018

A special meeting of the Board of Directors of the Redwood Coast Energy Authority was held on the above date and place at 3:46 p.m. with Chair Sheri Woo presiding. Notice of this meeting was posted on July 18, 2018, and the agenda was posted on July 20, 2018.

PRESENT: Directors Austin Allison, Dean Glaser, Dwight Miller, Bobbi Ricca, Michael Sweeney, Frank Wilson, Vice-Chair Michael Winkler, Chair Sheri Woo. Estelle Fennell arrived at 4:21 p.m.

ABSENT: None.

STAFF PRESENT: Acting Executive Director Lori Biondini, Power Resources Manager Allison Campbell, General Counsel Nancy Diamond, Power Resources Director Richard Engel, Power Resources Specialist Jocelyn Gwynn, Account Services Manager Mahayla Slackerelli.

ORAL COMMUNICATIONS

Vice-Chair Winkler informed everyone that Terra-Gen would hold public forums on their Monument Ridge wind project on Wednesday, July 25 at the Fortuna Veterans Hall, and again on Thursday, July 26 at the Aquatic Center in Eureka.

Chair Woo invited public comment. No member of the public came forward to speak. Chair Woo closed public comment.

COMMUNITY CHOICE ENERGY (CCE) BUSINESS

Chair Woo determined that a CCE quorum was present.

NEW CCE BUSINESS - Integrated Resource Plan (IRP)

Power Resources Manager Campbell reported on the 2018 Integrated Resource Plan (IRP) which the California Public Utilities Commission (CPUC) required all load-serving entities to file by August 1. Staff Manager Campbell explained that the CPUC is doing long-term planning and wants to integrate all load-serving entities in projected total greenhouse gas emissions for 2030. For this compliance filing, Ms. Campbell stated the CPUC required RCEA's portfolio not exceed 111,000 metric tons of CO2 emissions in 2030.

Chair Woo stated the public might interpret this IRP as saying that RCEA has no biomass contracts by 2026.

Director Glaser stated that he opposed leaving RCEA's biomass partners without power purchasers.

Staff Manager Campbell clarified that biomass existing contracts and battery planned storage volume were the only known quantities reflected in the IRP and that projected future biomass contracts were not included to preserve the agency's negotiating ability.

Acting Director Biondini stressed that this IRP is a compliance document, does not bind the organization to any power purchasing decisions, and that final power procurement decisions are made by the Board, and not the CPUC.

Chair Woo requested the IRP language be edited to reinforce that local biomass volumes reflect existing, not anticipated, contracts, and that RCEA makes no affirmative statement regarding future contracts or policies. Counsel Diamond requested inclusion of a statement that no current contractual commitments exist for wind and solar energy. Chair Woo requested that the Board's program launch guidelines be included as an attachment to the report.

Staff Manager Campbell stated that staff would like to do an integrated resource plan in the future that reflects the Board's power procurement guidelines. That IRP, she stated, would be a useful tool to inform RCEA's procurement decisions.

Director Wilson stated that the future, Board guideline-based, IRP would help reflect RCEA's fulfilment of renewable power supply promises made to the County.

Director Ricca requested that it be made clear that RCEA's future IRP, and not the CPUC-mandated plan, reflects the agency's actual power procurement policies to avoid the mistaken perception that the agency committed to one level

of biomass procurement in the CPUC IRP, then adjusted the level in a subsequent document.

Director Glaser stated he questioned the CPUC's intentions for requiring this filing and suggested RCEA network with other CCAs. Staff Manager Campbell confirmed that RCEA recently hosted a CalCCA procurement team meeting and discussed the CPUC-lead IRP process.

Chair Woo invited public comment.

Member of the public Ellen Golla commented that while the IRP states that RCEA's long-term energy procurement is not expected to negatively impact local air quality, local biomass power is polluting the air with benzene and other harmful substances. Ms. Golla stated that the document was disappointing and indicates RCEA is not working towards cleaner energy.

RCEA Community Advisory Committee member Dr. Norman Bell, speaking as a member of the public, stated that local biomass emissions are small compared to the national and international biomass industry's emissions and stressed the importance of RCEA's offshore wind development. Dr. Bell asked the Board to weigh two factors when making power procurement choices: 1) how much it costs to produce a megawatt of electricity, and 2) how much CO2 that choice puts into the atmosphere and contributes to global climate change.

Chair Woo closed public comment.

Chair Woo verified that the IRP document as it was drafted reflects RCEA guidelines and policies.

Director Glaser stated he would like the agency to maintain its emissions standards until the State requires more stringent standards.

Upon inquiry by Chair Woo, Staff Director Engel stated that the Schatz Energy Research Center's preliminary model results for its statewide biomass power impact study is anticipated to be ready in December 2018 and would include data on the industry's greenhouse gas emission impacts.

M/S: Miller, Glaser: Approve 2018 Integrated Resource Plan, with changes made as indicated in attached version and as discussed in this meeting, and authorize submittal to the California Public Utilities Commission.

The motion passed on a unanimous voice vote. Ayes: Allison, Fennell, Glaser, Miller, Ricca, Sweeney, Wilson, Winkler. Noes: None. Absent: None. Abstentions: Woo (non-voting).

END OF COMMUNITY CHOICE ENERGY (CCE) BUSINESS

Chair Woo adjourned the meeting at 4:24 p.m.

Respectfully submitted,

Lori Taketa
Clerk of the Board