CAC Item C5
Staff Report Item 12

TO: East Bay Community Energy Board of Directors

FROM: Marie Fontenot, Vice President of Power Resources

SUBJECT: **EBCE 2020 Integrated Resource Plan Compliance Filing (Action Item)**

DATE: October 19, 2022

Recommendation
Adopt a Resolution that

A. Approves the analysis and findings resulting from the 2022 Integrated Resource Planning (IRP) study process, and
B. Authorizes staff to submit to the California Public Utilities Commission (CPUC)- the required IRP Compliance documents November 1, 2022.

Background and Discussion

The IRP proceeding currently includes two primary components: the biennial study workstream and the mandated procurement workstream. This memo refers only to the biennial study workstream.

The IRP is a long-term planning proceeding that evaluates the CPUC's electric procurement policies and programs and estimates the reliability and cost-effectiveness of the CPUC-jurisdictional entities'[1] electric supply plans, with the goal of reducing the cost of achieving GHG reductions and other CPUC policy goals. The IRP proceeding forecasts and reports on the least-cost resource mix required to meet these goals while maintaining system reliability over a period of at least 10 years. This year, the IRP planning horizon spans from 2023 to 2035.

The IRP also evaluates the contribution of individual load serving entities' (LSE) resource portfolios to the State's greenhouse gas (GHG) emissions. This IRP cycle, the

[1] In the context of IRP requirements, "CPUC-jurisdictional entities" includes Investor-Owned Utilities (IOUs), Energy Service Providers (ESPs), and Community Choice Aggregators (CCAs).

CPUC requires each entity to submit portfolios that achieve emissions levels equal to or less than that entity's proportional share of two alternative statewide electric sector GHG targets. EBCE will report analysis results and proposed resource portfolios that address the question "what are the desired portfolios of resources based on a statewide electric sector goal of achieving (1) 30 million metric tons (MMT) of GHG emissions by 2030; and (2) a maximum of 25 MMT of GHG emissions by 2030." The inputs and assumptions used in the 30 MMT and 25 MMT scenario must be consistent with certain CPUC directives; the required assumptions are discussed below. Given East Bay Community Energy's (EBCE) Board of Directors' approved target of achieving an emission-free portfolio by 2030, EBCE staff sought to develop a single Preferred Conforming Portfolio that will be emission-free consistent with EBCE's goals and the emissions methodology required for use in the annual Power Source Disclosure Report (PSDR).

All CPUC-jurisdictional LSEs are required to file and serve their individual IRPs with the CPUC by November 1, 2022. The filings must use three documents provided by the CPUC: a Narrative Template, a Resource Data Template (RDT), and results from the CPUC's Clean System Power (CSP) Calculator.[2] Staff is seeking Board approval of the analysis and the submission of these required materials.

Discussion

Compliance with the CPUC's IRP filing requires completion and submittal of three documents by November 1, 2022: the IRP Narrative Template, the Resource Data Template, and the Clean System Power (CSP) Calculator. Each document is described below, followed by a discussion of the CPUC's modeling inputs and assumptions, an overview of EBCE's approach to IRP analysis and a discussion of the results of EBCE's analysis. Finally, Staff describes the next steps, including portfolio planning work beyond what is required for IRP compliance purposes.

Narrative Template

In this document, each LSE provides a narrative description of its approach in developing a long-term resource portfolio plan, results of supporting analytical work, and its planned actions based on the results of its analysis.

Resource Data Template (RDT)

In the RDT, EBCE is required to report its existing and planned energy and capacity contracts and identify the amount of energy and capacity that are indicated from the analysis as necessary to contribute to the 30 MMT and 25 MMT portfolios. The portfolios of resources must be described in terms of total annual contracted volumes by resource type. The CPUC uses this document to analyze and aggregate individual entities' IRP portfolios.

Clean System Power (CSP) Calculator

[2] CPUC Decisions 18-02-018 and 22-02-004 define these filing requirements.

The CSP Calculator is a CPUC-provided tool used to estimate GHG and other local air pollutant emissions associated with both the 30 MMT and 25 MMT resource portfolios included in the Resource Data Template. This workbook is used to calculate the implied emissions values associated with each type of generating resource using CPUC-determined assumptions. However, the calculator is not intended by the CPUC to be an after-the-fact compliance tool, but rather to provide all LSEs a simple and uniform way of estimating the emissions associated with their IRP portfolios. The CPUC uses this document to check that each LSE has a plan to meet the required GHG targets.

Required Assumptions

In this IRP cycle, the CPUC is requiring its jurisdictional entities use certain standardized inputs and assumptions. The required assumptions include:

- Load forecast: each load serving entity is required to use the CPUC-approved, California Energy Commission (CEC)-developed 2021 Integrated Energy Policy Report (IEPR) demand forecast update, with LSE-specific adjustments adopted by a CPUC administrative law judge's ruling.[3] The 2021 IEPR forecast identified annual retail sales for entities out to 2035; then added and subtracted load to reflect the CEC's forecast for the expansion of Additional Achievable Energy Efficiency (AAEE), Additional Achievable Fuel Substitution (AAFS), behind-the-meter solar PV generation, behind-the-meter combined heart & power generation, other self-generation, and time of use rate effects.

- Baseline resources: represent generating resources that are currently online or are contracted to come online during the IRP's planning timeframe. This list includes generating resources inside and outside California, but within the Western Electricity Coordinating Council (WECC).

- Candidate resources: represent resources that have not yet been built or contracted. The CPUC provides the types of future generating resources that may be included in entities portfolios. The eligible resource types are renewables (biomass, geothermal, solar PV, onshore wind, out-of-state wind, offshore wind), energy storage, natural gas generation (Aero Gas Turbines and "Advanced" Combined Cycle Gas Turbines), and demand response. The CPUC identified certain geographic assumptions related to the placement of these potential resources; the resources could be in California or out of state with eligible regions tied to existence or planned expansion of transmission lines. EBCE, like the CPUC, used the technology cost curves sourced from NREL's 2021 Annual Technology Baseline (ATB). For electricity and capacity prices, EBCE used its internal, proprietary forward curves.

[3] *ALJ Ruling Finalizing Load Forecasts and Greenhouse Gas Emission Benchmarks for 2022 Integrated Resource Plan Filings*, issued 6/15/2022 in R.20-05-003.

- Proforma Financial Model: used by the CPUC to create levelized fixed costs for each candidate resource type. These costs are then used as inputs to modeling to establish the least-cost portfolio. EBCE elected to use technology cost curves sourced from NREL's 2021 ATB in developing its single Preferred Conforming Portfolio.

- Operating Assumptions: The operating cost (fixed and variable operations and maintenance costs) of candidate resources were based on the values estimated in NREL's ATB study. Components of the operational costs are aggregated costs for classes of generation resources, unit commitment costs, costs associated with dispatching resources for energy or ancillary services, and transmission costs based on zones (i.e., costs to move electricity over the transmission system in WECC).

- Resource Adequacy Requirements: the CPUC assumptions require a planning reserve margin. In previous years the planning reserve margin was set at 15%, based on and consistent with the rules in place for System Resource Adequacy for CPUC-jurisdictional entities; in this IRP the planning reserve margin varies by forecast year ranging from 14.9% in 2022 to 22.5% in 2028 and after. The CPUC also incorporates the most recent effective load carrying capability (ELCC) assumptions for resources and differentiates between ELCCs used for resources based on year the resource obtains commercial operation, consistent with CPUC D.21-06-035.

- GHG Emissions and Renewable Portfolio Standard: the 30 MMT and 25 MMT scenarios represent two different 2030 statewide electric sector GHG constraints under which least-cost resource portfolios are developed. The emissions accounting used for the IRP analysis is consistent with the California Air Resource Board's regulation of the electric sector under California's cap and trade program. It is worth noting that EBCE uses the emission accounting methodology from the Power Source Disclosure Report to calculate and report its annual emissions which differs from the forward-looking accounting methodology of the IRP. The IRP also assigns a certain volume of emissions to each load serving entity as their allocated share of the state's combined heat and power (CHP) resources.

Preferred System Plan

The CPUC develops a Preferred System Plan (PSP) every two years, aggregating individual LSE's plans, this approach is new for the 2022 IRP but will be the process going forward. This plan represents the total mix of resources at the system-level that the CPUC modeling shows is the most cost-effective way to the achieve 30 MMT and 25 MMT scenarios while maintaining system reliability. Following adoption of the PSP, the CPUC sends the PSP as the 'best case' resource portfolio to the California Independent System Operator (CAISO) for inclusion in the annual Transmission Planning Process.

The PSP includes four important elements. First, it identifies the 2030 statewide electric sector GHG planning target (in this case, 30 MMT). Second, it recommends a portfolio of resources that the CPUC believes represents the least-cost, least risk way to achieve the GHG target (these resources are identified based on the CPUC's required inputs and assumptions, described above). Third, a GHG planning price is reported that represents the marginal cost of GHG abatement associated with the PSP; this is intended to provide a consistent way to demonstrate the value of demand and supply resources. Fourth, near-term CPUC policy actions are incorporated with the stated intention of ensuring results from the IRP modeling to inform other CPUC proceedings.

EBCE's Approach to IRP Compliance Analysis

EBCE staff developed a single Preferred Conforming Resource Portfolio to meet the CPUC's 30 MMT and 25 MMT scenarios. EBCE's recommended portfolio was developed based on the CPUC's system-level resource portfolios.

Working with our consultant, First Principles Advisory, staff incorporated details of EBCE's existing contracts as the baseline for the portfolios. First Principles employed a three-step modeling process:

Step 1 of the process begins with capacity expansion modeling (CEM) of the CAISO system in a manner similar to that taken by the CPUC's IRP instance of E3's RESOLVE model. First Principles successfully benchmarked GridPath to the CPUC's model; this enabled EBCE to conducted additional capacity expansion modeling studies of the bulk electric system using alternative assumptions for future planning exercises.

Step 2 in the modeling sequence is to take the system buildout from Step 1 and port the selected candidate resources into a production cost model to assess system reliability, emissions, and regional forward pricing conditions in a more detailed manner. EBCE assumed the same fuel and carbon price forecasts as listed in the official 2022 Inputs and Assumptions dataset. This modeling analysis was performed using Plexos, an industry known tool.

Once the Plexos modeling is finished, the analysis of the CAISO system is complete, and the modeling framework transitions into "local mode" for Step 3. In this step, the Gridpath model was used again, this time seeking to optimize EBCE's portfolio for the active planning horizon by identifying the candidate resources that, together with the existing baseline resources, will meet the agency's reliability and environmental targets in a least cost manner. GridPath is also able to account for any board-specific RPS and/or GHG goals that exceed state-mandated targets.

The baseline list of existing contract resources incorporated into the modeling and the forecasted list of resources to build out the Preferred Resource Portfolio is listed in Appendix 1, Table 1.

Results of Analyses & Recommended Compliance Portfolios

Using the approach described herein, EBCE was able to achieve compliance with its share of the CPUC GHG emissions limits. The forward calculated annual CO2 emissions from the portfolio are 0.749 million metric tons (MMT) in 2030 and 0.609 MMT in 2035, which are less than EBCE's assigned GHG benchmarks of 0.772 MMT in 2030 and 0.623 MMT in 2035 for the 25 MMT GHG scenario. EBCE forecasts a 2030 load of 7,180GWh and 7,540 GWh in 2035. It is important to note that the Preferred Conforming Portfolio does not include the addition of the city of Stockton as a EBCE customer; staff will perform supplementary work to revise the Preferred Portfolio based on the formal inclusion of Stockton to EBCE's service territory in 2024. A summary of results follows; additional details and visual aids are included as Attachment 1, "Integrated Resource Plan Compliance Results" PowerPoint.

- Forecast Costs of Portfolio: over the IRP planning horizon, the annual expense of the organization's optimal portfolio is expected to average $53/MWh (2020 USD). EBCE's reliance on the market for capacity and energy diminish over time as bundled contracts assume a larger proportions of EBCE's portfolio. The portfolio results in an average procurement cost of $400 million per year over the 2024 – 2035 planning horizon under the cost assumptions provided by the CPUC.

- Resource Mix of Portfolios: the total long-term contracted nameplate capacity associated with the Preferred Conforming Portfolio is 2,124 MW by 2035, plus an additional 890 MW of annual RA purchases. Of the 2,124 MW in long-term contracted resources, 1,550 MW represent new-build resources and 574 MW represent resources already under contract to EBCE.

- Portfolio Emissions: EBCE's Preferred Conforming Portfolio as calculated by the Clean System Power (CSP) calculator[4] meets the obligations of both the 30 MMT and 25 MMT CPUC scenarios. EBCE's assigned GHG benchmark for 2030 and 2035 are 0.772 million metric tons (MTT) and 0.623 MMT, respectively. With reported emissions of 0.749 MMT in 2030 and 0.609 MMT in 2035, EBCE's Preferred Conforming Portfolio meets both requirements. The primary sources of air pollutants represented in this portfolio are the result four things: (1) of its reliance on system power to meet some unhedged hours, (2) energy storage charging hours, (3) some additional pollutants arising as a result of the agency's VAMO allocation, and (4) the behind-the-meter combined heat and power (CHP) emissions allocated to all load serving entities.

- Risk Management associated with Portfolios
    - Overall: The Preferred Conforming Portfolio seeks to fill an energy need of approximately 7,290 GWh in 2030 and 7,540 GWh in 2035.

[4] The Clean System Power (CSP) tool is an excel-based workbook provided the CPUC that calculates emissions from CAISO system's dispatchable thermal generation and unspecified imports and allocates them to LSEs based on their planned IRP portfolios.

- This IRP analysis does not incorporate short-term transactions which comprise a portion of EBCE's hedging strategy. EBCE does not enter into long-term contracts to cover 100% of its forecast demand; rather EBCE incorporates short-term transactions and a limited amount of exposure to the CAISO spot market into it risk management strategy. Because this version of the IRP analysis does not include short-term transactions, the portfolio covers some portion of what Staff would likely hedge through short-term deals into the long-term resource portfolio and the remainder into what the model regards as purchases made in the CAISO market.
- Similar and related to the lack of short-term transactions in the IRP model, neither are the short-term renewable and carbon free energy transactions EBCE engages in to ensure it meets compliance obligations and customer commitments in a cost-effective manner incorporated, though in reality these transactions play a valuable role in EBCE's portfolio management strategy.
- Summary of Portfolios: Over the 2024-2035 study timeframe, the long-term resources that comprise the Preferred Conforming Portfolio are forecasted to provide approximately 7,134 GWh of delivered emissions-free energy in 2035 that can be used to meet demand. This provides coverage of 99% of EBCE's forecast retail demand and leaves a forecasted open position in 2035 of 21 GWh per year that are assumed to be covered in the CAISO spot market but in actuality can be covered through short-term carbon-free energy transactions.

- Reliability of Portfolios
  - Staff evaluated portfolio reliability in relation to EBCE's ability to meet its CPUC-designated Resource Adequacy obligations on an annual basis and in the month of September for every year during the study period. The results indicate that RA obligations can be achieved through a combination of existing RA contracts, long-term generation contracts (i.e. the resources described in the portfolios of Scenarios 1 and 2) and with additional RA purchases, similar to those EBCE engages in today. The analyses also evaluated the number of "forced" & "simulated" hours of portfolio market exposure. In this case, "forced exposure" represents the number of hours where generating resources and energy storage are insufficient to meet demand. "Simulated exposure" represents the number of hours with net market purchases including energy storage charging.
  - Resource Adequacy: The long-term contracts anticipated in this portfolio represent sufficient capacity to meet annual RA obligations. It is important to note that the RA paradigm is currently undergoing wholesale redesign; effectively being changed from a one target per month program to 24 different RA targets for each month. The RA program redesign will not be finalized until early 2023 at the earliest; thus this IRP analysis does not reflect these impending yet uncertain changes.

- Market Exposure: The computer-optimized portfolio and resulting storage dispatch strategy selected by the model indicates a preference for continued reliance on market purchases of energy over a strategy in which EBCE procures additional resources to completely cover customer and storage charging load in more hours. Additional contracted resources would result in an increase in the number of hours in which EBCE was selling excess generation back into the market, often at times when solar production across the state is high and CAISO energy market prices are correspondingly low.

  This reliance on market power declines over time as additional resources are brought online, but indicates a continued modeling preference for reliance on the market in the winter months and summer nights to avoid the need to resell excess power into the market on a consistent basis during the lowest price hours of the day. The following table shows the percentage of retail sales provided by renewable contracted resources over the modeled years according to the calculations in the Clean System Power (CSP) tool and in the GridPath model.

Year	2024	2026	2030	2035
CSP Delivered Renewables as % of Total Retail Sales	64.8%	76.2%	89.5%	94.6%
GridPath Delivered Renewables as % of Total Retail Sales	66.5%	75.2%	100.0%	100.0%

Next Steps

EBCE must submit its 2022 IRP Compliance filing and all required materials to the CPUC by November 1, 2022. Following timely submission, Staff proposes to undertake supplemental analysis utilizing the GridPath model. The supplemental analysis will incorporate the addition of Stockton to EBCE's service territory in 2024 and with revised assumptions that better reflect the cost of resources offered to EBCE in the current marketplace. Depending on the timing of RA program redesign, Staff may incorporate changes to the RA program in this supplemental analysis as well. Staff will provide an informational update to the Board on this supplemental analysis later in fiscal year 2023.

Fiscal Impact

There is no financial impact associated with the recommended action as this filing is intended to meet the CPUC compliance requirement and actual procurement authorization will be brought forth to the board in accordance to EBCE's risk management policies.

Attachments

- Attachment A: Resolution of the Board of Directors Approving the Results of the IRP Analysis and Authorizing Staff to Submit the Related Compliance Filing to the CPUC
- Attachment B: Integrated Resource Plan Compliance Results PowerPoint
- Attachment C: CPUC Narrative
- Attachment D: CPUC Resource Data Template – 25 MMT
- Attachment E: CPUC Resource Data Template – 30 MMT
- Attachment F: CPUC Clean System Power Calculator – 25 MMT
- Attachment G: CPUC Clean System Power Calculator – 30 MMT

Please note: Attachments D, E, F, G are not included in the agenda packet. These attachments can be accessed at the following links:

Attachment D: CPUC Resource Data Template – 25 MMT:
https://res.cloudinary.com/diactiwk7/image/upload/v1665779100/Item_12D_-_CPUC_Resource_Data_Template_-_25_MMT_qeyktg.pdf

Attachment E: CPUC Resource Data Template – 30 MMT:
https://res.cloudinary.com/diactiwk7/image/upload/v1665779128/Item_12E_-_CPUC_Resource_Data_Template_-_30_MMT_hq7zsq.pdf

Attachment F: CPUC Clean System Power Calculator – 25 MMT:
https://res.cloudinary.com/diactiwk7/image/upload/v1665779163/Item_12F_-_CPUC_Clean_System_Power_Calculator_-_25_MMT_hgyhpt.pdf

Attachment G: CPUC Clean System Power Calculator – 30 MMT:
https://res.cloudinary.com/diactiwk7/image/upload/v1665779195/Item_12G_-_CPUC_Clean_System_Power_Calculator_-_30_MMT_scrh4r.pdf

Appendix 1:

Table 1 Nameplate Capacity (MW) of EBCE's Preferred Conforming Capacity by Project Type and Technology[5]

Project Type	Tech	Project	2024	2026	2030	2035
baseline	4hr_batteries	HenriettaStorage	10	10	10	10
baseline	4hr_batteries	Sanborn	47	47	47	0
baseline	4hr_batteries	Tumbleweed	50	50	50	50
baseline	BTM_Solar	BTM_Solar	618	719	940	1,196
baseline	Demand Response	OhmConnect	10	10	0	0
baseline	Demand Response	SUN01RA2031	1	1	1	0
baseline	Geothermal	FervoFECNevada1	0	40	40	40
baseline	Hybrid	DaggettSolarPower3	50	50	50	50
baseline	Hybrid	Scarlet	100	100	100	100
baseline	In-State Wind	SummitWind	56	56	56	56
baseline	Out-of-State Wind	Tecolote	100	100	100	0
baseline	RA_Only	Aggregate	1,205	873	832	858
baseline	Solar	EdwardsSolarII	100	100	100	100
baseline	Solar	RosamondCentral	112	112	112	112
baseline	Solar	TulareSolarCenter	56	56	56	56
candidate	4hr_batteries	Arizona_Li_Battery	57	117	117	0
candidate	4hr_batteries	Northern_California_Li_Battery	44	117	117	0
candidate	4hr_batteries	Riverside_Li_Battery	49	117	117	0
candidate	6hr_batteries	Generic_6hr_battery	0	0	0	268
candidate	8hr_batteries	Generic_8hr_battery	0	47	47	47
candidate	In-State Wind	Northern_California_Wind	100	200	349	349
candidate	Offshore Wind	Humboldt_Bay_Offshore_Wind	0	0	256	638
candidate	RA_Only	Aggregate	59	16	454	590
candidate	Solar	Arizona_Solar	55	205	205	205

[5] Includes EBCE's allocated share of Cost Allocation Mechanism (CAM) and Central Procurement Entity (CPE) related capacity.

RESOLUTION NO. R-2022-XX

A RESOLUTION OF THE BOARD OF DIRECTORS

OF THE EAST BAY COMMUNITY ENERGY AUTHORITY APPROVING THE RESULTS OF THE IRP ANALYSIS AND AUTHORIZING STAFF TO SUBMIT THE RELATED COMPLIANCE FILING TO THE CPUC

WHEREAS The East Bay Community Energy Authority ("EBCE") was formed as a community choice aggregation agency ("CCA") on December 1, 2016, Under the Joint Exercise of Power Act, California Government Code sections 6500 *et seq.,* among the County of Alameda, and the Cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Piedmont, Oakland, San Leandro, and Union City to study, promote, develop, conduct, operate, and manage energy-related climate change programs in all of the member jurisdictions. The cities of Newark and Pleasanton, located in Alameda County, along with the City of Tracy, located in San Joaquin County, were added as members of EBCE and parties to the JPA in March of 2020.

WHEREAS the California Public Utilities Commission (CPUC) issued Decisions 18-02-018 and 22-02-004 defining IRP filing requirements and requiring its jurisdictional load serving entities file their 2022 Integrated Resource Plans (IRP) with the CPUC on or before November 1, 2022; and

WHEREAS the CPUC further requires entities utilize three document templates to complete their filings: the Narrative Template, the Resource Data Template, and the Clean System Power (CSP) Calculator; and

WHEREAS EBCE staff worked with First Principles Advisory to perform analysis and develop IRP portfolios to meet the CPUC's requirements; and

WHEREAS EBCE staff has presented the IRP analysis performed by First Principles Advisory and EBCE staff to the Board.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE EAST BAY COMMUNITY ENERGY AUTHORITY DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. The Board hereby approves the results of the IRP analysis performed by First Principles Advisory and EBCE staff and presented at this Board meeting.

Section 2. The Board hereby authorizes staff to submit the 2022 IRP compliance filing to the CPUC by November 1, 2022.

ADOPTED AND APPROVED this 19th day of October, 2022.

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Dianne Martinez, Chair

ATTEST:

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Adrian Bankhead, Clerk of the Board

Attachment Staff Report Item 12B

OCTOBER 19, 2022

2022 Integrated Resource Plan - Review of Results & Request for Approval to File

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Background

- **Integrated Resources Plan (IRP): a biennial analysis and filing required by CPUC.**
  - Load serving entities (LSEs) submit long-term procurement plans to the CPUC
- **Evaluate LSEs' ability to contribute to emissions reduction while meeting electricity-related compliance obligations.**
- **CPUC evaluates California's resource needs for 10 coming years.**
  - Important: can result in CPUC-mandated procurement

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Deliverables

CPUC

1) Analyses based on CPUC-prescribed elements & with EBCE-specified changes
2) Narrative – analyses, process, results, lessons learned, procurement targets
3) Resource Data Template – conforming and preferred portfolios
4) Clean System Power Calculator

EBCE Board

1) All CPUC materials for review and approval pre-filing
2) Understand drivers of portfolio costs
3) Evaluate macro-level resource ability
4) Identify potential threats to EBCE 0MMT 2030 portfolio; later develop mitigations

Key Takeaways

Benefits

- **Highlight hours of exposure to CAISO market volatility**
- **Ability to stress test portfolio and region**

Limitations

- **Assumptions drive outcomes**
- **Inputs do not reflect current market / regulatory conditions**
- **Impossible to achieve a 0 MMT CO2 portfolio with CPUC-mandated Combined Heat and Power (CHP) emissions assigned to each LSE**
- **Differences in emissions accounting can create confusion:**
  - EBCE uses PSDR method – incorporates all actual physical purchases in report based on *actuals*;
  - CPUC IRP accounting – *forecast* view calculates what may happen if no additional GHG-free purchases are made

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Key Takeaways: Portfolio

- **Noteworthy that model suggests 6-hour batteries**
  - Background: 4-hour is “standard”; 8-hour is “long duration” & has been mandated
- **CPUC assumptions on offshore wind led to specific outcomes; highly uncertain development timeline & cost trajectory**
- **Staff have uncertainties about reliability of analysis given discrepancies between price inputs and market**

Next Steps

- Complete CPUC compliance filing due Nov 1, 2022
- Re-run IRP including Stockton
- Incorporate new Resource Adequacy (RA) rules following the ~fall 2022 redesign of the RA program
- Establish an internal IRP process based on EBCE fundamentals
- Update EBCE Board following supplemental internal analysis

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CPUC Requirements

Attachment Staff Report Item 12B

LSE	2035 Load (GWh)	Share of 2035 load in IOU territory	2035 GHG emissions cap - 30 MMT scenario[1]	2035 GHG emissions cap - 25 MMT scenario[1]
PG&E Bundled	29,852	36.6%	3.086 MMT	2.466 MMT
EBCE	7,540	9.2%	0.779 MMT	0.623 MMT[1]
SCE Bundled	55,276	62.2%	5.025 MMT	3.993 MMT
SDG&E Bundled	3,787	21.1%	0.479 MMT	0.386 MMT

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[1] Reflects requirement including behind the meter Combined Heat & Power emissions

Approach to Modeling

Step 1:
Capacity Expansion Modeling

What does the statewide system look like in the future?

Step 2:
Production Cost Modeling

What price patterns does the system yield?

Step 3:
Local Portfolio Optimization

What resources should EBCE procure to serve load?

EAST BAY COMMUNITY ENERGY

Developing Single Preferred Conforming Portfolio

CPUC compliance portfolio developed differs from CPUC's "Preferred System Plan"

Benefits:

- Different model than CPUC but benchmarked reliably
- Conforms with CPUC requirements
- Defensible: Tied to CPUC-expectations of resource availability
- Able to incorporate EBCE-views of availability & portfolio-fit

Limitations:

- Does not reflect emissions accounting & reporting used for PSDR compliance
- Resource costs (from NREL) not consistent with contracts currently available in actual market

	2024	2026	2030	2035
CAISO Load (GWh)	203,597	206,558	211,801	218,513
EBCE Load (GWh)	6,740	6,887	7,180	7,540
EBCE % of CAISO	3.31%	3.33%	3.39%	3.45%

EAST BAY COMMUNITY ENERGY

Preferred Conforming Portfolio - Summary

Tech	Project	2024	2026	2030	2035
Baseline Resources					
4hr_batteries	HenriettaStorage	10	10	10	10
4hr_batteries	Sanborn	47	47	47	0
4hr_batteries	Tumbleweed	50	50	50	50
BTM_Solar	BTM_Solar	618	719	940	1,196
Demand Response	OhmConnect	10	10	0	0
Demand Response	SUN01RA2031	1	1	1	0
Geothermal	FervoFECNevada1	0	40	40	40
Hybrid	DaggettSolarPower3	50	50	50	50
Hybrid	Scarlet	100	100	100	100
In-State Wind	SummitWind	56	56	56	56
Out-of-State Wind	Tecolote	100	100	100	0
RA_Only	Aggregate	1,205	873	832	858
Solar	EdwardsSolarII	100	100	100	100
Solar	RosamondCentral	112	112	112	112
Solar	TulareSolarCenter	56	56	56	56

Tech	Project	2024	2026	2030	2035
Candidate Resources					
4hr_batteries	Arizona_Li_Battery	57	117	117	0
4hr_batteries	Northern_California_Li_Battery	44	117	117	0
4hr_batteries	Riverside_Li_Battery	49	117	117	0
6hr_batteries	Generic_6hr_battery	0	0	0	268
8hr_batteries	Generic_8hr_battery	0	47	47	47
In-State Wind	Northern_California_Wind	100	200	349	349
Offshore Wind	Humboldt_Bay_Offshore_Wind	0	0	256	638
RA_Only	Aggregate	59	16	454	590
Solar	Arizona_Solar	55	205	205	205

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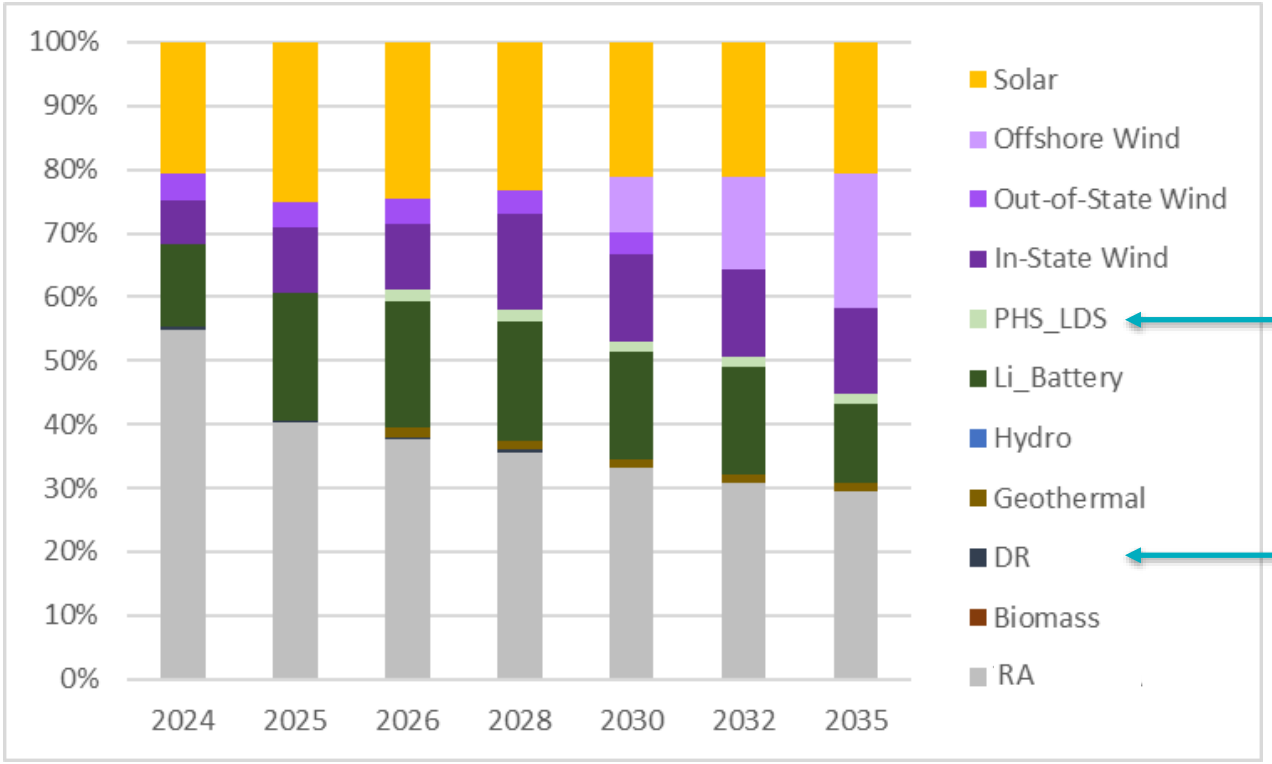
Preferred Conforming Portfolio – Capacity Allocation by Resource Type



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Preferred Conforming Portfolio – Capacity by Resource Type

Nameplate Capacity (MW) of Total Resources Selected for EBCE's Preferred Conforming Portfolio

Technology	2024	2025	2026	2028	2030	2032	2035
RA	1,264	1,001	950	954	977	910	890
Hydro	0	0	0	0	0	0	0
DR	11	11	11	11	1	0	0
Solar	472	622	622	622	622	622	622
Geothermal	0	0	40	40	40	40	40
Biomass	0	0	0	0	0	0	0
In-State Wind	156	256	256	406	406	406	406
Out-of-State Wind	100	100	100	100	100	0	0
Offshore Wind	0	0	0	0	256	434	638
PHS / LDS	0	0	47	47	47	47	47
Li_Battery	300	500	500	500	500	500	371

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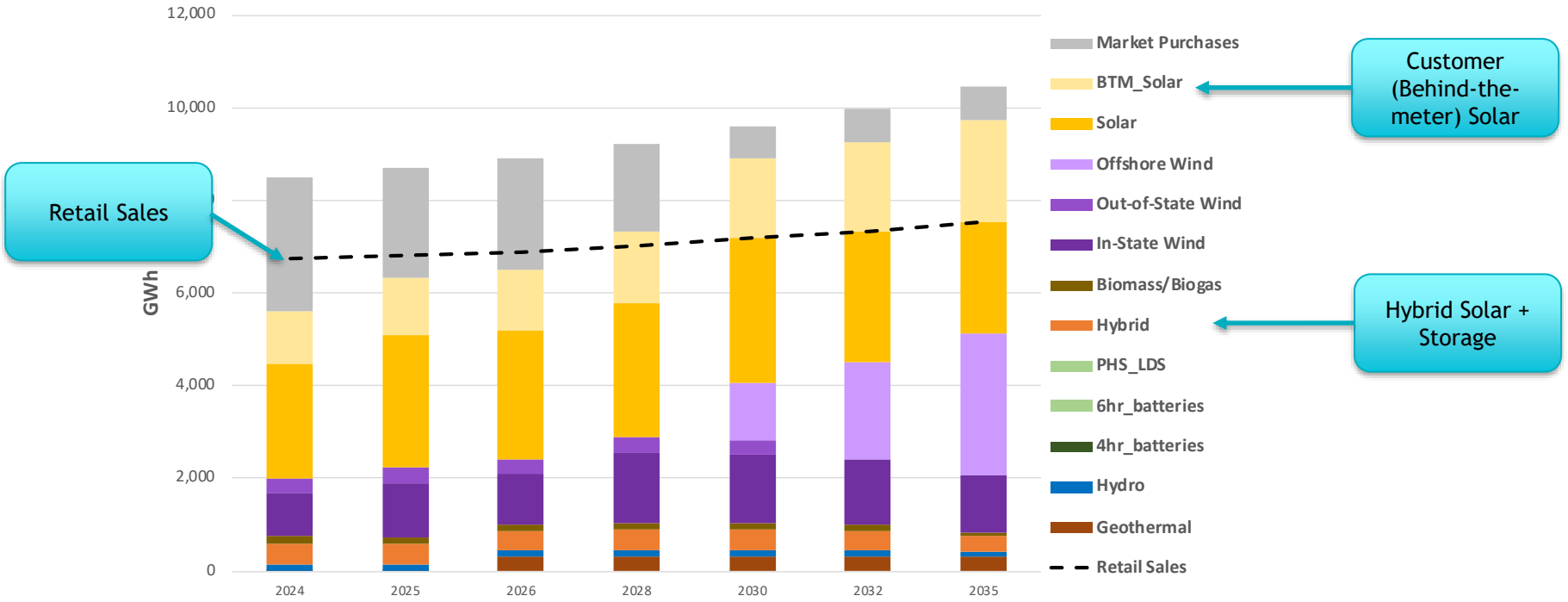
Preferred Conforming Portfolio – Energy Supply

Net Annual Generation of Preferred Conforming Portfolio



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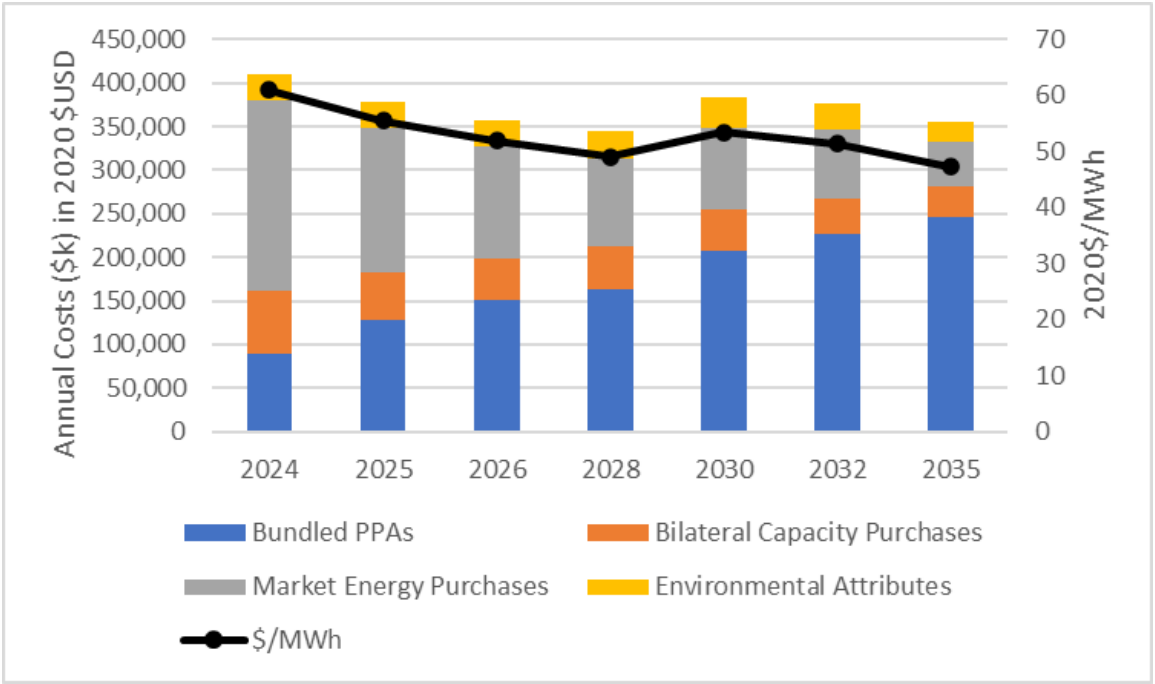
Forecast Costs & Revenues of Portfolio



What are the expected implications for customer rates?

- In the short run, EBCE will continue to peg rates to PG&E
- As a result, there is a focus on finding the “least-cost” portfolio to maximize contributions to reserves / BC discount
- A transition to cost-based pricing would allow EBCE to pass cost savings directly along to customers through rates

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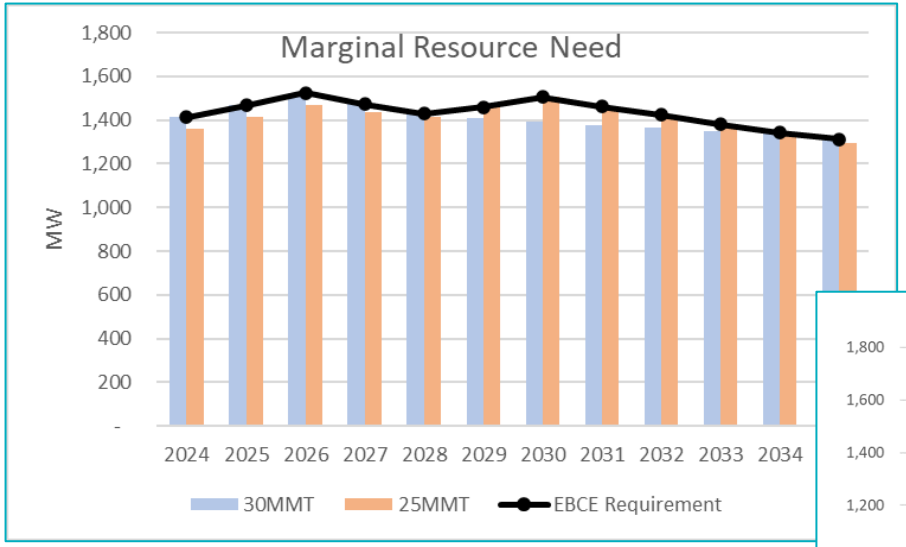
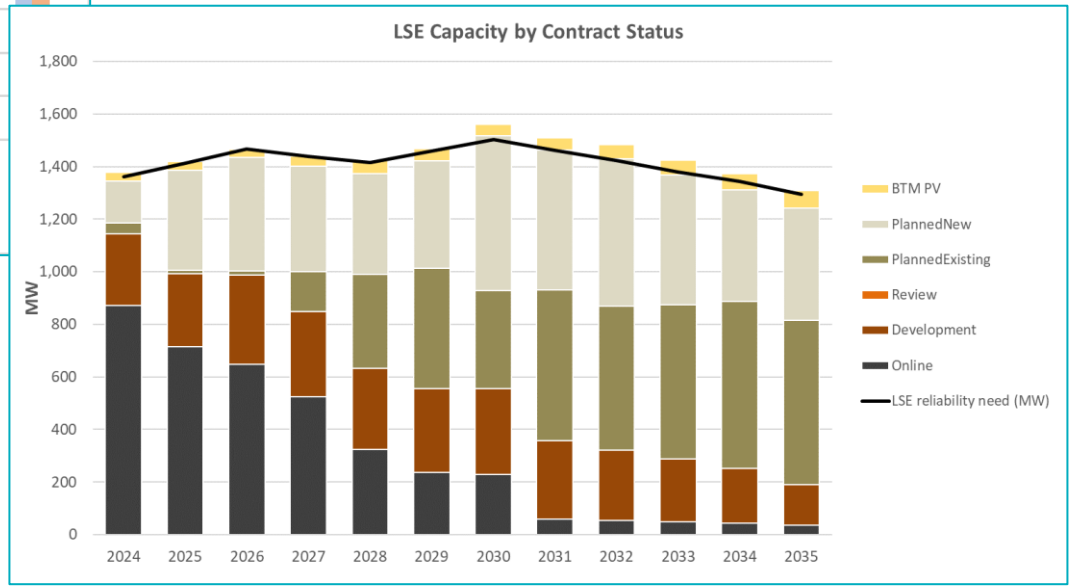
Preferred Conforming Portfolio – Contribution to Reliability



25MMT Scenario



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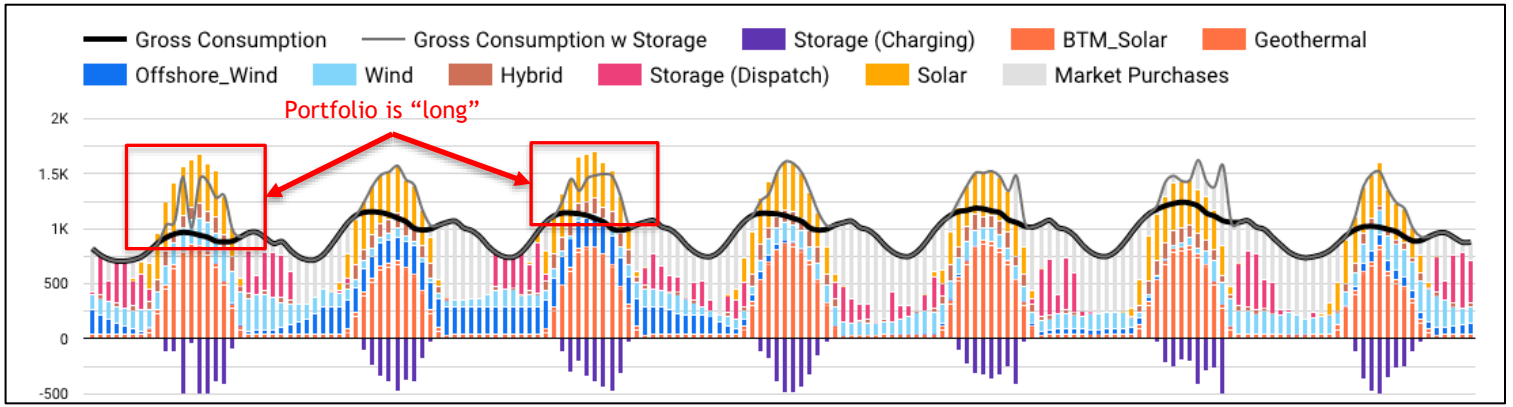
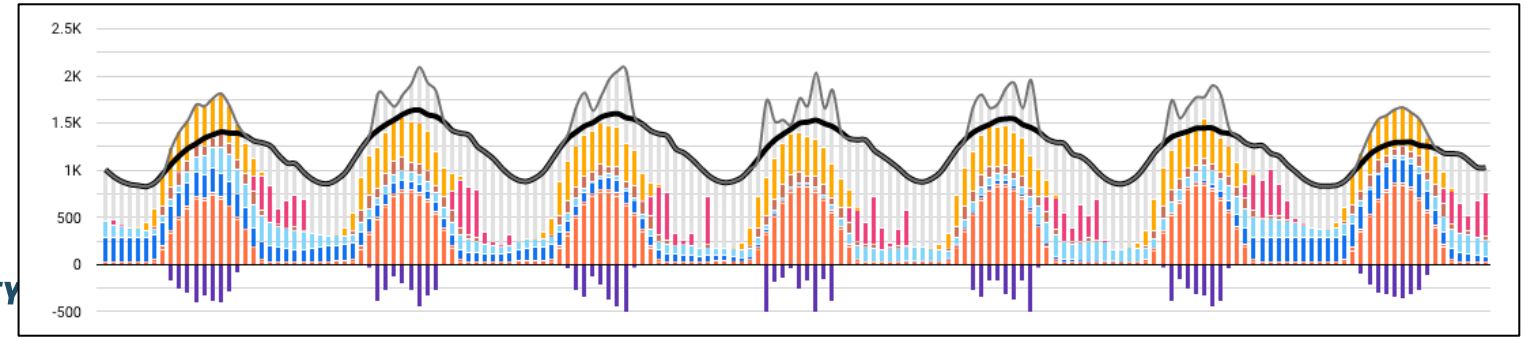
Preferred Conforming Portfolio – Market Exposure

Modeling exhibits a preference for portfolios that, on average, limit EBCE's sales of excess electricity into the market. This leads to periods of market reliance in "high load" months to limit exposure to low / negative prices in "lower load" months

Sample week – April 2030



Sample week – July 2030



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Portfolio Market Exposure - 2030

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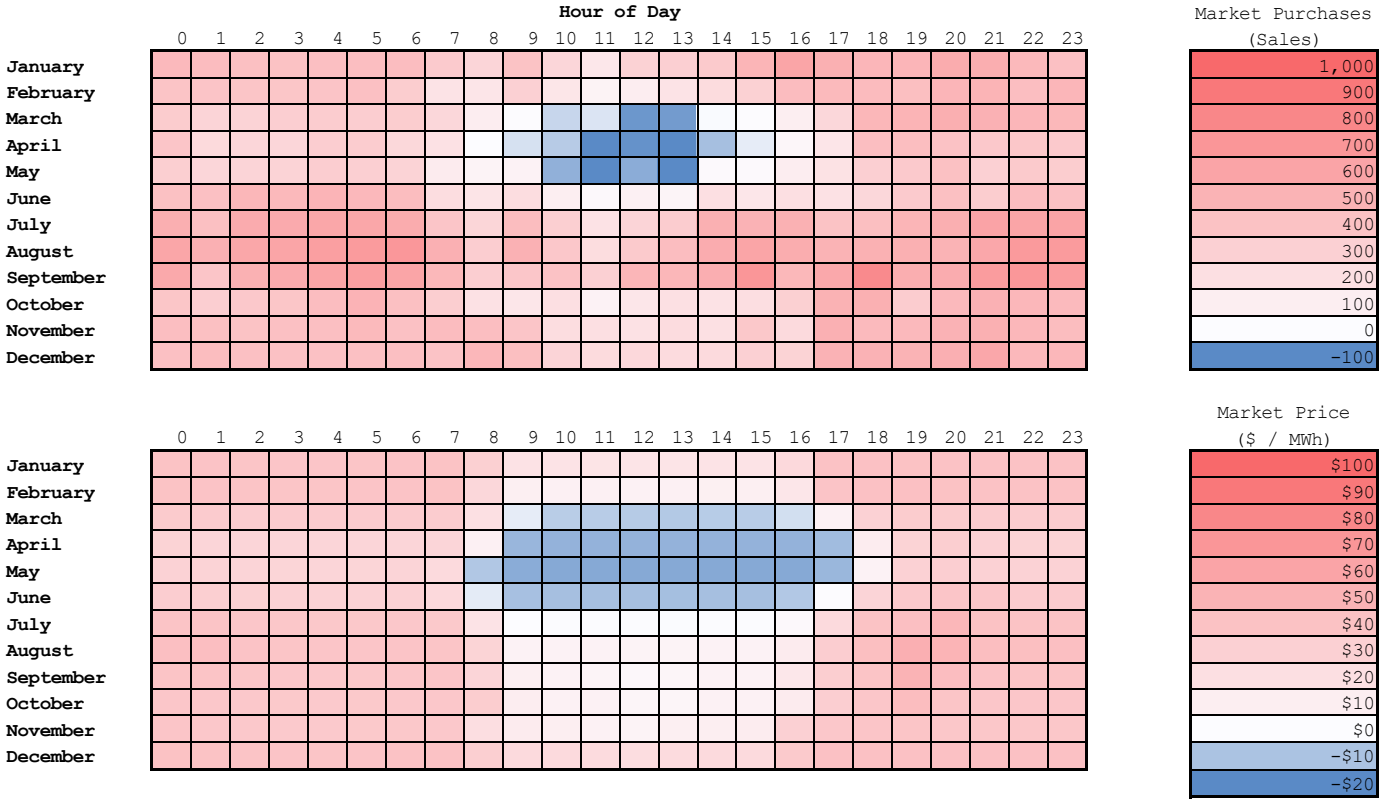


Emissions Accounting Methodologies

Power Source Disclosure Report (PSDR)

- Measures and reports on total purchases by generation type as percent of total sales across a calendar year
- Doesn't consider when power is generated relative to customer demand, no method for hourly emission accounting
- The Board adoption of zero emissions power in 2030 would have a goal of zero reported emissions as measured through the PSDR
- 100% of the purchases (relative to retail sales) would be from either renewable or carbon free sources and reported on the Power Content Label (PCL)
- PSDR values are based on actual energy delivered, rather than “modeled” curtailment and market interactions used in the CSP
- Specification of the GridPath model focused on imitating the PSDR accounting

Emissions Accounting Methodologies

CPUC's Clean System Power (CSP) Tool

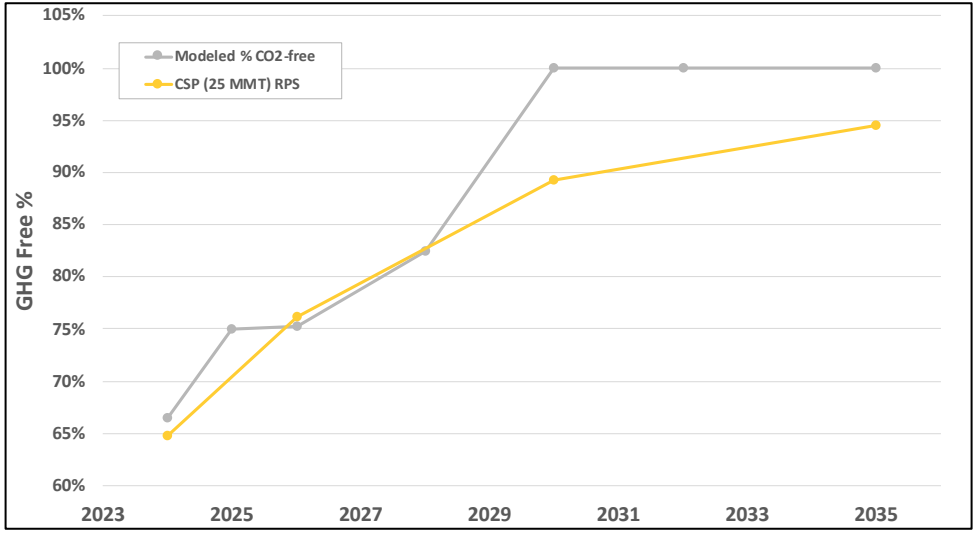
- **Hourly emissions accounting based on resource profiles and assumptions in the CPUC 30 and 25 MMT cases**
  - EBCE's emissions driven by model's preference for market power in the shoulder hours over additional long-term contracts that would increase the hours in which EBCE was a net seller into the market
- **Mismatch between curtailment in GridPath and CSP**
  - GridPath optimization ensured 100% RPS *as calculated by GridPath*, but does not have capability at this time to incorporate the method used in CSP
- **Difficult to get to 0 MMT CO_2 due to allocation of emissions from system resources**
- **CSP calculates emissions based on wholesale power and the timing of generation and demand, the PSDR does not include losses nor considers demand and generation coincidence for emissions accounting**

Preferred Conforming Portfolio – Compliance with RPS

	2024	2026	2030
Compliance Period	4	5	6
State RPS Requirement %	43.8	49.2	60.0
State RPS Requirement GWh	2,952	3,388	4,308
Delivered RPS (CSP)	4,370	5,253	6,415
State RPS Long-term Requirement (%)	65.0	65.0	65.0
State RPS Long-term Requirement (GWh)	1,919	2,203	2,800
Delivered LT RPS (CSP)	4,129	5,063	6,296

- Iterating between the two models to achieve a 100% RPS in the CSP is possible, but does not necessarily change emissions as reported in PSDR
- Staff will monitor progress toward the Board-specified goals as projects become operational and statewide resource mix develops; staff will present Board with opportunities to exceed current targets and meet affordability objectives

- GridPath modeling achieves 100% RPS by 2030, including curtailment
- CSP RPS calculation contains its own assumptions about extent to which renewable generation is deliverable



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Preferred Conforming Portfolio – Emissions

CO_2	*Unit*	2024	2026	2030	2035
Coal	*MMt/yr*	0.000	0.000	0.000	0.000
CHP	*MMt/yr*	0.163	0.162	0.159	0.098
Biogas	*MMt/yr*	0.000	0.000	0.000	0.000
Biomass	*MMt/yr*	0.000	0.000	0.000	0.000
System Power	*MMt/yr*	1.129	0.853	0.597	0.518
Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000
Total	***MMt/yr***	**1.292**	**1.015**	**0.756**	**0.616**
Average emissions intensity	*tCO2/MWh*	0.192	0.147	0.105	0.082
Oversupply Emissions Credits	*MMt/yr*	0.16	0.18	0.10	0.22

Reminder of 2035 emission caps:
30MMT: 0.779 MMT
25 MMT: 0.623 MMT

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	6,740	6,887	7,180	7,540
RPS-Eligible Delivered Renewable	GWh	4,370	5,253	6,415	7,125
GHG free	GWh	4,370	5,253	6,418	7,134
RPS-Eligible Delivered Renewable Percentage	% of retail sales	65	76	89	94
GHG-free Percentage	% of retail sales	65	76	89	95

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Thank You!

Questions? Give us a call:

1-833-699-EBCE (3223)

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Appendix Slides

Attachment Staff Report Item 12B

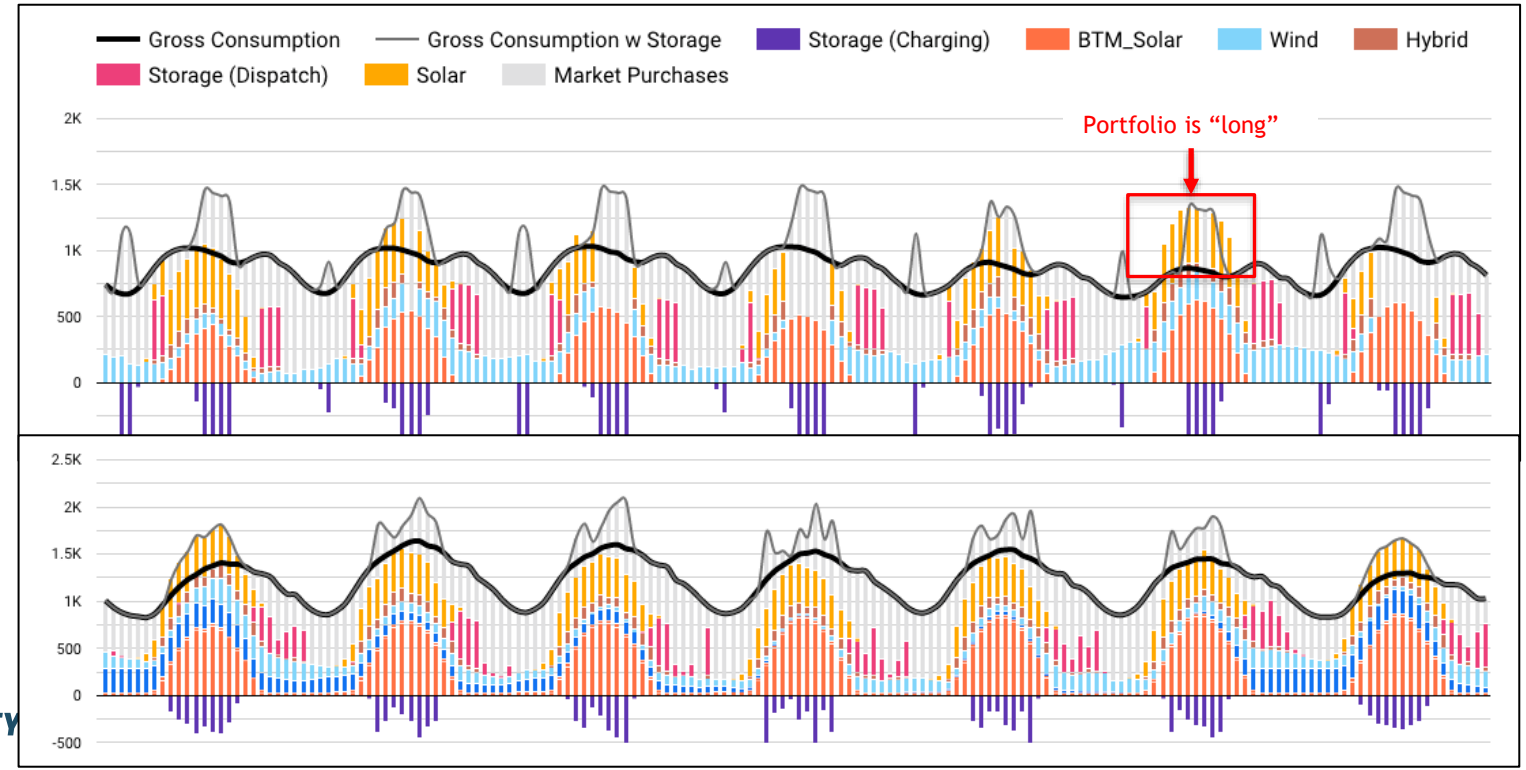
EAST BAY COMMUNITY ENERGY

Preferred Conforming Portfolio – Market Exposure

Modeling exhibits a preference for portfolios that, on average, limit EBCE's sales of excess electricity into the market. This leads to periods of market reliance in "high load" months to limit exposure to low / negative prices in "lower load" months

Sample week – April 2025

Sample week – July 2025



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Portfolio Market Exposure - 2025

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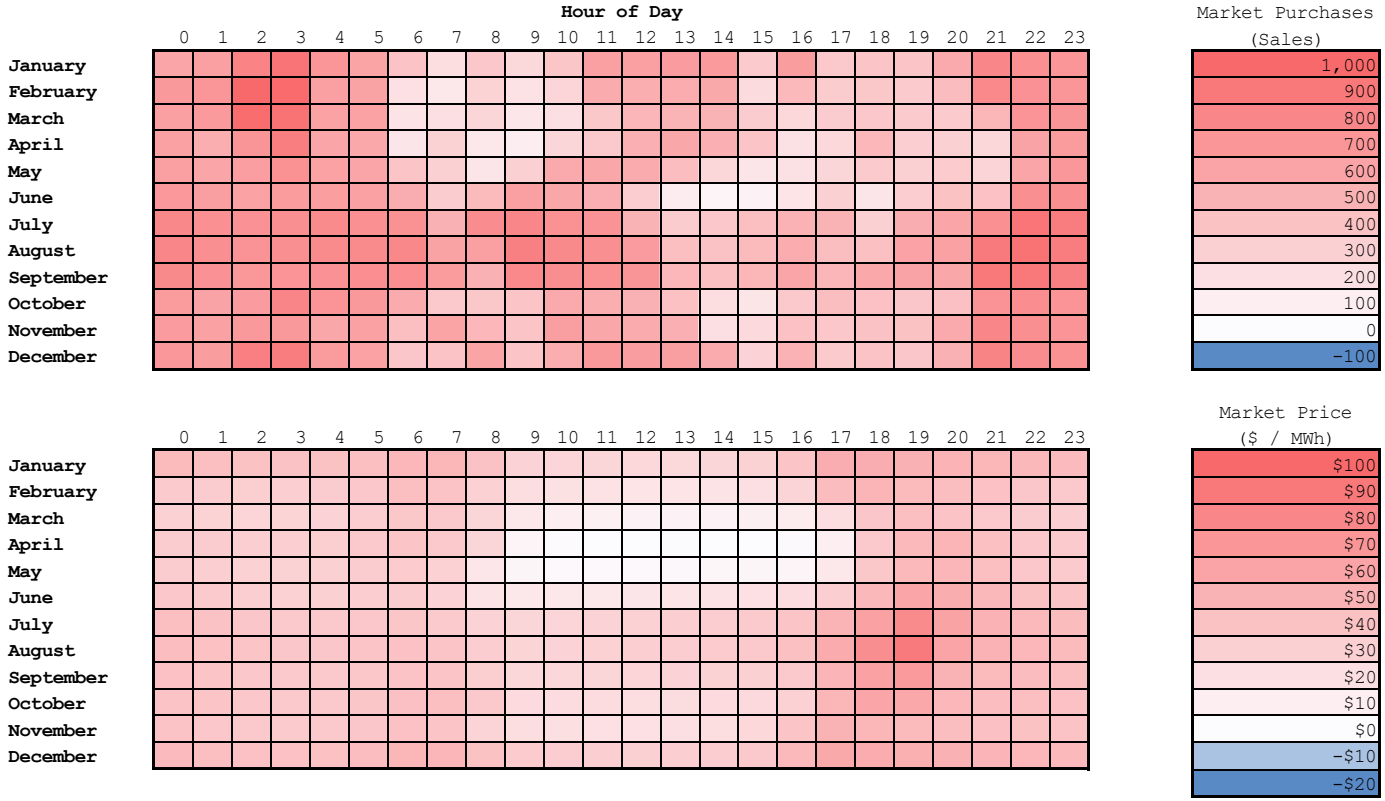
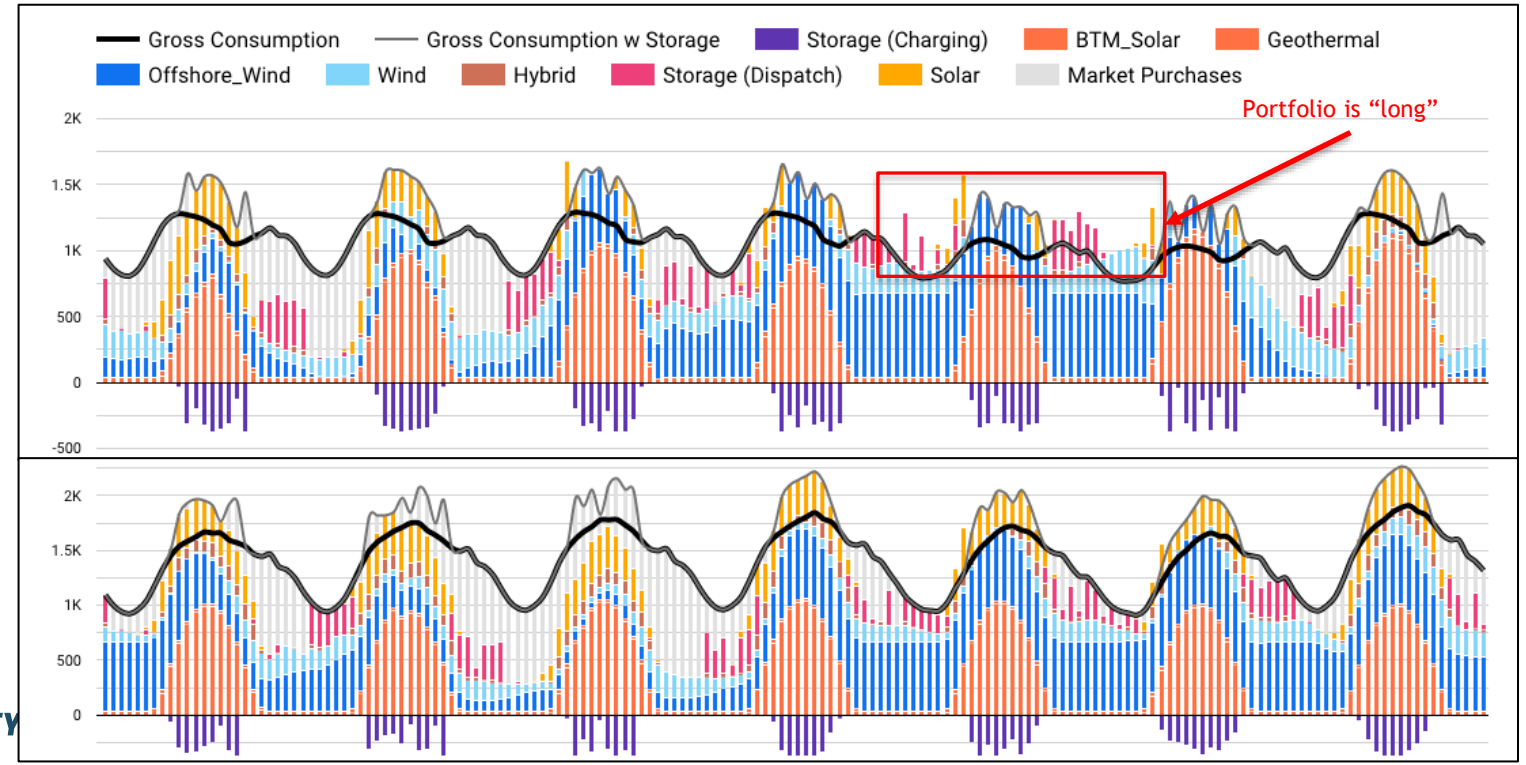


Preferred Conforming Portfolio – Market Exposure

Modeling exhibits a preference for portfolios that, on average, limit EBCE's sales of excess electricity into the market. This leads to periods of market reliance in "high load" months to limit exposure to low / negative prices in "lower load" months

Sample week – April 2035

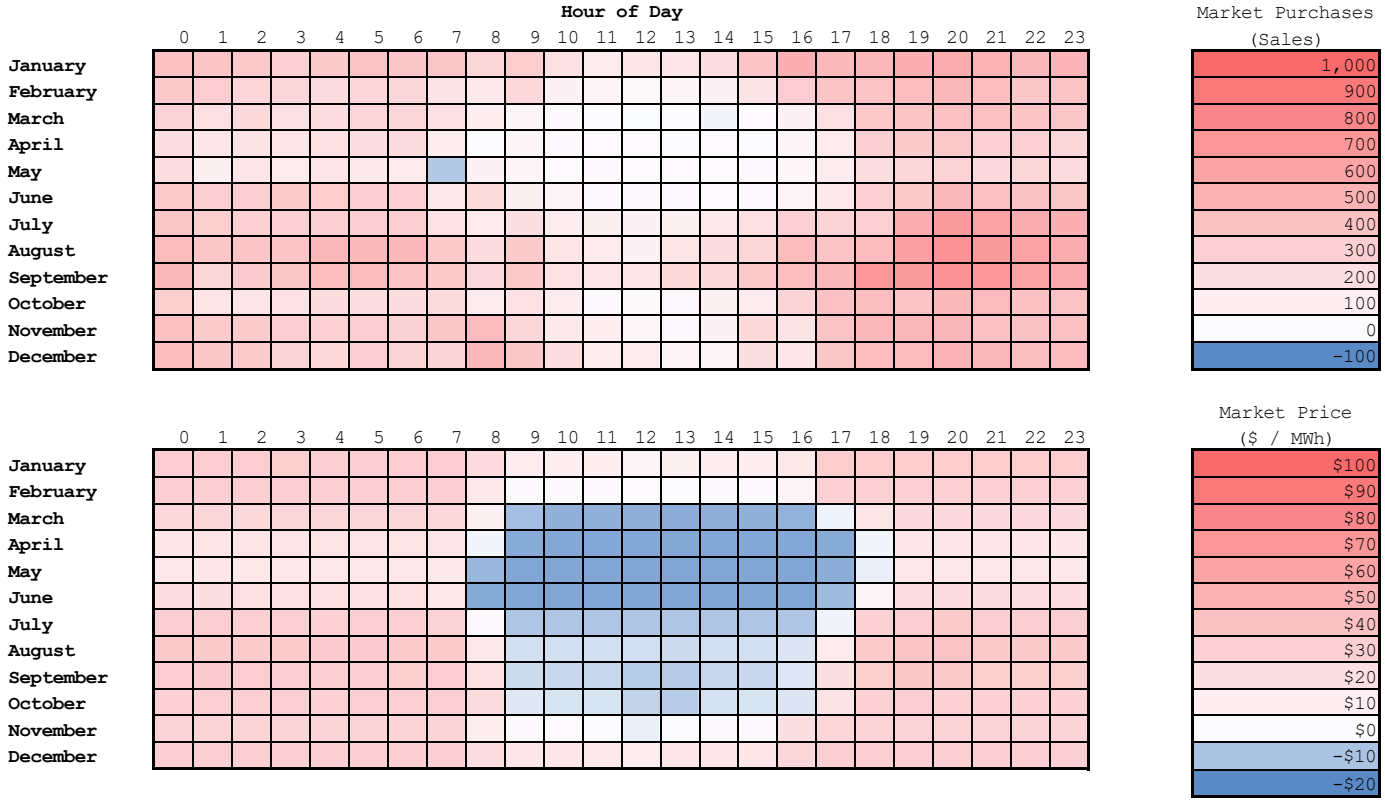
Sample week – July 2035



EAST BAY COMMUNITY ENERGY

Portfolio Market Exposure - 2035

Attachment Staff Report Item 12B



Standard LSE Plan

East Bay Community Energy Authority

2022 Integrated Resource Plan

November 1, 2022

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I. Executive Summary

The East Bay Community Energy Authority (EBCE), a Community Choice Aggregator (CCA) and public Load Serving Entity (LSE) governed by elected officials from its 15 member communities,[1] is pleased to participate in the Integrated Resource Planning (IRP) process. EBCE is proud to serve one of the most dynamic and diverse communities in the State of California, with a clear mandate to spur the transition to a clean, greenhouse gas (GHG)-free energy economy while providing affordable energy to our customers.

This IRP narrative presents EBCE's Preferred Conforming Portfolio that meets all applicable reliability constraints and assigned GHG benchmarks for the 2022 IRP cycle. Together with the accompanying Resource Data Templates (RDTs) and Clean System Power (CSP) workbooks for both the 30MMT and 25MMT 2035 GHG scenarios, this narrative satisfies the IRP filing requirements defined by the California Public Utilities Commission (CPUC or Commission). [Expected:] On October 19, 2022, EBCE's Board of Directors (Board) approved the analysis and delegated final review of filing materials to EBCE's CEO.

For the 2021–2022 IRP cycle, EBCE partnered with First Principles Advisory to build a bespoke modeling framework that optimizes the goals of reliability, GHG-emission reductions, and affordability of different resources. Leveraging the benefits afforded by this modeling framework, EBCE identified an optimized least-cost portfolio that surpasses the emission reduction targets from the CPUC and meets the requirements for GHG-free procurement adopted by EBCE's Board. With no current plans to include new large hydro contracts or an allocation of nuclear power in its future portfolio, EBCE's entire supply of GHG-free energy in 2030 would be made up of qualifying renewable resources. As a result, EBCE exceeds the California State goal that LSEs serve at least 60% of retail sales with qualifying renewable sources by 2030. Additionally, at least 39% of the renewable generation in EBCE's Preferred Conforming Portfolio would be from resources with which EBCE had signed long-term contracts.

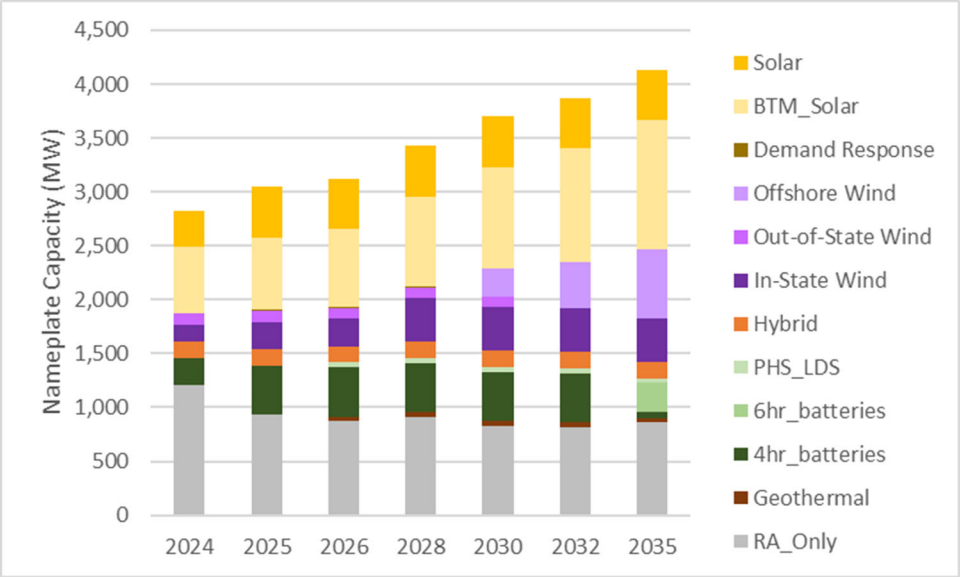
Actual procurement decisions may vary from EBCE's Preferred Conforming Portfolio due to prevailing market conditions, changes in direction from EBCE's Board, or CPUC action. Shortly after EBCE's completion of the modeling for this filing, the City of Stockton and EBCE's Board of Directors voted on and approved the City of Stockton's inclusion in EBCE's service territory starting in 2024. Required implementation filings to the CPUC have not been completed at this time, which means EBCE could not include Stockton's demand in the Preferred Conforming

[1] EBCE's current members are Alameda County and the Cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, Tracy, and Union City. The City of Stockton is scheduled to join EBCE in 2024.

Portfolio.[2] Nonetheless, EBCE staff view this IRP filing as an opportunity to communicate the overall direction of its procurement roadmap over the medium- and long-term horizons to EBCE's governing boards, customers, and regulatory agencies, while also recognizing a need for subsequent analysis that incorporates the additional electric demand from Stockton customers. EBCE encourages stakeholders to view the Preferred Conforming Portfolio as the organization's directional view on likely procurement decisions regarding resource types, amounts, locations, and timing of future portfolio additions.

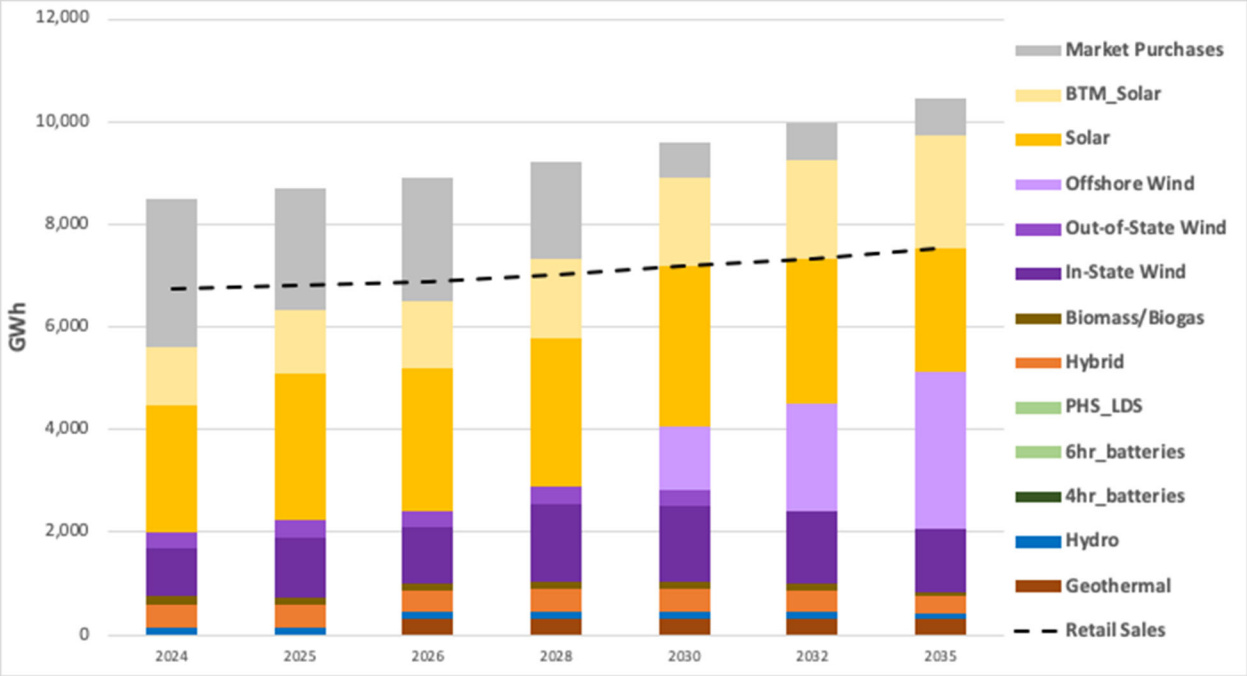
The total resource mix for EBCE's Preferred Conforming Portfolio is broken down by resource type in Figure 1 and Figure 2 below. These charts include EBCE's baseline resources, (i.e., resources already under contract), candidate resources (i.e., incremental resources added to the portfolio as part of this IRP exercise), environmental attributes (e.g., the Voluntary Allocation and Market Offer [VAMO]), and expected future market transactions (e.g., Resource Adequacy [RA]-Only contracts, fixed price Inter-Scheduling-Coordinator Trades [ISTs], and Day-Ahead Market purchases).

Figure 1 Nameplate Capacity of EBCE's Preferred Conforming Portfolio



[2] The CPUC determines the requirements for what constitute a "Conforming Portfolio" and specifies the retail sales forecast that each LSE must use for their filing to meet this definition. Nevertheless, EBCE appreciates that the Commission continues to allow LSEs to recommend modifications to the LSE-specific breakdown of the IEPR load forecast as part of the IRP cycle.

Figure 2 Annual Net Generation of EBCE's Preferred Conforming Portfolio[3]



To improve the applicability of the results from this IRP, EBCE staff supplemented the inputs and assumptions provided by the Commission with internal, proprietary forecasts on expected future market pricing conditions. The CPUC-provided values can be found in the 2022 Unified RA and IRP Modeling Datasets.[4] This dataset includes the 2021 California Energy Commission (CEC) Integrated Energy Policy Report (IEPR) load forecast, technology cost curves from NREL's 2021 Annual Technology Baseline (ATB), and the Effective Load Carrying Capacity (ELCC) values from the CPUC's latest loss-of-load-probability (LOLP) studies published in partnership with Energy and Environmental Economics, Inc. (E3), and Astrapé Consulting. EBCE staff relied on internal assumptions for the following: EBCE's actual procurement to date, expectations on future RA market pricing conditions and resource availability, and information germane to EBCE's local customer programs. All load-modifying resources, including BTM solar and storage, were modeled based on IEPR assumptions.

Once EBCE completed the modeling exercise to identify the optimal portfolio, staff transferred the results into the CPUC's RDT and CSP workbooks to verify that the portfolio conformed with all the applicable reliability and environmental requirements. As shown in the RDTs submitted

[3] Listed volumes include EBCE's VAMO allocations.

[4] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials/unified-ra-and-irp-modeling-datasets-2022

with this IRP Plan, EBCE's Preferred Conforming Portfolio satisfies its share of the system's Marginal Resource Needs in each year from 2024 – 2035 for both GHG scenarios. In addition, the calculated annual CO_2 emissions from the portfolio are 0.751 million metric tons (MMT) in 2030 and 0.614 MMT in 2035, which are less than EBCE's assigned GHG benchmarks of 0.772 MMT in 2030 and 0.623 MMT in 2035 for the 25 MMT GHG scenario.

II. Study Design

A. Objectives

Tracking the CPUC's IRP cycle, EBCE performs an IRP analysis exercise every two years to inform its mid-term and long-term procurement strategy. An integral part of EBCE's IRP analysis is to ensure that the planned resource mix can achieve the milestones assigned by EBCE's Board of Directors. Another key objective of this planning exercise is to identify a portfolio that satisfies CPUC requirements related to system reliability and GHG-reduction targets across the entire IRP planning horizon, which currently looks forward to 2035. The resulting portfolio not only is feasible to adopt and implement but may also assist EBCE in balancing the goals of reliability, decarbonization, and economics. Equally important, the IRP compliments the Commission's efforts to identify cost-effective resource choices that support system grid reliability and other statewide policy goals. The resource portfolio submitted for this IRP is the joint outcome of a series of fundamental modeling exercises as well as discussions with EBCE's Board, advisory committee, and other stakeholders.

The objectives for the analytical work described herein include:

- Satisfy the goals set forth by EBCE's Board;
- Satisfy the regulatory requirements of PU Code Section 454.52(a)(1);
- Satisfy all CPUC specifications for required conforming portfolios;
- Demonstrate how future portfolios achieve EBCE's 30 MMT and 25 MMT 2030 GHG Benchmarks;
- Demonstrate continuous progress towards meeting or exceeding the State's RPS targets;
- Show how EBCE's future portfolios will contribute to overall system reliability, particularly between the hours of 5 p.m. and 9 p.m.; and
- Provide insight into how State policy mandates and GHG emission reductions change EBCE customer costs over time.

B. Methodology

i. Modeling Tool(s)

For this IRP cycle, EBCE contracted with First Principles Advisory to design, build, and conduct the modeling analysis. To generate its Preferred Conforming Portfolios, EBCE and its consultant used a suite of modeling tools to account for all the critical modeling aspects related to planning: (1) capacity expansion modeling, (2) production cost modeling, and (3) local portfolio optimization. For capacity expansion modeling and local portfolio optimization, EBCE used Blue Marble Analytics' GridPath modeling software.[5] For production cost modeling of the California Independent System Operator (CAISO) system and broader WECC region, EBCE used Energy Exemplar's Plexos modeling program, an industry-leading fundamental modeling software.[6]

GridPath is an open-source fundamental modeling tool built and maintained by Blue Marble Analytics. The program can perform a variety of functions relevant to the IRP process, including regional capacity expansion modeling for CAISO and its surrounding balancing area (BA) regions. For this IRP exercise, GridPath was modified from its latest public release (version 14.1) to mimic the functionality available in RESOLVE. Specifically, two primary modifications were made: (1) an ELCC storage surface was added alongside the existing wind-solar ELCC surface; and (2) transmission deliverability constraints for peak primary, peak secondary, and off-peak time periods were also added to the linear problem (LP) formulation. In addition, GridPath was also modified to handle the CPUC-issued marginal ELCC values for each technology type across all years in the planning horizon. This last modification enabled EBCE to account for the annual reliability constraint in the RDT when generating its optimal portfolio.

For production cost modeling of the CAISO system and its surrounding BA neighbors, EBCE used Plexos. Working with First Principles Advisory, EBCE updated its Plexos' WECC zonal database with the Inputs and Assumptions for the 2022 IRP cycle and cross-referenced its database with the databases maintained by Energy Exemplar, the CEC and CAISO. The version of Plexos used for this modeling exercise was v9.0 R09.

ii. Modeling Approach

The modeling framework used to create EBCE's Preferred Conforming Portfolio is a multi-step process that begins with investment and operational decision modeling and concludes with local portfolio optimization. By individually addressing each of the key stages that constitute a robust

[5] See https://github.com/blue-marble/gridpath (latest available public codebase available at this website address).

[6] See https://www.energyexemplar.com/

IRP planning methodology, EBCE acquired greater clarity on potential future states of the grid and what the likely impacts would be to its portfolio. In addition, EBCE was able to conduct a detailed assessment of the trade-offs between its long-term goals and associated costs of such targets, and as a result, EBCE is better positioned to make timely, orderly, and cost-efficient procurement decisions for its customers.

Step 1 of the process begins with capacity expansion modeling (CEM) of the CAISO system in a manner similar to that taken by the CPUC's IRP instance of E3's RESOLVE model. Using the same inputs and spatiotemporal settings, GridPath was run by First Principles Advisory to conduct a benchmarking exercise with the CPUC's June 2022 Preferred System Plan (PSP). Although comparable results between the two models were attained, EBCE used the official results from RESOLVE to eliminate the introduction of modeling basis error downstream. Nevertheless, with GridPath successfully benchmarked to RESOLVE, EBCE is now capable of conducting additional capacity expansion modeling studies of the bulk electric system using alternative assumptions for future planning exercises.

Step 2 in the modeling sequence is to take the system buildout from Step 1 and port the selected candidate resources into a production cost model to assess system reliability, emissions, and regional forward pricing conditions in a more detailed manner. Similar to Step 1, EBCE assumed the same fuel and carbon price forecasts as listed in the official 2022 Inputs and Assumptions dataset. To map the candidate resources to the appropriate geographic region, First Principles Advisory leveraged the results of the CPUC's Resource-to-Busbar methodology defined for the 2021-2022 Transmission Planning Process (TPP)[7]. Once the setup of the Plexos model was complete, the model was run to ensure there was sufficient reliability across all hours and generated 8760 pricing for all the primary load zones in California. For this IRP cycle, EBCE only ran deterministic studies in Plexos and did not conduct any stochastic runs. EBCE will investigate the added utility in including stochastic runs to augment its reliability and pricing analysis for future IRP filings.

Once the Plexos modeling is finished, the analysis of the CAISO system is complete. The modeling framework then transitions into "local mode" for Step 3. In this step, Gridpath seeks to optimize EBCE's portfolio for the active planning horizon by identifying the candidate resources that, together with the existing baseline resources, will meet EBCE's reliability and environmental targets in a least cost manner. At this stage, financial markets for both energy and capacity are defined in Gridpath and the model implements a price-taking assumption on behalf of EBCE. The

[7] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2019-20-irp-events-and-materials/portfolios-and-modeling-assumptions-for-the-2021-2022-transmission-planning-process.

instantiation of these markets enables GridPath to assist EBCE in identifying the optimal tradeoff between bundled energy power purchase agreements (PPAs) and energy storage agreements (ESAs)[8], RA-only contracts, and market exposure to the CAISO's Day-Ahead (DA) market. In addition to these economic considerations, GridPath is also able to account for any Board-specific RPS and/or GHG goals that exceed state-mandated targets.

The figure below conceptually outlines each step of the modeling framework.

[8] Hereinafter all long-term agreements that include multiple products, whether in the form of an ESA, PPA or other form of contract, are referred to as "bundled PPAs" for ease of reference.

Figure 3 Graphical Depiction of EBCE's IRP Modeling Methodology

Step	Stage: Region	Methodology Description
1	System CEM (GridPath)	Using the official I&A values, GridPath replicated the CPUC's June 2022 PSP generated in RESOLVE. **Note:** for this IRP cycle, EBCE did not evaluate alternative system-wide buildout scenarios and used the official published results for 30 MMT and 25 MMT base cases for the sake of consistency. For this IRP cycle, GridPath was primarily run to benchmark its results to RESOLVE. 
2	System PCM (Plexos)	Taking the official results from the June 2022 version of RESOLVE for the 30 MMT and 25 MMT cases, a zonal configuration of WECC—with an emphasis on the CAISO BA— is modeled for select calendar years from 2024-2035 to assess system adequacy, generate indicative forward pricing, and estimate system wide GHG emissions. 
3	Local Portfolio Optimization (Gridpath)	Using the results from Step 2 along with the relevant CPUC-administered inputs for RA and GHG targets, GridPath identifies a portfolio with the optimal selection of candidate resources that will—along with the existing baseline resources— satisfy all the requirements LSEs must meet for a Conforming Portfolio as well as any additional LSE-specific constraints that exceed the requirements of the IRP proceeding. 

III. Study Results

A. Conforming and Alternative Portfolios

Pursuant to ALJ Ruling, an LSE is permitted to submit a single preferred portfolio where that LSE intends to go below its proportional share of both the 2030 30 MMT benchmark and the 2035 25

MMT benchmark.[9] EBCE intends to achieve a lower portfolio emissions level than its expected share of both the 30 MMT and 25 MMT 2035 benchmark. Therefore, EBCE elected to develop a single conforming portfolio for the 2022 IRP cycle. Table 1 lists the resources and corresponding nameplate capacities for the calendar years explicitly modeled in GridPath. For additional project related information, please refer to the RDT attachments.

Table 1 Nameplate Capacity (MW) of EBCE's Preferred Conforming Capacity by Project Type and Technology[10]

Project Type	Tech	Project	2024	2026	2030	2035
baseline	4hr_batteries	HenriettaStorage	10	10	10	10
baseline	4hr_batteries	Sanborn	47	47	47	0
baseline	4hr_batteries	Tumbleweed	50	50	50	50
baseline	BTM_Solar	BTM_Solar	618	719	940	1,196
baseline	Demand Response	OhmConnect	10	10	0	0
baseline	Demand Response	SUN01RA2031	1	1	1	0
baseline	Geothermal	FervoFECNevada1	0	40	40	40
baseline	Hybrid	DaggettSolarPower3	50	50	50	50
baseline	Hybrid	Scarlet	100	100	100	100
baseline	In-State Wind	SummitWind	56	56	56	56
baseline	Out-of-State Wind	Tecolote	100	100	100	0
baseline	RA_Only	Aggregate	1,205	873	832	858
baseline	Solar	EdwardsSolarII	100	100	100	100
baseline	Solar	RosamondCentral	112	112	112	112
baseline	Solar	TulareSolarCenter	56	56	56	56
candidate	4hr_batteries	Arizona_Li_Battery	57	117	117	0
candidate	4hr_batteries	Northern_California_Li_Battery	44	117	117	0
candidate	4hr_batteries	Riverside_Li_Battery	49	117	117	0
candidate	6hr_batteries	Generic_6hr_battery	0	0	0	268
candidate	8hr_batteries	Generic_8hr_battery	0	47	47	47
candidate	In-State Wind	Northern_California_Wind	100	200	349	349
candidate	Offshore Wind	Humboldt_Bay_Offshore_Wind	0	0	256	638
candidate	RA_Only	Aggregate	59	16	454	590
candidate	Solar	Arizona_Solar	55	205	205	205

[9] *ALJ Ruling Finalizing Load Forecasts and GHG Targets for the 2022 IRP LSE Plans,* issued June 15, 2022 at pp. 12, 15.

[10] Baseline "RA_Only" resources include EBCE's allocated share of Cost Allocation Mechanism (CAM) and Central Procurement Entity (CPE) related capacity.

Rather than assuming a proportional share of the June 2022 PSP, EBCE leveraged the capabilities of its modeling framework to identify a portfolio that was better suited to satisfy both state-mandated and EBCE-specific requirements. Table 2 lists the planned resources the organization would have selected had EBCE taken its proportional share of the PSP Portfolio[11]. To facilitate a comparative analysis, Table 3 summarizes EBCE's planned resources that GridPath selected for the Preferred Conforming Portfolio using a similar classification scheme.[12] Table 4 and Table 5 provide a similar comparison for the entire portfolio – including both baseline (i.e., existing) and candidate (i.e., planned) resources.

Table 2 EBCE's Pro-Rate Share of Planned Resources (MW) from 2022 PSP (25 MMT Scenario)

Technology	2024	2025	2026	2028	2030	2032	2035
DR	21	24	24	24	24	24	24
Solar	229	324	337	369	706	706	819
Geothermal	3	3	33	33	33	33	33
Biomass	2	3	3	4	4	4	4
In-State Wind	76	126	126	126	126	126	126
Out-of-State Wind	0	0	0	142	142	142	142
Offshore Wind	0	0	4	6	6	91	139
PHS / LDS	0	0	6	30	30	30	30
Li_Battery	298	349	349	357	429	473	584

Table 3 Candidate (i.e., Planned) Resources (MW) Selected for EBCE's Preferred Conforming Portfolio

Technology	2024	2025	2026	2028	2030	2032	2035
DR	0	0	0	00	0	0	0
Solar	55	205	205	205	205	205	205
Geothermal	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0
In-State Wind	100	200	200	349	349	349	349
Out-of-State Wind	0	0	0	0	0	0	0
Offshore Wind	0	0	0	0	256	434	638
PHS / LDS	0	0	47	47	47	47	47
Li_Battery	150	350	350	350	350	350	268

[11] EBCE staff assumed 2.95% of total system load for this exercise.

[12] Table includes only bundled resources and excludes market-related transactions (e.g., RA-only or IST contracts). These volumes can be found in Table 5.

Table 4 EBCE's Pro-Rate Share of Total Resources (MW) from 2022 PSP (25 MMT Scenario)

Technology	2024	2025	2026	2028	2030	2032	2035
RA	869	809	804	804	804	793	777
Hydro	293	293	293	293	293	293	293
DR	86	89	89	89	89	89	89
Solar	713	809	821	853	1,190	1,190	1,190
Geothermal	50	50	80	80	80	80	80
Biomass	26	27	27	28	28	28	28
In-State Wind	282	332	332	332	332	332	332
Out-of-State Wind	0	0	0	142	142	142	142
Offshore Wind	0	0	4	6	6	91	139
PHS / LDS	56	56	62	86	86	86	86
Li_Battery	357	408	408	416	487	531	642

Table 5 Nameplate Capacity (MW) of Total Resources Selected for EBCE's Preferred Conforming Portfolio

Technology	2024	2025	2026	2028	2030	2032	2035
RA	1,264	1,001	950	954	977	910	890
Hydro	0	0	0	0	0	0	0
DR	11	11	11	11	1	0	0
Solar	472	622	622	622	622	622	622
Geothermal	0	0	40	40	40	40	40
Biomass	0	0	0	0	0	0	0
In-State Wind	156	256	256	406	406	406	406
Out-of-State Wind	100	100	100	100	100	0	0
Offshore Wind	0	0	0	0	256	434	638
PHS / LDS	0	0	47	47	47	47	47
Li_Battery	300	500	500	500	500	500	371

As shown in Figure 4 and Figure 6 below, EBCE's Preferred Conforming Portfolio exhibits noteworthy differences when compared to its pro-rata share of the PSP. One of the principal distinctions between the two portfolios is the Preferred Conforming Portfolio's greater preference for wind energy over solar energy. While multiple assumptions in the GridPath model promote this resource type preference, the primary drivers are wind's resource profile during favorable LMP hours and greater per-unit reliability benefits thanks to the higher assigned ELCC factors from the CPUC. The other salient difference between the two portfolios is the selection between RA-only contracts and storage with tolling benefits. Similar to the wind-solar tradeoff,

multiple assumptions affect the model's evaluation of RA-only and storage contracts for the portfolio. The primary ones, however, are the market price of RA, forecasted hourly energy prices, storage CAPX costs, and the required minimum contract length for both candidate resources.

Figure 4: Percent Allocation of EBCE's Portfolio Assuming Pro-Rate Share of 2022 PSP (25 MMT Scenario)

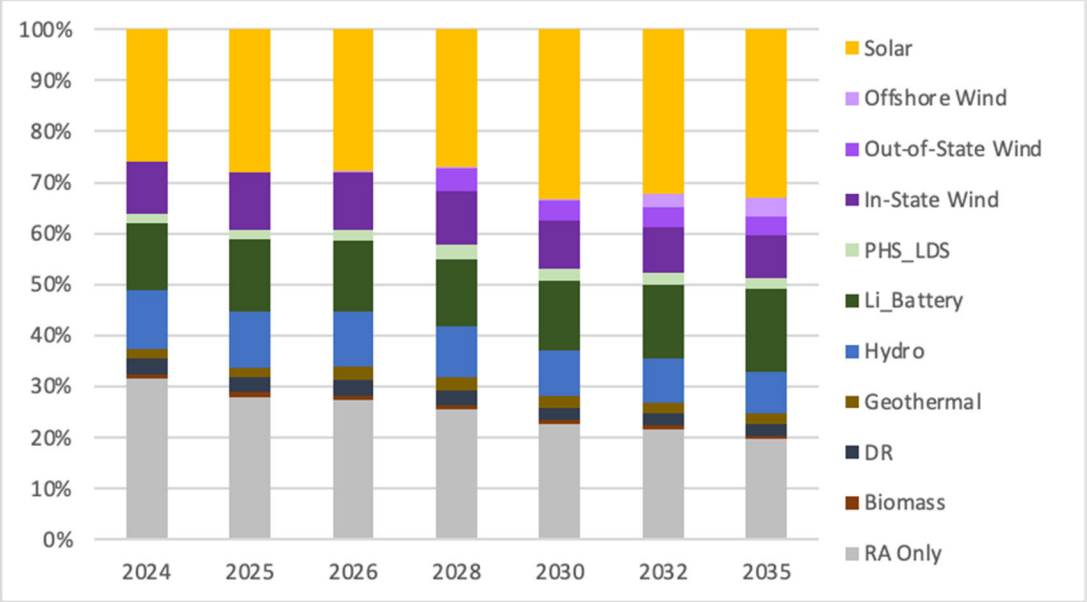
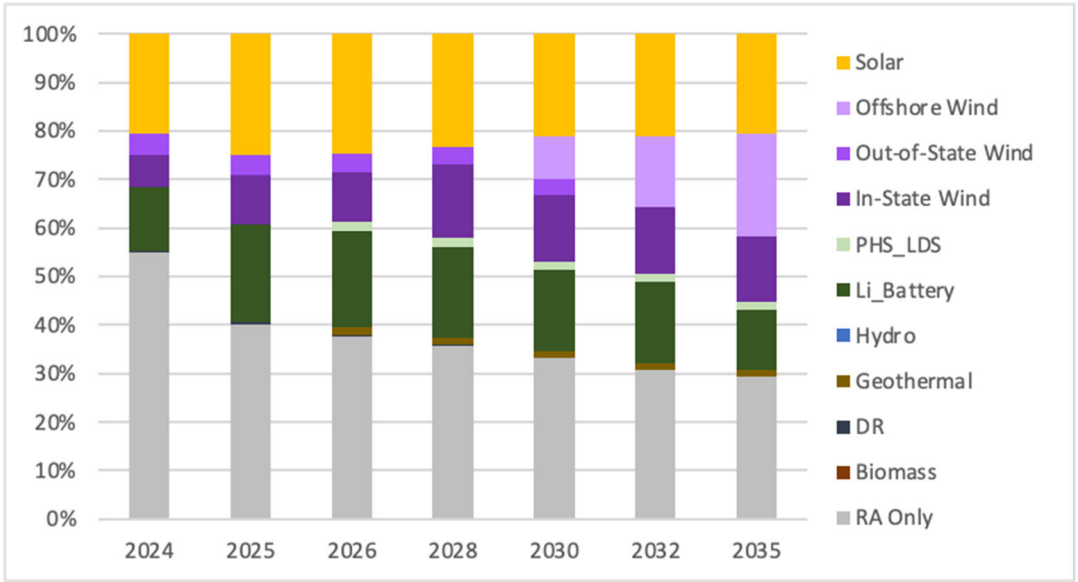


Figure 5: Percent Allocation of EBCE's Preferred Conforming Portfolio



iii. EBCE's existing and contracted resources

EBCE began executing long-term offtake agreements in 2019 and has released three RFOs since its inception. Presently, five of EBCE's long-term contracted assets are operational resources and numerous additional resources are scheduled to achieve commercial operation in the next few years. These resources are described below as physical, in development resources, consistent with the definitions provided in the Resource Data template. To date, EBCE has contracted with nine RPS-eligible generating resources of varying types and in some cases with co-located energy storage, to reduce emissions and to cover our load. These contracts are not included in the CPUC's Baseline resource list and were added to the Resource Data Templates as physical resources in development for EBCE's 30 MMT and 25 MMT conforming portfolios to ensure completeness.[13]

- **Scott Haggerty Wind Energy Center**: The project is a 57.5 MW wind facility under contract with Greenbacker Energy; PPA executed on July 9, 2019. It is solely a wind facility and is located in Alameda County, making it the first in-county generating facility with energy off-take that EBCE contracted. The facility achieved Commercial Operation Date (COD) on July 20, 2021 and the term of the PPA is 20 years.
- **Golden Fields Solar**: The project is a 112 MW solar facility developed by Clearway Energy Group; PPA executed on July 26, 2019 . It is solely a solar facility and is located in Kern County. The facility achieved COD on December 22, 2020 and the term of the PPA is 15 years.
- **Henrietta D Storage**: The project is a 10 MW, 4-hour duration energy storage (40 MWh) resource developed by Convergent Energy and Power; ESA executed on July 30, 2021. It is solely an energy storage facility and is located in Kings County. The facility achieved COD under its contract on January 1, 2022. The term of the PPA is 15 years.
- **Tecolote Wind**: This project is a wind facility developed by Pattern Energy; PPA executed on December 20, 2021. It is solely a wind facility and is located in Torrance and Guadalupe counties, New Mexico. The facility achieved COD on December 20, 2021 and the term of the PPA is 10 years.
- **Tulare Solare Center**: This project is a 55.8 MW solar facility under contract with Idemitsu Renewables; PPA executed June 10, 2019. It is solely a solar facility and is located in Tulare County. The facility achieved COD on April 30, 2022 and the term of the PPA is 15 years.
- **Scarlet I Solar Park**: This project is a 100 MW solar plus 30 MW 4-hour duration energy storage (120 MWh) resource developed by EDP Renewables North America; amended and restated PPA+ESA executed on March 21, 2022. It will be located in Fresno County. The expected COD is March, 2023 and the term of the PPA is 20 years.
- **Edwards Energy Center**: This project is a 100 MW solar facility developed by Terra-Gen; PPA executed on September 25, 2019. It is solely a solar facility and will be located in Kern County. The expected COD is December, 2022 and the term of the PPA is 15 years.

[13] *See* Attachment 3a (Resource Data Template – 25 MMT) and Attachment 3b (Resource Data Template – 30 MMT).

- **Sanborn Storage**: This project is a 47 MW 4-hour duration energy storage (188 MWh) resource developed by Terra-Gen; ESA executed on September 3, 2021. It is solely and energy storage facility and will be located in Kern County. The expected COD is December, 2022 and the term of the ESA is 12 years.
- **Daggett 3**: This project is a 50 MW solar and 12.5 MW 4-hour duration energy storage (50 MWh) resource developed by Clearway Energy; PPA+ESA executed on September 29, 2021. The facility will be located in San Bernadino County. The expected COD is July, 2023 and the term of the PPA+ESA is 15 years.
- **Oberon II**: This project is a 125 MW solar and 125 MW 4-hour duration energy storage (500 MWh) resource developed by Intersect Power with an executed PPA + RA Agreement on September 3, 2021. The facility will be located in Riverside County. The expected COD is January, 2024 and the term of the contract is 10 years.
- **Tumbleweed Energy Storage**: This project is a 500 MW 4-hour duration energy storage (200 MWh) resource developed by REV Renewables with an executed ESA on September 20, 2021. The facility will be located in Kern County. The expected COD is June, 2024 and the term of the contract is 15 years.
- **FEC Nevada 1**: This project is a40 MW geothermal facility developed by Fervo Energy; PPA executed on April 6, 2022.It is solely a geothermal facility and will be located in Churchill County, Nevada. The expected COD is June, 2026 and the term of the contract is 15 years.

Table 6 EBCE's current list of contracted long-term generation ("development resources")

Seller	Project Name	Technology	Nameplate MW	Storage MW	County	Expected COD	Term (Years)
Greenbacker Energy	Scott Haggerty Wind Energy Center	Wind	57.5	N/A	Alameda	7/20/2021	20
Clearway Energy Group	Golden Fields Solar	Solar	112	N/A	Kern	12/22/2021	15
Idemitsu Renewables	Tulare Solar Center	Solar	55.8	N/A	Tulare	4/30/2021	15
EDP Renewables North America	Scarlet I Solar Park	Solar + Storage	100	30MW/120MWh	Fresno	3/31/2022	20
Terra-Gen	Edwards Energy Center	Solar + Storage	100	TBD	Kern	12/31/2022	15
Clearway Energy Group	Daggett 3	Solar + Storage	50	12.5MW/50MWh	San Bernadino	7/30/2023	15

Seller	Project Name	Technology	Nameplate MW	Storage MW	County	Expected COD	Term (Years)
Intersect Power	Oberon II	Solar + Storage	125	31.25MW/125MWh	Riverside	1/1/2024	15
Pattern Energy	Tecolote Wind	Wind	100		Guadalupe & Torrance, NM	12/20/2021	10
Fervo Energy	FEC Nevada 1	Geothermal	40		Churchill, NV	5/01/2026	15
Convergent Energy and Power	Henrietta D	Storage		10MW/40MWh	Kings	01/01/2022	15
REV Renewables	Tumbleweed Energy Storage	Storage		50MW/200MWh	Kern	6/01/2024	15
Terra-Gen	Sanborn Storage	Storage		47MW/188MWh	Kern	12/28/2022	12

B. Preferred Conforming Portfolios

EBCE's Preferred Conforming Portfolio meets the CPUC's requirements of "conforming" and is consistent with the relevant statutory requirements of PU Code Section 454.52(a)(1). Below is a description of how EBCE's planned resource mix satisfies each of those requirements.

- The GHG reduction targets established by the State Air Resources Board for the electricity sector are set such that economywide GHG emissions reductions of 40 percent from 1990 levels by 2030 are achieved. By EBCE meeting its assigned GHG benchmarks for the 30MMT and 25 MMT scenario—as reflected in the accompanying CSP Calculators, this requirement is satisfied.
- Article 16 (commencing with Section 399.11) of Chapter 2.3 requires LSEs to meet at least 60 percent of retail sales with eligible renewable energy resources by December 31, 2030. Based on CSP accounting methodologies, EBCE's conforming portfolio is expected to meet 89% of retail sales with eligible RPS energy by 2030.
- Along with its current projections on future market pricing conditions, EBCE uses the costs assumptions provided by the CPUC. The organization's IRP modeling methodology applies these assumptions and identifies the least-cost portfolio that satisfies all defined reliability, GHG, and RPS constraints. As a result, EBCE's Preferred Conforming Portfolio fulfills its obligation to serve customers at just and reasonable rates and minimizes impacts on ratepayer's bills.

- By satisfying the reliability constraint defined in the RDT for both the 30MMT and 25MMT GHG scenario, EBCE believes it has demonstrated how its Preferred Conforming Portfolio meets the near-term and forecast long-term resource adequacy requirements of Section 380.
- Net of expected curtailments, EBCE's planned resource mix is scheduled to provide at least 65 percent of its RPS requirement for each compliance period from contracts of 10 years or more in duration. Please see the following table for supporting values.
- EBCE's planned resource mix is a diverse mix of resources that spans multiple technology types. In instances in which transmission upgrades are possible or likely (e.g., offshore wind) the organization will work with the appropriate stakeholders to assess commercial viability in a timely and costly manner.
- Enhance demand-side energy management.
- EBCE will continue to monitor the cost and availability of alternative supply-side and demand-side resources that can minimize air pollutant emissions, particularly in disadvantaged communities.

Table 7 Required RPS Portfolio Level and CSP Tool Modeled RPS Generation

	2024	2026	2030
Compliance Period	4	5	6
State RPS Requirement %	43.8	49.2	60.0
State RPS Requirement GWh	2,952	3,388	4,308
Delivered RPS (CSP)	4,370	5,253	6,415
State RPS Long-term Requirement (%)	65.0	65.0	65.0
State RPS Long-term Requirement (GWh)	1,919	2,203	2,800
Delivered LT RPS (CSP)	4,129	5,063	6,296

C. GHG Emissions Results

This section discusses the emissions results for EBCE's Preferred Conforming Portfolio as calculated by the Clean System Power (CSP) calculator.[14] Because EBCE is submitting a single portfolio that satisfies both GHG scenarios, the values listed below are from the 25 MMT version of the CSP.

While EBCE's portfolio meets the accepted definition of a 100% Renewable/CO2-Free Portfolio (eligible renewable or carbon-free resources as a share of *retail* sales, calculated on an annual basis), the modeling specifications developed by staff allowed the use of system power to shape the renewable output and account for transmission and distribution losses. When the resulting Preferred Conforming Portfolio was input into the CSP, which takes an hourly view of emissions associated with a given portfolio, the system power portion of EBCE's portfolio is calculated as emitting 0.597 million metric tons (MMT) in 2030 and 0.518 MMT in 2035. Additionally, the CSP assigns each LSE a share of the system emissions from Combined Heat and Power (CHP) resources. Table 8 shows EBCE's CPUC-assigned GHG benchmarks for 2030 and 2035 at 0.772 MMT and 0.623 MMT, respectively. With reported emissions of 0.749 MMT in 2030 and 0.609 MMT in 2035, EBCE's Preferred Conforming Portfolio is compliant with the CPUC's targets in both years.

Table 8 CO_2 Emissions Summary of EBCE's Preferred Conforming Portfolio[15]

CO_2	*Unit*	2024	2026	2030	2035
Coal	*MMt/yr*	0.000	0.000	0.000	0.000
CHP	*MMt/yr*	0.163	0.162	0.159	0.098
Biogas[16]	*MMt/yr*	0.000	0.000	0.000	0.000
Biomass[16]	*MMt/yr*	0.000	0.000	0.000	0.000
System Power	*MMt/yr*	1.130	0.854	0.590	0.511

[14] The Clean System Power (CSP) tool is an excel-based workbook provided the CPUC that calculates emissions from CAISO system's dispatchable thermal generation and unspecified imports and allocates them to LSEs based on their planned IRP portfolios.

[15] CHP emissions shown in Table 8 represent EBCE's pro rata share of behind-the-meter Combined Heat and Power (CHP) interconnected to the CAISO-controlled electric grid. CHP emissions are determined by the CSP calculator as a function of LSE load, unrelated to the 'actual' GHG-emission profile of any specific LSE's resource portfolio. EBCE is required to include this allocation in its CSP.

[16] As shown in the section below, EBCE is allocated particulate emissions associated with the VAMO allocation of Biomass / Biogas attributes. However, the CSP assigns no CO2 emissions for these resources.

Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000
Total	***MMt/yr***	**1.293**	**1.015**	**0.749**	**0.609**
Average emissions intensity	*tCO_2/MWh*	0.192	0.147	0.104	0.081
Oversupply Emissions Credits	*MMt/yr*	0.15	0.17	0.10	0.22

- The only inputs specified by EBCE for the CSP workbook were the CPUC-issued retail sales and BTM solar forecasts and EBCE's supply portfolio information, which are copied over from the RDT. For this exercise, EBCE did not include any custom hourly load shapes or user-specified production profiles.
- Table 9 provides a summary of the amount of EBCE's portfolio that is provided by RPS and GHG-F resources according to the methodology used in the CSP. While GridPath modeling indicates that EBCE would achieve 100% of retail sales from GHG-free resources in 2030 and beyond, the CSP calculator expects curtailment beyond that shown in GridPath. This modeled curtailment lowers the percentage of retail sales from GHG-free resources to 89% and 95% in 2030 and 2035, respectively. Please refer to the CSP calculator file for more information on the emission calculations used to generate the results shown in Table 8 and Table 9.

Table 9 CSP Summary of EBCE's Preferred Conforming Portfolio

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	6,740	6,887	7,180	7,540
RPS-Eligible Delivered Renewable	GWh	4,365	5,249	6,425	7,136
GHG free	GWh	4,365	5,249	6,428	7,147
RPS-Eligible Delivered Renewable Percentage	% of retail sales	65	76	89	95
GHG-free Percentage	% of retail sales	65	76	90	95

D. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

The following tables provide a breakdown of the air pollutant emissions (e.g., Particulate Matter (PM) 2.5, SO_2, and NO_X) associated with EBCE's Preferred Conforming Portfolio as calculated by the CSP. As previously mentioned, EBCE's primary source of air pollutants are the result of its reliance on system power, with some additional pollutants arising from EBCE's VAMO

allocation[17]. To minimize the generation of local air pollutants and their corresponding impacts on disadvantaged communities, EBCE will continue to monitor the cost and availability of alternative candidate projects as well as the percentage of total supply for the portfolio made up by market purchases.

Table 10 Preferred Conforming Portfolio of PM 2.5 Emissions

PM2.5	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	9.16	9.09	8.95	5.50
Biogas	tonnes/yr	4.35	4.34	4.11	1.27
Biomass	tonnes/yr	36.95	35.04	26.08	19.87
System Power	tonnes/yr	28.85	21.28	16.58	13.88
Total	tonnes/yr	79.30	69.76	55.72	40.52
Average emissions intensity	kg/MWh	0.01	0.01	0.01	0.01

Table 11 Preferred Conforming Portfolio SO_2 Emissions

SO2	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	0.97	0.97	0.95	0.58
Biogas	tonnes/yr	3.17	3.15	3.06	0.95
Biomass	tonnes/yr	14.21	13.48	10.03	7.64
System Power	tonnes/yr	2.70	1.99	1.54	1.29
Total	tonnes/yr	21.05	19.59	15.58	10.47
Average emissions intensity	kg/MWh	0.00	0.00	0.00	0.00

Table 12 Preferred Conforming Portfolio NO_x Emissions

NOx	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	42.68	42.04	40.70	21.70
Biogas	tonnes/yr	14.25	14.18	13.76	4.29
Biomass	tonnes/yr	111.48	105.97	79.24	60.35
System Power	tonnes/yr	34.58	25.26	21.27	17.72
Total	tonnes/yr	203.00	187.45	154.97	104.06
Average emissions intensity	kg/MWh	0.03	0.03	0.02	0.01

[17] Biogas and Biomass emissions appear in Local Air Pollutants Tables 10, 11, and 12 as a result of EBCE accepting the VAMO allocation.

ii. Focus on Disadvantaged Communities

There are 11 zip codes in EBCE's service area that are considered Disadvantaged Communities (DACs) according to the IRP definition that relies on CalEnviroScreen 4.0. These communities represent a total population of 137,029 ratepayers, or roughly 6% of EBCE's total number of customers. The identified zip codes are as follows:

1. 94601 – Oakland
2. 94621 – Oakland
3. 94603 – Oakland
4. 94607 – Oakland
5. 94606 – Oakland
6. 94577 – San Leandro
7. 94608 – Emeryville
8. 94609 – Oakland
9. 94578 – San Leandro
10. 95376 – Tracy
11. 94612 – Oakland

While CalEnviroScreen 4.0 is a useful tool to provide information on EBCE's customers living in areas of environmental and socioeconomic burdens, it is not the only resource. CalEnviroScreen 4.0 looks at the entire state and provides useful comparative information between significantly different regions across California. EBCE's service territory is significantly smaller. The variations in our territory do not resolve in a useful way while using the CalEnviroScreen 4.0 tool. To provide ourselves with more useful information applicable to our smaller portion of the State, EBCE collects its own data to provide a more complete picture of its communities. For example, EBCE is closely tracking disconnection and arrearage data based on zip code to inform program design that supports residents in need through its Connected Communities Program. EBCE is collaborating with UC Berkeley to conduct an evaluation of different programs supporting customer billing and debt-relief efforts. The purpose of the study is to measure program efficacy so EBCE can build robust programming under the Connected Communities Pilot. In addition to using arrearage data, EBCE integrates CARE- and FERA data in local programs, marketing campaigns, and policy efforts. There are roughly 120,000 CARE- and FERA-enrolled accounts in EBCE's service area, which makes up about 19% of total accounts served.

EBCE is committed to serving its DACs through numerous cross-organizational efforts, including in areas of procurement, local program development, increased customer engagement, and equitable policies. Of importance to EBCE is increasing the deployment of clean energy resources in areas typically overburdened by air pollution. EBCE's DAC Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT) programs advance access to renewables in DACs. The DAC-

GT program allows EBCE to procure 5.72 MW of solar nameplate capacity and the CS-GT permits 1.56 MW of solar nameplate capacity. Currently, there are about 1,800 customers subscribed to the DAC-GT program. The CSGT program prioritizes community stakeholder engagement by collaborating and partnering with a community sponsor. This structure not only strengthens EBCE's relationships with its communities, but also encourages the development of just, clean energy economies. In addition to the DAC-GT and CSGT programs, EBCE has engaged in a variety of efforts to prioritize benefits to low-income residents and disadvantaged communities, including its Health-e Home program[18] in partnership with BlocPower and Revalue.io. This program provides low- to moderate-income homeowners with affordable financing options to gain access to the health and safety benefits of transitioning to clean energy and electric appliances. Energy efficient whole home upgrades can propel the clean energy just transition. EBCE's efforts to support increased EV adoption will reduce criteria air pollutants improving human health outcomes for all residents, especially those in the most vulnerable communities located along interstate corridors. These programs can be a model for intentional procurement of emission-free power to displace fossil-fueled generation and transportation fuel on behalf of our communities most at-risk of environmental injustices.

Equity is also a single thread guiding EBCE's transportation electrification initiatives. Since 2019, EBCE has analyzed transportation electrification gaps, needs, and opportunities in our service territory. Nearly half of the residents in our area are renters in multi-family properties that currently do not have access to at-home charging infrastructure. Significantly, home charging access is often complicated by the age of the properties where renters live. EBCE found that almost all the multi-family properties in our service territory are over 50 years old, meaning that many of these properties would require costly electrical upgrades above and beyond the cost of installing home charging equipment. Moreover, renters may not have the authority to make the upgrades needed to install home charging equipment because they do not own the property.

Recognizing these systematic challenges to EV adoption for nearly half the residents in our service area, EBCE is prioritizing deployment of reliable, convenient, and cost-effective public fast charging network. EBCE's EV fast charge network will establish equitable access for community-members who cannot charge at home to ensure that *all* residents in EBCE's service area, especially renters, can join in and benefit from the transition to clean energy transportation.[19]

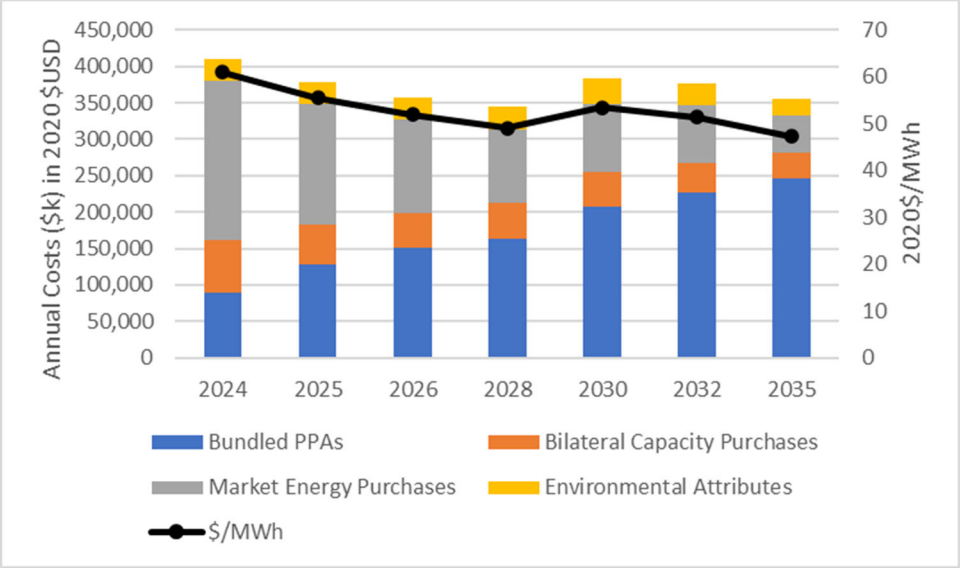
[18] *See infra*, AICP, p. 43; *see also infra*, DCFC Hub Network, p. 44.

[19] *See infra* at 43.

E. Cost and Rate Analysis

Recognizing that affordability is a key component of our long-term procurement strategy, EBCE incorporated timely technology costs assumptions and market conditions forecasts into its IRP process to ensure the optimal portfolio reflected EBCE's prevailing expectations on the future business landscape. EBCE's technology cost curves are sourced from NREL's 2021 Annual Technology Baseline (ATB). For electricity and capacity prices, EBCE used its internal, proprietary forward curves. The figure below provides an estimate of the inflation-adjusted total net costs[20] of the Preferred Conforming Portfolio listed in real 2020 USD for select calendar years with a breakdown of the total by major cost category. Over the IRP planning horizon, the annual expense of the organization's optimal portfolio is expected to average $53/MWh (2020 USD). EBCE's reliance on the market for capacity and energy diminishes over time as bundled PPAs assume a larger role in the portfolio.

Figure 6 Inflation-Adjusted Expenses (2020 $USD) of EBCE's Preferred Conforming Portfolio



Currently, EBCE offers its customers two different product choices: (1) Bright Choice, which offers a fixed percentage savings[21] relative to PG&E's generation rates for an electricity mix containing a larger percentage of renewables than the baseline PG&E product; and (2) Renewable 100, which offers a 100% renewable electricity mix at a small fixed per-kWh premium relative to PG&E's generation. Though EBCE is investigating a move toward cost-of-service-based pricing in

[20] Total net costs equals expenditures to serve load in CAISO plus payments to counterparties EBCE has signed PPAs and other bilateral agreements with minus offsetting revenue from generation scheduled into the CAISO market.

[21] Over the course of EBCE's operating history, this discount has ranged from 1% to 3%.

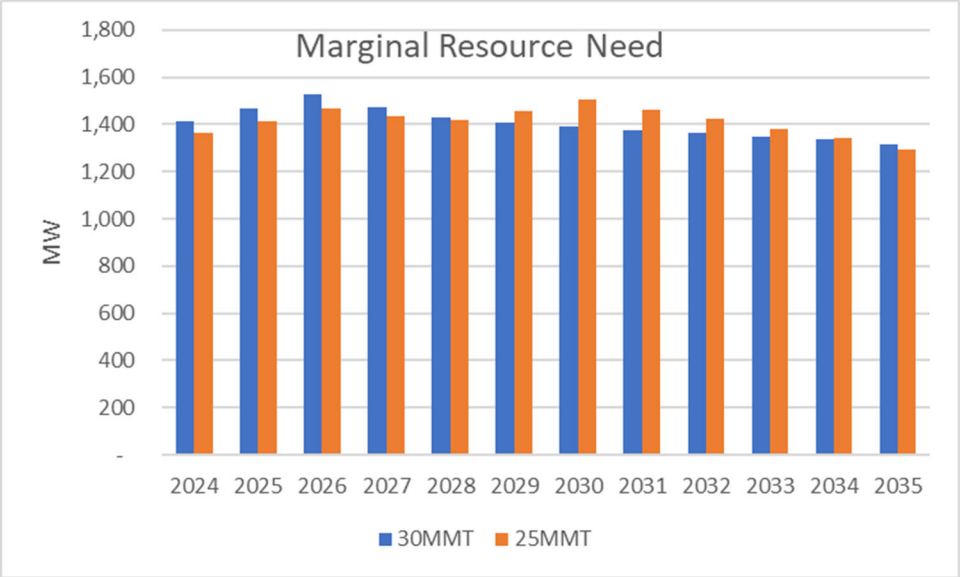
the coming years, the timing of such a move will depend on our internal analytical capabilities, the rate at which we are able to build up the operating reserves necessary to ensure our long-term financial health, and the direction provided by EBCE's Board.

EBCE strives to maintain stable costs for our customers while collecting sufficient revenues by conducting extensive planning and risk-management to intelligently safeguard against the risks of extreme fluctuations in future energy prices.

F. System Reliability Analysis

EBCE's Preferred Conforming Portfolio satisfies system reliability requirements for both the 30 MMT and 25MMT GHG scenarios and illustrates how EBCE contributes its commensurate share of system reliability to the grid. As a part of its IRP filing requirements, every CPUC-jurisdictional entity must demonstrate how it plans to meet its annual reliability requirements for every year in the IRP planning horizon. This reliability requirement is based on a Marginal Resource Need (MRN) to better account for the annual peak in net load shifting later into the evening due to the increasing penetration of solar. As shown below in Figure 7, the MRN EBCE must meet is a function of the GHG scenario.

Figure 7 EBCE's Marginal Resource Need (MW) for the 30MMT and 25MMT GHG Scenarios



EBCE can satisfy its MRN requirement by either procuring bundled PPAs or RA-Only contracts; the amount of nameplate capacity that qualifies as firm is determined by the underlying physical resource backing the contract. In the 2022 IRP cycle, the CPUC updated its methodology when assigning firm capacity ratings to facilities by introducing dynamic marginal Effective Load

Carrying Capacities (ELCCs) that are based on a "Perfect Capacity" construct. These ELCCs vary by year and reflect the ability of the resource type to provide reliable capacity during periods of high demand in net load. These ratings also account for the grid-level interactions of a given resource type with another, which is becoming increasingly more important as the grid sources more of its firm MWs from renewable and energy-limited resources. For additional information on these changes, please refer to the CPUC website.[22] A sample of ELCC assignments for certain resource types and select calendar years for both GHG scenarios are listed below.

Figure 8 Marginal ELCC Assignments (30MMT Scenario)

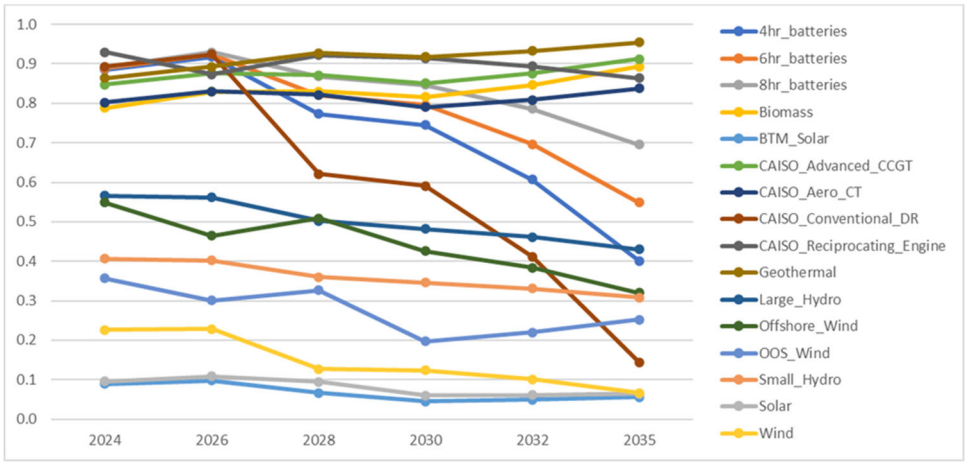
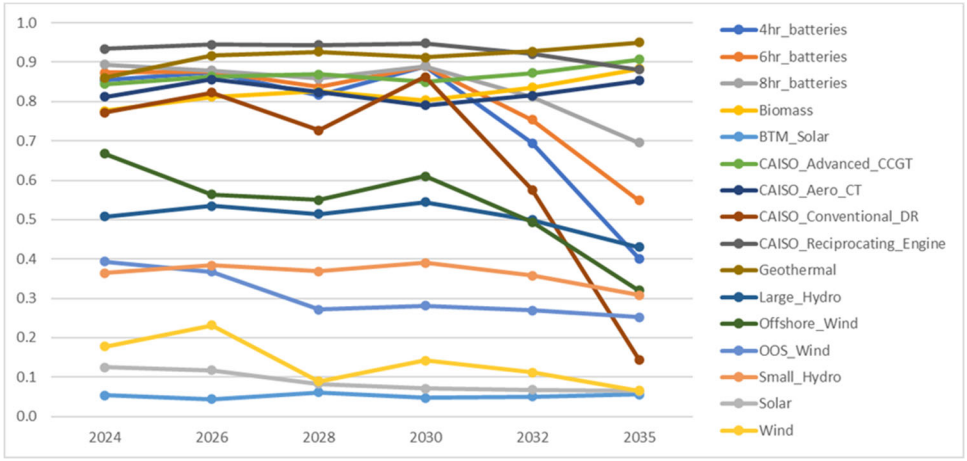


Figure 9 Marginal ELCC Assignments (25MMT Scenario)



[22] *See* CPUC presentation, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/20220719-fr-and-reliability-mag-slides.pdf.

Because the MRN requirements and ELCC assignments are both a function of the active GHG scenario, EBCE's portfolio is dependent, to a degree, on which GHG reduction target the state ultimately selects. To reduce this dependency, EBCE crafted a Preferred Conforming Portfolio that is compliant with both GHG scenarios by assuming the more conservative values for the MRNs and ELCCs in each calendar year. The corresponding MRN and ELCC values that resulted from this assumption and were used by EBCE during the modeling exercises are shown in Figure 10 and Figure 11.

Figure 10 EBCE's Effective Annual MRN Requirement

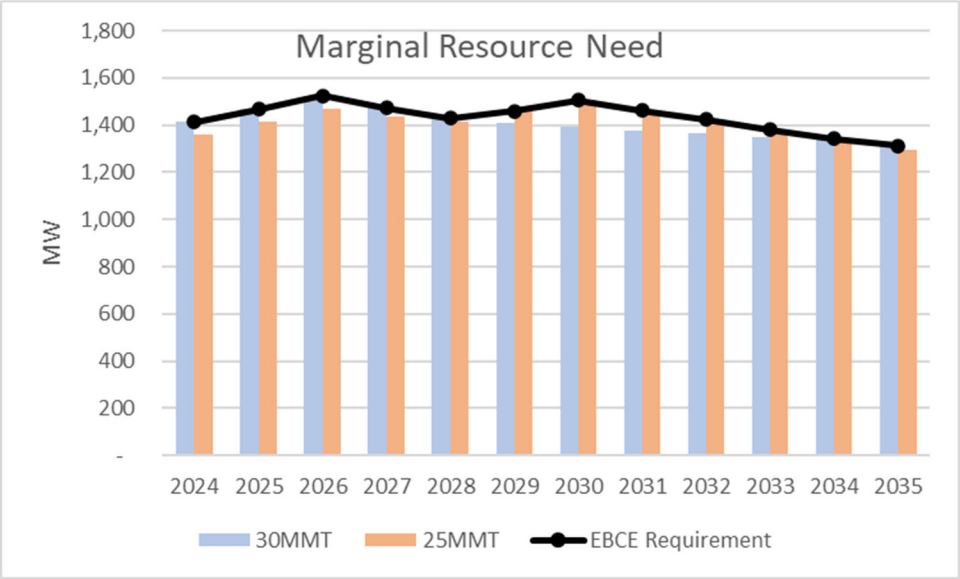
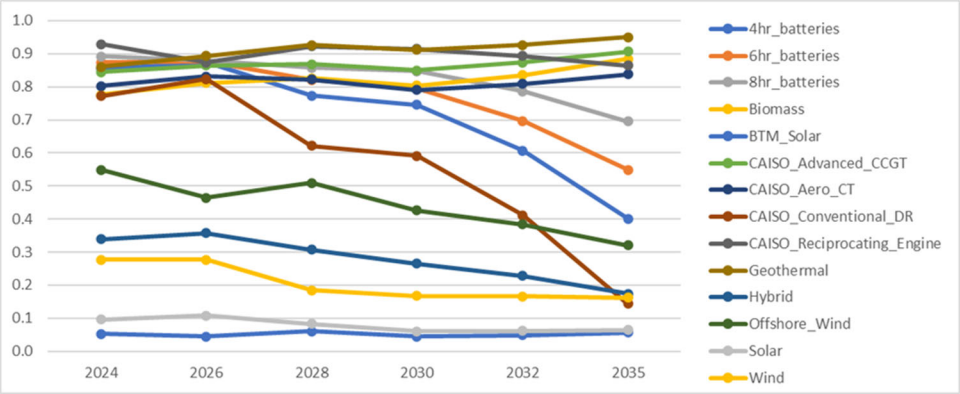


Figure 11 EBCE's Effective Marginal ELCC Assignments



The tables and charts below display the annual marginal reliability need EBCE must satisfy and the corresponding composition of its marginal ELCC supply by contract type for both the 30MMT and 25MMT scenarios. Although the same portfolio is shown for both GHG scenarios, the total supply of effective MWs shows slightly different amounts between the 30 MMT and 25MMT case

due to the functional dependency of ELCCs on the active GHG scenario.[23] EBCE acknowledges that there is an increasing amount of project development risk in its portfolio, given that the percentage of its IRP portfolio of RA supply from projects that have not yet achieved commercial operation increases over time. Some of this risk can be managed through prudent procurement: for example, EBCE would seek to diversify its contracts across multiple developers, resource types, and expected CODs. EBCE will continue to monitor this risk factor and update the CPUC with any material updates related to project delays in a timely manner.

Figure 12 RDT Reliability Need and Effective Supply (30 MMT GHG Scenario)

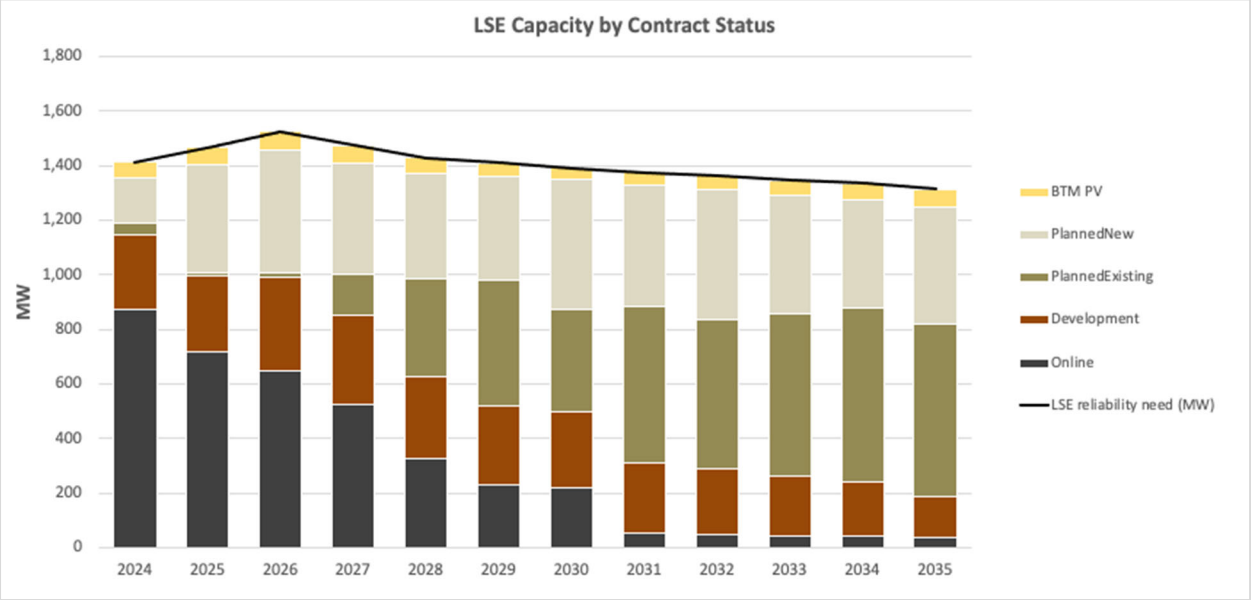


Table 13 Load and Resource Table by Contract Status (30 MMT GHG Scenario)

ELCC by contract status (effective MW)	2024	2026	2028	2030	2032	2034	2035
Online	876	649	325	219	48	40	37
Development	271	344	301	280	240	201	153
PlannedExisting	43	16	359	373	549	637	629
PlannedNew	168	448	390	479	476	396	428
BTM PV	55	71	55	42	52	62	67
LSE total supply (effective MW)	1,412	1,527	1,430	1,393	1,364	1,336	1,314
LSE reliability need (MW)	1,412	1,525	1,430	1,393	1,364	1,336	1,313
Net capacity position	0	2	0	0	0	0	0

[23] *See* narrative, *supra*, p. 26.

Figure 13 RDT Reliability Need and Effective Supply (25 MMT GHG Scenario)

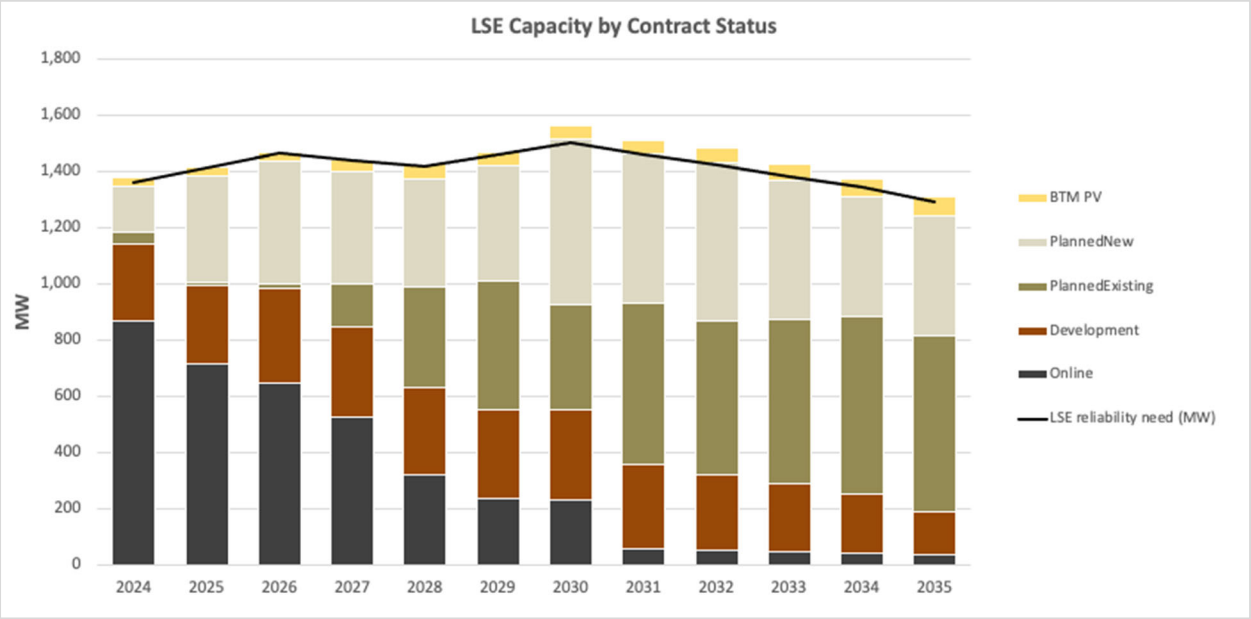


Table 14 Load and Resource Table by Contract Status (25 MMT GHG Scenario)

ELCC by contract status (effective MW)	2024	2026	2028	2030	2032	2034	2035
Online	871	648	323	229	54	42	37
Development	273	339	309	326	268	210	153
PlannedExisting	43	16	358	372	547	634	625
PlannedNew	159	433	384	590	562	424	428
BTM PV	33	32	50	44	53	62	67
LSE total supply (effective MW)	1,378	1,466	1,425	1,562	1,484	1,373	1,309
LSE reliability need (MW)	1,362	1,466	1,417	1,504	1,424	1,343	1,295
Net capacity position	16	0	8	57	60	29	14

G. High Electrification Planning

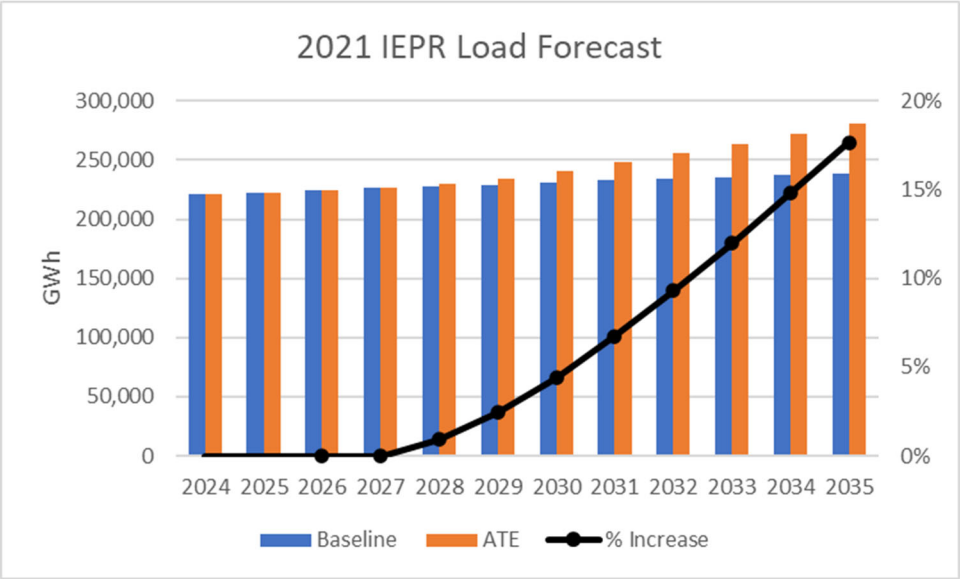
Guided by the direction in the June 15 Ruling,[24] EBCE analyzed the CECs Additional Transportation Electrification (ATE) scenario in its modeling framework to estimate the impacts from additional demand for electricity on its Preferred Conforming Portfolio. EBCE recognizes that over time this secular trend can have a material impact on EBCE's annual retail sales, peak demand, and aggregate load profile shape. To quantify the impacts of these changes on EBCE's procurement

[24] See *ALJ Ruling Finalizing Load Forecasts and GHG Targets for 2022 IRP LSE Plans*, issued June 15, 2022, p. 3.

strategy, EBCE leveraged its modeling framework to conduct a separate portfolio optimization exercise with revised inputs to reflect this high electrification scenario.

Figure 14 below illustrates the increase in CAISO demand relative to the Mid Baseline Scenario (AAEE Scenario 3; AAFS Scenario 3) from the 2021 IEPR. Starting in 2028, the ATE scenario reflects an increase in annual demand, primarily as the result of greater than expected EV charging demand relative to what is assumed in the baseline scenario. By 2035, cumulative effects of this incremental load are forecasted to result in an 18% increase in annual demand relative to the baseline IEPR scenario.

Figure 14 Percent Increase in CAISO Annual Load Assuming High Electrification



To map these systemwide impacts to its local service territory, EBCE applied the percent increase in CAISO load to its own 2022 IRP load forecast. Table 15 lists this information.

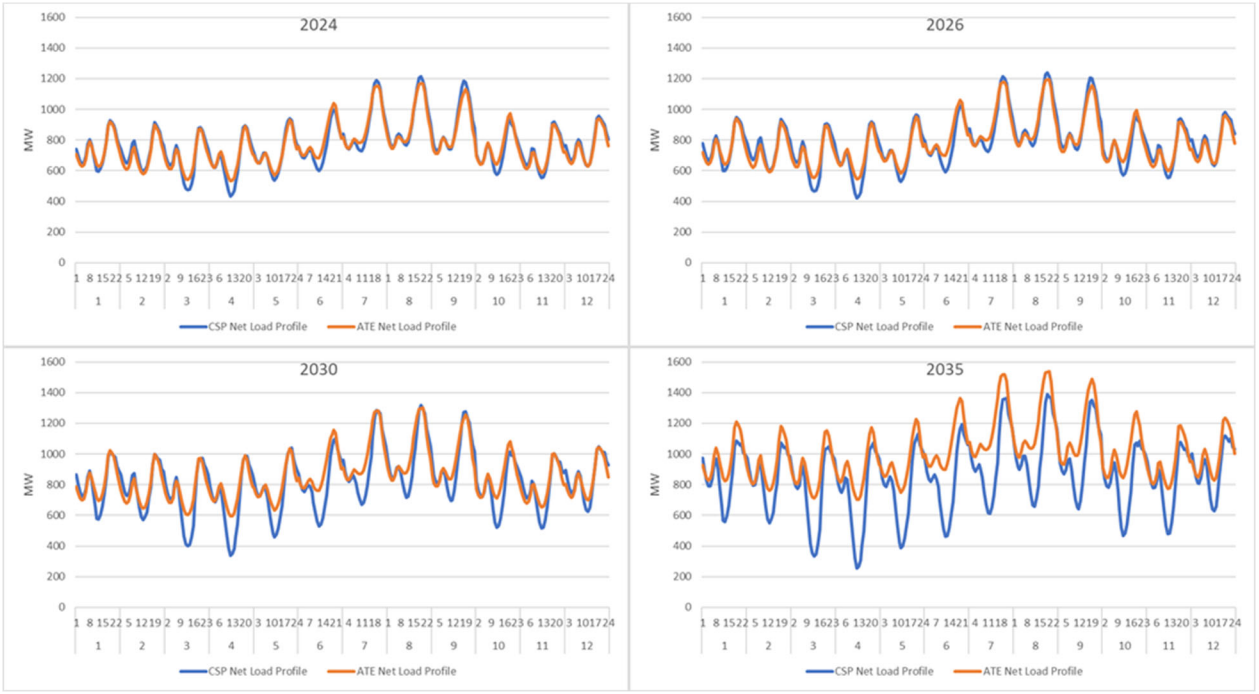
Table 15 EBCE Annual Demand for Baseline and Electrification Scenario

Service Area	LSE Name	YEAR	Baseline IRP Sales Forecast (GWH)	ATE IRP Sales Forecast (GWH)
PGE	East Bay Community Energy	2024	6,740	6,740
PGE	East Bay Community Energy	2025	6,816	6,816
PGE	East Bay Community Energy	2026	6,887	6,887
PGE	East Bay Community Energy	2027	6,955	6,955
PGE	East Bay Community Energy	2028	7,027	7,090
PGE	East Bay Community Energy	2029	7,101	7,271

PGE	East Bay Community Energy	2030	7,180	7,496
PGE	East Bay Community Energy	2031	7,259	7,746
PGE	East Bay Community Energy	2032	7,326	8,007
PGE	East Bay Community Energy	2033	7,394	8,281
PGE	East Bay Community Energy	2034	7,461	8,565
PGE	East Bay Community Energy	2035	7,540	8,867

In addition to modeling the increase in annual load, EBCE substituted the weather-normalized load profiles provided by the CSP calculator with the Managed Net Load profile defined in the IEPR's ATE scenario. Figure 15 shows the assumed EBCE load profile shapes for the High Electrification sensitivity case for select years. By 2030, the increase in load from daytime EV charging becomes significant and partially offsets BTM solar generation. In 2035, these effects become more pronounced. On balance, EBCE's load profile for the ATE scenario realizes a shallower trough in the middle of the day relative to the baseline load profile shape defined in the CSP.

Figure 15 EBCE Load Profile Shape for Preferred Conforming Portfolio and High Electrification Planning Portfolio



After updating the model with these changes, EBCE ran another study to identify a least-cost portfolio that satisfies the applicable reliability and environmental constraints. The results of that analysis are listed below.[25]

Table 16 Incremental Resources Selected for High Electrification Planning Scenario

Resource Type	MWs	Annual GWh	2035 GHG target	Transmission Zone	Substation / Bus	Alternative location	Note
Solar_2024	150	438	25MMT	SCE		PGE	
Solar_2025	150	438	25MMT	SCE		PGE	
Solar_2030	260	759	25MMT	SCE		PGE	
In-State Wind_2024	100	257	25MMT	PGE		SCE	
In-State Wind_2025	100	257	25MMT	PGE		SCE	
In-State Wind_2028	62.5	160	25MMT	PGE		SCE	
In-State Wind_2030	393	1,009	25MMT	PGE		SCE	
Offshore Wind_2032	268	1,290	25MMT	PGE		SCE	
Offshore Wind_2035	372	1,794	25MMT	PGE		SCE	
4hr storage_2024	88	n/a	25MMT	PGE		SCE	
4hr storage_2024	200	n/a	25MMT	PGE		SCE	
6hr storage_2035	295	n/a	25MMT	PGE		SCE	
8hr storage_206	47	n/a	25MMT	PGE		SCE	

H. Existing Resource Planning

EBCE, like most CCAs, has a preference for energy produced by non-GHG emitting resources. Given our Board-approved goal of achieving an emissions-free portfolio for EBCE's retail demand by 2030, EBCE has no plans to enter into long-term contracts with GHG-emitting resources. As such, existing in- and out-of-state hydro resources would generally be attractive to EBCE.[26] Staff actively monitors the market to identify opportunities to contract with existing hydro resources—either through short term transactions or through long-term contracts. EBCE has been successful

[25] EBCE's current modeling resolution is zonal, so the methodology does not capture busbar-specific issues such as expected congestion and/or deliverability availability. As a result, regional locations are listed for indicative purposes and are not final.

[26] *C.f. infra*, p. 34.

in entering into short-term transactions with existing hydro resources to date and does not have any long-term hydro resources in its portfolio at this time. If such resources became available in the coming years, EBCE would evaluate those resources for portfolio fit and consider adding these resources to its portfolio. However, EBCE recognizes the demand for these resources and increasing uncertainty associated with their fuel supply as the western United States faces unprecedented droughts and other effects of climate change. Given the uncertainty of hydro resource availability, existing hydro resources are not assumed to contribute to EBCE's Preferred Conforming Portfolio. EBCE does not assume existing wind, solar, or battery storage resources in its portfolios but will evaluate existing resources for cost competitiveness in relation to generation profile in future procurements as these resources roll off their long-term contracts. EBCE assumes 0% of its portfolio will be served by contracted coal or nuclear resources, consistent with Board-approved organizational goals.

While EBCE will evaluate opportunities to contract with existing clean resources, there are currently no specific existing CAISO resources EBCE has plans to contract with in the future. Due to the limited and uncertain availability, EBCE's approach to contracting with existing resources should be regarded as opportunistic and resulting from such resources submitting offers for long-term or short-term contracts to EBCE at a price and forecasted net present value that is competitive with new-build resources.

I. Hydro Generation Risk Management

EBCE's Preferred Conforming Portfolio does not include any expectations of long-term hydro asset contracts, whether with in-state or out-of-state hydro resources.[27] EBCE does hope to opportunistically enter into short-term transactions for carbon-free electricity, likely from out-of-state resources, to help EBCE achieve its goals of having an emission-free portfolio by 2030, but EBCE's ability to meet RPS and RA compliance obligations is unrelated to and unthreatened by its ability to procure *excess* carbon-free energy from hydro assets.

California and the Western North America are seeing increased levels of extreme heat duration and intensity. Concurrently, precipitation in the form of rain and snow are proving to be a less consistently reliable as 'fuel source' for hydro power across this same area. EBCE's potential exposure to the impact of drought and other climate-related hydro generation conditions lies in the impact prolonged drought has on the CAISO energy market and forward prices for electricity. Because EBCE procures a portion of its energy needs through short-term transactions, persistent drought will increase market forward prices and result in higher prices being offered for forward

[27] *See* Table 5, *supra*, p. 13.

transactions than would be associated with average or above average hydro years. Any EBCE demand exposed to the CAISO day-ahead and real-time market will be subjected to greater price volatility in hours of exposure.

EBCE manages its exposure to high forward market prices by implementing its Board- and Risk Oversight Committee-approved Risk Management Regulations ("Risk Regs"). The Risk Regs mandate that EBCE transact following a dollar cost averaging approach such that EBCE procures specified amounts of electricity on a forward basis on a pre-determined schedule, thus minimizing exposure to short-term price fluctuations. In high level terms, EBCE manages the risk of CAISO price volatility in by incorporating the PCIA into hedging strategy and minimizing its open position in hours subject to high demand prices and likely high volatility.

J. Long-Duration Storage Planning

In February 2022, EBCE released a joint RFO with San Jose Clean Energy (SJCE); the RFO seeks opportunities to enter into long-term contract(s) with new, incremental resources to contribute to EBCE's obligation under D.21-06-035 ("MTR"). EBCE is currently engaged in negotiation with long duration storage resources that were offered in the RFO and expects to meet its MTR ordered obligation of 37 MW as a result of this effort. Notably, EBCE's Preferred Conforming Portfolio selects a total of 47 MW (i.e., 10 MW in excess of the MTR obligation).

EBCE recognizes that widespread plans for expansion of intermittent renewable resources creates needs for storage that goes beyond the 4-hour standard energy storage product that exists in today's market. EBCE's IRP analysis suggests that energy storage of sub-8-hour duration will be most favored in the near- to mid-term. This is driven by the assumed availability of different technologies and ability to develop sub-8-hour resource. Longer term, EBCE's IRP analysis suggests that longer-duration energy storage could play a larger role in supporting EBCE's as well as the State's resource needs. However, the availability of long-duration storage resources is not assured. Even with procurement mandates and other incentives, the technology may not become available due to other constraints including but not limited to transmission planning and the scarcity of deliverability. Load serving entities contracting with resources at this time lack certainty that barriers to deliverability will improve in near-mid-long term, meaning the transmission system may not be able to accommodate the amount of storage we anticipate may be necessary. Finally, it is also noteworthy that while the IRP analysis indicates portfolio value of 6-hour and some 8-hour duration storage, long-term forward curves common to the California market do not all assume the same value. At this time, it is difficult to justify investment in long duration storage based only on project economics as forward curves prefer 4-hour duration

storage and storage dispatched in the CAISO market today continues to be incentivized to be used for the ancillary services market.

EBCE will meet its MTR long duration storage obligation in the near term. EBCE expects that it will release another all source RFO in early 2023 and will seek additional storage and generation resources to achieve commercial operation in the mid to late 2020s at that time. EBCE is also in a fortunate position that its largest contracted hybrid solar plus storage projects include a contractual right to extend duration on the existing storage capacity in future years by adding incremental lithium batteries at future installation costs. EBCE will continually evaluate the merit to calling on this contractual right versus contracting with new resources.

K. Clean Firm Power Planning

EBCE received multiple offers for geothermal resources that fit the Clean Firm Power requirements in its 2020 Renewable Energy and Storage RFO.[28] Though EBCE elected not to execute contracts with any of the geothermal resources offered in the RFO, when the CPUC released the MTR procurement order EBCE was able to initiate bilateral negotiations with one of the projects that had been previously offered. In April 2022, EBCE executed a contract with FEC Nevada 1 for a 40 MW geothermal facility which will be constructed in Churchill Country, Nevada. The facility is scheduled to achieve commercial operation in June 2026. This resource will contribute value firm renewable generation to EBCE's portfolio and serve as a baseload resource and hedge against price volatility. EBCE also looks forward to incorporating the high capacity factor RA into its RA position. EBCE must obtain import allocation rights (IAR) to ensure energy generated by the resource is fully deliverable into the CAISO and that the resource will provide RA value, thus there is some risk associated with the project. EBCE is working closely with the developer, Fervo Energy, to monitor CAISO transmission planning and evaluate probability that IAR will be available at the intended delivery point. If in EBCE and Fervo's estimation the ability to obtain IARs at the intended point is at risk, EBCE has some contractual ability to change the delivery point to a different CAISO branch group.

L. Out-of-State Wind Planning

Cost declines in solar resources from the early 2000s until approximately 2021 have largely resulted in lower costs for solar generation, on a levelized basis, as compared to wind. However, the diurnal production profile of solar means that wind resources can act as an important

[28] https://ebce.org/2020-rfo/

complementary resource in LSEs' portfolios, supplementing renewable production in overnight and winter hours and reducing the need for load shifting from battery or demand-side resources.

EBCE has one, energy-only (no RA) out-of-state wind resource in its portfolio and generating electricity at this time. While the out-of-state wind resource type was not selected within EBCE's IRP analysis, EBCE is aware of and following CAISO's Transmission Planning Process (TPP) solicitation of interest regarding Idaho-area out-of-state wind and in the CAISO's corollary to its TPP, the 20-year Transmission Outlook in which transmission projects that support access to out-of-state resources are evaluated. EBCE is interested in out-of-state wind resources should their project economics appear more favorable than the economic assumptions underpinning the IRP analysis and will provide updates on any long-term contracts EBCE enters into should that come to pass.

M. Offshore Wind Planning

EBCE recognizes the significant interest in offshore wind (OSW) development in the California and Pacific Coast region. EBCE's portfolio analysis suggests that offshore wind (OSW) resources may be a valuable contribution to EBCE's portfolio in outer years of the forecast.[29] At this time, EBCE determined that, of the candidate OSW resources, North Coast OSW had greater value than Central Coast resources. However, the selection of *any* OSW resources in EBCE's portfolio is highly dependent on the availability of OSW resources (resource uncertainty is this case is driven by both construction risk and risks associated with the development of transmission to interconnect the OSW resources) within the time frame anticipated by mandated IRP modeling assumptions, as well as anticipated costs associated with OSW resources.

As is well known, OSW resources are not yet available, and their future availability is contingent on successful navigation of complex layers of Federal and State processes.[30] Given the uncertainty of the timeline and barriers to developing OSW off the coast of California, EBCE will continue to monitor the progress of OSW development and evaluate inclusion of these resources in our portfolio within the broader market context. If OSW development does not progress along the timeline necessary to incorporate these resources in its portfolio, EBCE will select other resources to achieve commensurate energy hedge, RA value, and renewable energy to meet its

[29] Table 5, *supra*, p. 13.

[30] *See, e.g.*, the October 6, 2022, CEC Workshop on Assembly Bill 525: Preparing a Strategic Plan for Offshore Wind Development. Workshop materials available under CEC Docket 17-Misc-01 and at https://www.energy.ca.gov/event/workshop/2022-10/workshop-assembly-bill-525-preparing-strategic-plan-offshore-wind.

customers' needs. As described below,[31] EBCE expects to further explore the potential value of OSW resources.

N. Transmission Planning

Recognizing that transmission upgrades can constitute cost-effective investments in firm power, a key part of EBCE's IRP plan includes looking for opportunities to increase the deliverability of existing and new generation facilities. Based on the information available at this time, EBCE does not expect to incur any transmission-related restrictions on its procurement strategy for either baseline or planned resources.

Currently, there are no baseline resources with a "Development" status that require any transmission upgrades to achieve FCDS. As for planned resources, the only resource category in EBCE's portfolio that may require an upgrade to the existing transmission system is offshore wind. Starting in 2030, EBCE will look to procure significant amounts of procure offshore wind in either the Morro Bay or Humboldt Bay region, depending on costs, availability, and other considerations. As listed in the June 2022 PSP modeling results, RESOLVE flags the need to invest in transmission upgrade projects for additional deliverability of firm power in both these regions in 2032 and 2035.[32] EBCE assumes that either one or both of these deliverability projects will be built and that it will be able to secure a slice of these offshore projects at or near the current projected CAPX price for offshore wind in those future years. As for its plan to procure wind in the near-term horizon, EBCE conducts procurement RFOs to assess market conditions related to costs, location, and timing of new resources. It will emphasize the addition of wind to the portfolio, but the final amount, location, and timing will ultimately depend on the market pricing offered by project developers.

While, EBCE strives to execute contracts for long-term resources across a diverse geographic area to mitigate risks associated with congestion and limited deliverability in select load pockets, EBCE currently has no firm restrictions regarding the location of any of its planned candidate resources, as long as full capacity deliverability (FCDS) status is attainable.[33] The modeling framework used in this year's IRP has limited ability to account for transmission related constraints (e.g., congestion and interconnection capability) during the optimization stage. Moreover, the model

[31] *See infra*, p. 43.

[32] Currently, Morro Bay has up to 200 MW of unclaimed deliverability capacity, whereas Humboldt Bay has no existing spare deliverability capacity.

[33] A limited exception to EBCE's preference for geographically diverse resources is that EBCE does have a preference for projects sited in its own service territory for their contribution to local reliability, local air pollution reduction, and to minimize basis risk.

assumes that any additional costs stemming from an Area Distribution Network Upgrade (ADNU) project are accounted for in the CapEx assumptions. EBCE recognizes these limitations and will evaluate opportunities to mitigate the impacts of these limitations in future modeling exercises. At this time EBCE has no stated objection to the CPUC or CAISO relocating their candidate projects, assuming similar availability and costs for any given replacement project.

IV. Action Plan

The biennial IRP study is a valuable planning tool and provides guidance that contributes to EBCE's procurement strategy. However, neither EBCE's IRP analysis nor the make-up of its Preferred Conforming Portfolio should be viewed as an explicit roadmap or firm commitment for future procurement. While EBCE values the lessons learned through the IRP analysis, EBCE will make procurement decisions and enter into contracts based on the resources available in the market and the cost and value proposition of those resources based on current and forward market projections at the time the resources in question are offered to EBCE. EBCE also notes that there remains significant uncertainty around the availability and timing of new resource types such as offshore wind. Significantly, since the COVID pandemic began in 2020, the world has experienced massive supply chain disruptions causing price increases and reducing the availability of core components needs for renewable and conventional power plants resulting in significant project delays. While EBCE hopes the supply chain landscape will return to a more normal state no load serving entity has the ability to correct this ongoing disruption and as a result we find ourselves on an ongoing period of great uncertainty related to resource availability and timeliness of construction.

A. Proposed Procurement Activities and Potential Barriers

The following sections describe EBCE's planned procurement activities flowing from the IRP portfolio analysis and Preferred Conforming Portfolio, as well as potential barriers to those actions.

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

Table 17 EBCE Near Term IRP Procurement

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Golden Fields Solar	3/03/2021	2018 California Renewable Energy RFO	
Scott Haggerty Wind Energy Center	7/01/2021	2018 California Renewable Energy RFO	

Henrietta D Energy Storage	1/01/2022	2020 Renewable Energy and Storage RFO	
OhmConnect DR	1/01/2020	Bilateral negotiation	
CPA High Desert	4/01/2022	Bilateral negotiation	
SunRun OCEI	1/01/2022	Oakland Clean Energy Initiative RFO	
Tulare Solare	4/30/2022	2018 California Renewable Energy RFO	
Sanborn Storage	1/16/2023	2020 Renewable Energy and Storage RFO	Portion counted to D.21-06-035

EBCE is on track to fulfill its D.19-11-016 requirements through the long-term contracted resources listed in Table 17, above. This list of resources is consistent with the list EBCE has provided to the CPUC in the required IRP compliance filings.[34] There are no changes or updates to note at this time.

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

Table 18 EBCE Mid-Term Reliability IRP Procurement

Resource Name	**Expected or Actual COD**	**Procurement from which it was contracted**	**Notes**
Sanborn Storage	1/16/2023	2020 Renewable Energy and Storage RFO	Portion counted to D.19-11-016
Edwards Solar	4/30/2023		
Scarlet 1 Solar+Storage Park	3/31/2023	Amended & Restated PPA executed 3/21/2022	
Daggett 3 Solar+Storage	7/30/2023	2020 Renewable Energy and Storage RFO	
Oberon	1/1/2024	2020 Renewable Energy and Storage RFO	
Aramis	4/01/2024	Bilateral negotiation	
Tumbleweed Storage	6/01/2024	2020 Renewable Energy and Storage RFO	
FEC Nevada 1	5/01/2026	Bilateral negotiation	
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE has entered into multiple long-term contracts that will contribute to its D.21-06-035 requirements; executed agreements are listed inTable 18, above; however EBCE has not executed all agreements needed to fulfill its obligation. To ensure EBCE fulfills its obligation, EBCE partnered with SJCE and released a joint RFO in February of 2022. This procurement effort, titled

[34] *E.g.*, *see* EBCE's IRP Compliance Filing submitted August 1, 2022.

the "EBCE/SJCE 2022 Long-Term Resource RFO" was explicitly designed to procure resources that will fulfill the D.21-06-035 procurement mandate. Negotiations are ongoing and EBCE plans to bring contracts to its Board for approval over the following months, with the first wave of contracts to be brought for approval in October, 2022, concurrent to the review of this IRP Plan filing.

In the unlikely event that EBCE does not execute sufficient contracts to meet its D.21-06-035 obligations through this RFO, EBCE will then engage in bilateral negotiations to close the remaining open position.

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

Table 19 EBCE Mid-Term Reliability IRP Procurement – Firm Zero-Emitting Resources

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
FEC Nevada 1		Bilateral negotiation	

In February of 2022, EBCE executed a long-term contract with Fervo Energy to meet its Firm Zero-Emitting Resource requirements under D.21-06-035. EBCE's 40 MW FEC Nevada 1 project is expected to achieve COD in June 2026. At this time the resource is on schedule to achieve that operational date however EBCE stays in close touch with the developer as this is a long-lead time resource and the project is pursuing financing through a loan program backed by the Department of Energy. If EBCE perceives any potential delay to the financing of the project, it will notify the CPUC and seek an extension to permit the resource coming online before 2028—but at this time there are no such delays that EBCE is aware of.

EBCE is also actively monitoring the CAISO TPP with the project developer, Fervo. The contract identifies a point of delivery to EBCE tied to a specific CAISO branch group and EBCE is evaluating opportunities to obtain IAR at that branch group so the resource would have sufficient deliverability to meet the RA requirements of D.21-06-035. Both EBCE and Fervo are willing to modify the point of delivery if necessary to ensure the resource meets its RA obligations.

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

Table 20 EBCE Mid-Term Reliability IRP Procurement - Long-Duration Energy Storage

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE shortlisted long-duration storage projects in its EBCE/SJCE 2022 Long-Term Resource RFO and is in active negotiations with these resources at the time of the IRP filing

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

Table 21 Zero Emission, Co-located, and DR Procurement Activities

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Scarlet 1 Solar+Storage Park	3/31/2023	Amended & Restated PPA executed 3/21/2022	
Daggett Solar+Storage	7/30/2023	2020 Renewable Energy and Storage RFO	
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE has fulfilled a portion of this requirement and is actively negotiating additional contracts to fulfill the obligation. EBCE will keep the CPUC updated on its progress through the twice-yearly IRP compliance filings and the ongoing informal summer reliability update filings. In the unlikely event that EBCE fails to execute contracts that fulfill this obligation as a result of its EBCE/SJCE 2022 Long-Term Resource RFO, then the organization will engage in bilateral negotiations to ensure it meets or exceeds this obligation.

d. All other procurement requirements

As previously mentioned, EBCE is actively negotiating contracts shortlisted in its EBCE/SJCE 2022 Long-Term Resource RFO and will seek approval to execute contracts from its Board of Directors beginning in October 2022 and likely on a monthly basis through the end of 2022 or early 2023.

EBCE is currently evaluating its next procurement effort and will decide between pursuing bilateral negotiations for targeted resources in early 2023 or releasing its next all source solicitation in Q1 2023. If EBCE pursues bilateral negotiations, they will be targeted to achieve compliance with D.21-06-035 procurement mandates. At this time, EBCE anticipates releasing an all-source solicitation in Q1 2023 or after completing procurement for D.21-06-035 with the goal of this next solicitation being to contract new resources to contribute energy, renewable energy and attributes, and RA to cover EBCE's increased demand as the City of Stockton joins EBCE's service territory in 2024.

iii. Offshore wind

EBCE's IRP analysis supports adding OSW resources to the portfolio beginning in 2030. Given the newness of the resource type in California and long-lead time to develop these assets, EBCE anticipates beginning preliminary evaluation of potential projects in the 2023–2024 timeframe and plans to release an OSW request for information (RFI) to begin its education on the costs and development process for these assets. The timing of actual procurement will be informed by lessons learned in the RFI.

iv. Out-of-state wind

Although the Preferred Conforming Portfolio does not explicitly select out-of-state wind for inclusion in EBCE's portfolio, EBCE is aware of development efforts underway in Idaho, Wyoming, and New Mexico that may prove to be of value to EBCE's portfolio if necessary transmission is developed to enable the interconnection of these assets to California load. EBCE is actively monitoring the CAISO TPP and will evaluate out-of-state wind resources offered to the organization through upcoming solicitations or bilateral outreach by project developers.

v. Other renewable energy not described above

None at this time.

vi. Other energy storage not described above

None at this time.

vii. Other demand response not described above

None at this time.

viii. Other energy efficiency not described above

EBCE has received CPUC approval to elect to administer Energy Efficiency programs for three years, (between 2023 and 2026). EBCE forecasts the current approved program to deliver approximately 30 GWh of energy savings over the Effective Useful Life (EUL). EBCE will be focused on providing additional incentives from EBCE funds to developers that can deliver energy savings and durable flexible load during evening peak hours. EBCE expects to continue investing in Energy Efficiency programs beyond 2026.

ix. Other distributed generation not described above

EBCE has developed the Resilient Home program[35] to deliver solar and storage to single and multi-family residential customers with the solar company Sunrun. Over 1,000 customers are

[35] See https://ebce.org/resilient-home/.

currently enrolled in the program which is contracted to deliver 2MW/8MWh of energy during EBCE's 4 evening peak hours. EBCE will continue to develop programs to contract with battery storage resources in our territory to create flexible assets.

EBCE is currently negotiating with PPA providers to deliver solar + storage resources for municipal critical facilities in four Cities. These PPAs will provide 2–3 MW of solar generation and 2–6 MWh of BESS to increase resilience of City Services. EBCE will use these BESS systems to reduce peak load during evening hours. EBCE will issue a second RFO for an additional 5-7 Cities in Fall/Winter of 2023 for additional solar and storage projects. EBCE expects to aggregate these resources to reduce peak load during high-cost evening hours.

EBCE has over 40,000 existing NEM systems installed across our service area. Increasing battery installations on existing DG Solar systems and contracting those batteries to deliver energy during evening peak hours will be a priority for EBCE as we continue to develop mechanisms to build flexible renewable DERs.

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

EBCE has multiple transportation electrification efforts underway. What follows is a high-level summary of several of these activities.

a. Alameda County Incentive Project (ACIP)

EBCE has partnered with the CEC's Electric Vehicle Incentive Project (CALeVIP)[36] to develop and co-fund the Alameda County Incentive Project (ACIP).[37] The ACIP is distributing $17.3 million to incentivize the deployment of publicly accessible, shared Level 2 and direct current fast chargers (DCFCs). The program launched December 1, 2021, with demand rapidly outstripping supply.

EBCE prioritized equity in designing the ACIP. A minimum of 50% of all funding is required to be invested in DAC/low income community (LIC) applications in Alameda County. This minimum investment is for both DCFC and Level 2 technology types. Because nearly half of the residents in EBCE's service territory are renters without access to EV charging where they live, EBCE worked with the CEC to require that 50% of the budget dedicated for fast charging infrastructure had to

[36] CEC's CALeVIP is funded by the CEC and provides incentives for EV charger installations throughout California, working to improve air quality, combat climate change, and reduce petroleum use.

[37] See https://calevip.org/incentive-project/alameda-county.

be for projects deployed in EBCE-defined multi-family "hotspots" or areas with a *dense concentration of multi-family housing units*.[38]

In developing this project, EBCE also looked at our service territory comprehensively and not solely through the lens of the State's CalEnviroScreen 4.0 and AB 1550 geographic boundaries.[39] EBCE found that the DAC/LIC boundaries often exclude many *affordable* multi-family properties which by definition serve low-income residents because residents must meet income eligibility requirements to qualify for this type of housing. This was an issue in designing the requirements for the ACIP as the CEC's CALeVIP pillar requirements for multi-family incentive "adders" only applied to properties in DAC/LIC boundaries. EBCE saw an equity gap in how the CEC's CALeVIP funding was reaching community members. Affordable housing providers statewide had been in a position of investing in an amenity that helps some of their low-income tenants realize the benefits of EVs but not others. Yet all of these properties serve *the same low-income eligible populations* as those within DAC geographic boundaries. EBCE wanted to ensure that *all* affordable multi-family property owners had equal access to ACIP incentive adders regardless of where they were located geographically. In turn, we mapped affordable multi-family properties throughout our service area and were able to show the CEC that its pillar requirements for incentive adders were not equitable and needed to be expanded. The CEC reviewed EBCE's data analysis, approved expanding the incentive adder eligibility, and made a systematic change to their pillar requirements statewide.

Throughout 2021, in anticipation of the program launch, EBCE also provided affordable multifamily property managers/developers with free technical assistance to help them prepare for the ACIP. EBCE's budget allowed for the assessment of up to 75 multifamily properties in our service territory. EBCE provided technical assistance in the form of site visits, site charging infrastructure reports, and a concierge service to help property managers apply for ACIP incentives.

b. DCFC Hubs

EBCE is investing in deployment of the densest regional network of public DCFC infrastructure to deliver charging throughout our service area. EBCE is prioritizing development of this network to ensure all EBCE customers are served and establish EBCE's Joint Power Authority member communities as leaders in affordable and accessible EV fast charging. EBCE's goal is to facilitate regional adoption of EVs in excess of the regional share of the California goal of 5 million zero-

[38] See https://www.google.com/maps/d/u/0/viewer?mid=1IiJxkT5Rgg7wdcTRpOxplX6f0-tJjuEQ&ll=37.68066537992609%2C-121.9214665&z=10

[39] Boundaries determined in accordance with CalEnviroScreen 4.0 and AB 1550 requirements.

emission vehicles on the road by 2030. To support this goal, EBCE plans to build and operate as many as 50 public fast charging hubs, each with a minimum of 10 dual port DCFCs that have the capability of charging 20 EVs simultaneously. EBCE is focused on siting its hubs in areas with a dense population of renters.

EBCE's first such project is on the border of West Oakland and Downtown Oakland, in a municipal parking garage. The location is within the Bay Area Air Quality Management District AB617 boundary for West Oakland. EBCE anticipates that this DCFC hub will be the largest in Oakland and the second largest in Alameda County. More importantly, within two square miles of the DCFC hub are approximately 1,000 multi-family properties with over five units at each premises including over 100 in West Oakland specifically. This project will enable 60 minutes of free garage access for community members while charging, and all DCFCs will be powered by EBCE's Renewable 100 electricity product.

EBCE is working to develop additional projects throughout its service area including but not limited to the Cities of Berkeley, Hayward, Livermore, Pleasanton, and San Leandro.

c. Zero-Emission Medium- and Heavy-Duty Goods Movement Blueprint

As part of a 2-year, CEC-funded project, EBCE is developing a Zero-Emission Medium- and Heavy-Duty (MD/HD) Goods Movement Blueprint (Blueprint) to guide our comprehensive approach to MD/HD transportation electrification. The Blueprint focuses on five areas: (1) Vehicles, (2) Infrastructure, (3) Financing, (4) Workforce Development, and (5) Community Benefit and will serve as the regional plan on how to transition this ecosystem to zero-emission Class 3-6 and Class 7-8 vehicles by 2030 and 2045 respectively.

EBCE has also developed a technical assistance pilot program that is providing targeted MD/HD goods movement stakeholders with free fleet electrification assessments and a rebate application concierge service.

CALSTART is EBCE's technical consultant/partner for both the Blueprint as well as the technical assistance pilot program.

Blueprint Financing

To support Blueprint financing related actions and strategies, EBCE issued a Request for Offers solicitation that will provide $3M in MD/HD Goods Movement (vehicles and/or charging

infrastructure) loans to eligible applicants. Project proposals were due October 17, 2022.[40] EBCE is providing the funds for these loans as part of EBCE's Local Development program approved by its Board of Directors. The funds are not associated with the CEC Blueprint grant funding.

Blueprint Workforce Development

Building upon internal analysis, as well as research from several partner organizations, EBCE will target charging infrastructure and other transportation electrification investments to support a paradigm shift in how goods move in and through our service territory. We know that a successful transition to zero emission vehicles will require enough service technicians who know how to maintain electric vehicles and install and service the associated charging infrastructure. This will require growing out the technical skills development of both medium- and heavy-duty vehicle service technicians and electric vehicle charging technicians, which ultimately means resourcing technical skills instruction to cover these new skill sets. Some of the challenges we have identified in expanding the workforce to support zero emission vehicles are lack of curriculum, whether in formal educational programs or through trade skills development, and lack of medium- and heavy-duty zero emission vehicle training resources in the forms of training vehicles, facilities, certified instructors, and general funding to develop and sustain programming. We are working with educational institutions to understand and advocate for improvements to the educational pipeline starting at the high school and community college level to expand the awareness and capability of zero emission vehicle maintenance services in the East Bay. We are also looking at the role community-based organizations and organized labor can play in driving interest, engagement, and training opportunities to contribute to equipping the local workforce with relevant technical skills.

d. Commercial VGI Pilot Project

PG&E is partnering with EBCE on a Commercial Vehicle-to-Everything (V2X) pilot that targets the adoption of bidirectional charging among MD/HD fleets through customer incentives.

PG&E's pending V2X pilot will leverage EBCE's MD/HD goods movement scopes of work to engage applicable stakeholders with the goal of signing up 200+ bidirectional MD/HD zero-emission vehicles and charging stations. PG&E intends to demonstrate the value of V2X MD/HD technology and show how this technology can reduce the total cost of ownership once barriers are overcome. The pilot aims to prove out five value-streams: backup power; followed by customer bill management, system real-time energy, grid upgrade deferral and EV export for grid

[40] Current RFO available at https://res.cloudinary.com/diactiwk7/image/upload/v1664499492/REVISED_9.27.22_-_RFO_for_ZERO-EMISSION_MEDIUM_AND_HEAVY-DUTY_GOODS_MOVEMENT_PROJECT_LOANS_9.12_-_Copy_kfqviw.pdf (retrieved 10/11/2022). EBCE's prior solicitations can be accessed at https://ebce.org/solicitations-archive/.

services (such as system resource adequacy, system capacity) in 2023. The pilot will also address barriers such as lack of real-world experience; incremental costs for charging infrastructure with V2X capabilities; lack of market signals for deployment; lack of information about costs; programs/rules that incentivize stationary storage but not EVs that export to the grid; lack of customer education and need for a system to aggregate pricing signals and communicate them to market actors. Throughout 2022, PG&E and EBCE have been coordinating on development of a pilot scope of work for our collaboration. The pilot has a targeted end date in 2024.

e. Municipal Fleet Electrification Technical Assistance Program

EBCE is providing free technical assistance to develop municipal fleet electrification plans to its Joint Power Authority member cities and counties. EBCE is also providing local government partners with a Charging-as-a-Service product so they can focus their annual budgeting efforts on vehicle procurement.

f. Brownfield Revitalization DCFC Project Development

EBCE is developing a service area wide inventory of brownfields and conducting in-depth feasibility assessments of specific sites for potential revitalization as DCFC hubs to serve two reuse cases: 1) Light-duty passenger vehicles and 2) MD/HD Goods Movement vehicles. This scope of work is funded by the United States Environmental Protection Agency (EPA). EBCE was the first public or private sector entity in the United States to develop this concept and methodology for assessing brownfields for revitalization as fast charging hubs. In recognition of this work, in 2022 EBCE received the EPA's National Notable Achievement Award. The award reflects EBCE's outstanding performance in support of the EPA's most significant priorities and recognizes EBCE's accomplishment as one of the most noteworthy nationwide.

g. FreeWire Technologies CEC Grant

EBCE is a partner to FreeWire Technologies, Inc., on a CEC grant awarded in 2021. The project will specifically add the following advancements to FreeWire's Boost Charger: 1) Resilient EV charging even when grid power is unavailable; 2) Backup supply to power on-site loads as a microgrid; 3) On-site power demand management to reduce the overall energy costs for a Site Host; 4) Direct integration with on-site renewable sources, such as solar, to increase the efficiency of the solar plus storage system and reduce its total cost; 5) Bi-directional power flow to support charger-to-grid power flow, and 6) Utility integration to support demand response, grid load balancing and other grid services. EBCE provided match funding to the project and will own and test FreeWire's Boost Charger to understand how this functionality could be deployed at EBCE JPA member's municipal critical facilities in the future.

h. EBCE Smart Charge App

EBCE and leading energy software platform, Kaluza launched a pioneering VGI program to boost grid resilience, reduce energy costs and mitigate carbon emissions associated with electric vehicle (EV) charging using the EBCE Smart Charge app.[41]

The EBCE Smart Charge app, developed by Kaluza, will begin by servicing more than 1,000 electric vehicle drivers in EBCE's service area. As part of the initiative, Kaluza will enable drivers to easily 'set and forget' when they need their car ready via the mobile app and optimize vehicle charging to occur when electricity has a higher renewable energy content and is more cost effective. EBCE and Kaluza estimate that the service could enable the average EV driver to save over $550 a year and reduce their charging carbon emissions by 36%.

The EBCE Smart Charge app will leverage real-time price signals to enable cars to store energy during off-peak times creating 2-3GWh of flexible charging per year, thereby enabling EBCE to maximize its contracted wind and solar capacity and accelerate local system decarbonization.

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

EBCE has developed the Health-e Home program[42] to provide electrification and energy efficiency improvements to Low and Moderate income households in our service area. The Health-e Home program also supports health and safety improvements such as wiring upgrades and roofing repairs—all to help reduce indoor air pollution, increase resiliency during extreme weather events, and potentially increase home value. The Health-e Home program will retrofit 60 households by July 2023 and, if the model is successful, will scale up from there. The first installed projects will allow EBCE to create a baseline for the change in energy usage of these projects in order to forecast the impacts to load of future programs of this nature.

xii. Other

EBCE has worked with several of its member cities to develop and achieve Climate Action Plans, where cities transition their default energy service to EBCE's Renewable 100. EBCE's Renewable 100 service is sourced from California wind and solar facilities, including a new wind farm in Livermore. As EBCE's service area grows and more member cities adopt their own Climate Action Plans, EBCE will continue to maintain a portfolio that achieves 100 percent clean energy for customers in this service.

[41] *See* https://ebce.org/news-and-events/ebce-and-kaluza-launch-charging-service-to-slash-bills-for-ev-drivers/.

[42] See https://ebce.org/health-e-home/.

Recent legislative and other developments significantly alter the near-term procurement planning landscape. [List of changed circumstances: DCPP extension; DWR Strategic Reliability Reserve; EBCE expansion to incorporate residents of Stockton in 2024]

In light of the California state legislation seeking to extend operation of the Diablo Canyon Power Plant and pending further clarification of the implications of how this single large baseload resource may alter the relative costs and preferability of other resources, EBCE's Preferred Conforming Portfolio (as well as those of other LSEs') may not fully reflect EBCE's portfolio needs.

EBCE is monitoring developments regarding the California Department of Water Resources' (DWR) actions to establish a Strategic Reliability Reserve.[43] It is not yet clear how the development of the Strategic Reserve will affect other LSEs' ability to procure existing and planned resources. It seems likely that DWR's procurement activity may result in less availability of some existing resources to other LSEs to satisfy portfolio requirements.

B. Disadvantaged Communities

EBCE demonstrates its commitment to deploying equitable policies and programs for its constituents in Alameda County and the City of Tracy. Equity is a through-line in EBCE's approach to some of the community-focused programs included below.

- Disadvantaged Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT)
- Healthy-e Homes program
- Resilient Home program
- Connected Communities pilot
- Covid-19 Grants for Community-Based Organizations
- Arrearage Management Plan (AMP) and California Arrearage Payment Program (CAPP)

The first four programs deploy robust marketing, education, and outreach strategies to meet our low-income, multi-family customers. EBCE integrates thorough data analytics to best meet the needs of our disadvantaged communities. EBCE intends to ensure that those who have been historically excluded in the clean energy movement, have access to these programs to propel a just, all-electric transition. For example, EBCE's Resilient Home program, partnered with Sunrun offers home solar and battery back-up systems at a pre-negotiated prices. Through this effort, EBCE's teams have targeted multi-family developments. As of August 2022, EBCE has installed systems covering 418 tenant units. EBCE intends to expand the program to include more multi-

[43] AB 205, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB205.

family dwellings to bridge the accessibility gap for multi-family tenants. In addition to targeting specific customer segments, EBCE provides in-language marketing material for multilingual customers or non-English readers.

Additionally, EBCE implements programs and payment plans aimed at removing economic barriers for ratepayers in our service area. EBCE currently participates in the CPUC- and state-funded programs: Arrearage Management Plan (AMP) and the California Arrearage Payment Plan (CAPP). The aim is to reduce utility debt accumulated during the Covid-19 pandemic. EBCE understands that there are compounding injustices such as economic inequities that prevent customers from paying their bills, causing greater stress and anxiety. AMP and CAPP are aimed to reduce those stressors. Furthermore, EBCE donated dollars to local relief efforts directly in our communities as a response to the Covid-19 pandemic. In the past years, EBCE contributed over $2 million to local organizations. Some of the awardees included small to large non-profits, food banks, and healthcare organizations. EBCE recognizes that both short-term and long-term funding are necessary to elevate energy equity issues in our service area.

Furthermore, EBCE's governance structure allows community input through the Community Advisory Committee (CAC), which consists of twelve members, plus five alternatives. Formed in 2016, EBCE's CAC advises the Board on all subjects related to our operations. The committee acts as a liaison between key stakeholders and our Board, holding public committee meetings on a regulator basis. Having diverse community members is important to EBCE, including geographic diversity.

C. Commission Direction of Actions

EBCE encourages the Commission to consider the following items.

First, the Commission should strive to reduce the volume of regulatory changes occurring simultaneously to allow the IRP process to serve as a meaningful guide for LSE and statewide resource procurement.

EBCE is concerned that the range of changes occurring in multiple regulatory programs render the results of EBCE's, and perhaps other LSEs', IRP analysis less useful. The changing regulatory and statutory landscape has been recognized by the Commission already.[44] For example, the Resource Adequacy program is undergoing a fundamental change in program design by moving

[44] See *ALJ Ruling Seeking Comments on Staff Paper on Procurement Program and Potential Near-Term Actions to Encourage Additional Procurement*, issued September 8, 2022 (hereafter, 9/8 ALJ Ruling) at p. 8 (noting changes to the RA program, Strategic Reliability Reserve, DCPP operation extension, and carbon neutrality requirements).

towards a monthly 24-hour slice of day paradigm;[45] simultaneously, the Commission is considering making urgent changes to the framework of procurement orders that have been issued in the IRP program over the past 3 years while *also* establishing an ongoing IRP Procurement Program that would, potentially, replace the entire IRP procurement paradigm.[46]

EBCE is still determining how the RA program reforms will affect EBCE's portfolio needs. It has not been within the scope of EBCE's IRP analysis to anticipate or prejudge these impacts. Nevertheless, the RA program reform is a known area of uncertainty for EBCE's long-term resource planning.

The proposed changes in the IRP program[47] are potentially less well understood as they may affect EBCE's long-term portfolio planning. The proposed Near-Term Actions reflected in the September 8 Ruling may alter EBCE's near-term portfolio needs, by changing which resources may count towards EBCE's incremental Near Term and Mid-Term Reliability procurement obligations. Coupled with this is the prospect of additional procurement directives before even the February 1, 2022, IRP Compliance Filing.[48] The IRP Procurement Program, as reflected in the Staff Paper, may further add complexity to EBCE's growing portfolio analysis efforts. EBCE simply has not been able to incorporate these potential changes into its IRP analysis. The amount of uncertainty that these changes inject into the LSE long-term resource planning is not helpful.

Second, the Commission should impose greater discipline on the timing and release of IRP filing requirements, inputs, and assumptions. As further described in the Lessons Learned section, the Commission continued to revise the materials used to develop the IRP LSE Plan filing until as late as September 29, 2022. While EBCE appreciates the Energy Division Staff's responsiveness and effort to provide useful guidance and materials in a timely manner, there needs to be a recognition that the IRP is a planning exercise that should inform and guide, but not necessarily dictate, LSE procurement over the planning horizon. Modifying the filing materials long after they were expected to be fixed is an issue that can and should be avoided.

Third, the IRP is an imprecise forecast of LSE portfolio needs using assumptions about the future state of resource costs, timely interconnection with available deliverability, and load forecasts.

[45] D.22-06-050, issued June 23, 2022 (adopting 24-hour framework, workshop series, and timing to adopt with 2024 test year and 2025 implementation).

[46] 9/8 *ALJ Ruling* at p. 1.

[47] *Id.*

[48] 9/8 ALJ Ruling at p. 8 ("the [9/8 ALJ] ruling is focused on . . . additional changes the Commission could make . . . prior to [the] next formal need assessment [i.e., IRP Compliance Filing in February, 2023] . . . and prior to the implementation of" an IRP Procurement Program).

The conclusions of an LSE's IRP analysis provide more or less useful directional guidance about how their portfolio needs may change and what steps they may need to take in the future. In EBCE's case, several landscape changes have occurred since we started our IRP analysis. These include significant regulatory process changes underway in the RA and IRP proceedings; the extension of the Diablo Canyon Power Plant operation for several years; the development of California's Strategic Reliability Reserve by the Department of Water; and the addition of residents of the City of Stockton in 2024. With all these new uncertainties changes, EBCE anticipates that its portfolio needs in the future will differ from its Preferred Conforming Portfolio. The Commission should not expect nor insist that LSEs precisely follow the procurement plans reflected in their IRP portfolios.

V. Lessons Learned

As EBCE has matured, we are looking further ahead to determine the best resource portfolio that will achieve our organizational goals while contributing to system reliability and emission reduction goals for the State. To succeed, we need to manage our portfolio effectively, adding clean energy resources with the appropriate attributes to meet our portfolio needs over time. Striving to achieve EBCE's Board-established a goal of providing 100% clean energy on a net-annual basis by 2030,[49] EBCE purposefully sought to expand and improve the capability of our long-term portfolio planning both in preparation for the 2022 IRP LSE Plan submittal as well as to improve our own long-term portfolio management. We have adopted markedly different tools and methodologies we used for this year's IRP plan from previous cycles.[50] We did this to establish an enhanced baseline of long-term analytical capability that can be adapted and repeated more frequently that the current CPUC IRP cycle requires. EBCE's ultimate long-term portfolio strategy is to provide 24/7, coincident clean energy to our customers. EBCE's expanded long-term planning will be a critical tool in guiding our procurement strategy to manage portfolio needs over time.

As EBCE's long-term portfolio analysis continues to improve, we have identified several areas that warrant improvement.

[49] *See supra*, n. **Error! Bookmark not defined.**

[50] *See supra* at p. 8.

D. Commission Should Recognize the Needs of Public Agency LSEs to Develop IRP Plans

EBCE notices that there appears to be an awareness gap between the CPUC's development of the IRP filing requirements and materials on the one hand, and EBCE's (like other public agencies) required internal governance process on the other. Namely, while the filing deadline to submit an IRP LSE Plan is established by the Commission (e.g., for this year it is November 1, 2022), EBCE must obtain filing authority from its Board well in advance of the CPUC's filing date. As a public agency, EBCE must comply with public meeting notice requirements such as the duty to publish Board meeting materials in advance of regularly scheduled meetings. While EBCE is governed by a Board comprised of elected officials from every municipality within our service territory, our Board is advised by a Community Advisory Committee in addition to EBCE Staff. EBCE must comply with public meeting notice requirements for our advisory committee as well. To ensure that our Community Advisory Committee *and* our Board have a meaningful opportunity to review and approve our IRP LSE plan, EBCE must complete its IRP analysis and plan development approximately one month prior to the CPUC's filing deadline. EBCE, like other public agencies participating in the IRP proceeding, therefore has less time to develop and prepare our IRP analysis than the Commission appears to perceive. EBCE asks that the Commission consider the process to which public agencies must adhere when setting IRP cycle milestones, fixing the closed system of planning parameters, and establishing IRP LSE Plan filing deadlines.

Considering the IRP development timeline described above, much of which is dictated by EBCE's status as a public agency, EBCE was dismayed to see that the Commission continued to make revisions, however seemingly minor, to the filing requirements and materials as late as September 29, 2022.[51] EBCE's IRP analysis, like many other LSEs, is the culmination of several months' effort. While EBCE has made best efforts to accommodate these and other changes, it is not reasonable to expect such flexibility from all LSEs in every IRP cycle.

[51] See the Commission's *Aggregated CAM Resources for LSEs Plan Development* workbook, published September 29, 2022, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/aggregated_cam_resources.xlsm; see also the updated Resource Data Template, Version 3, published September 23, 2022, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/rdtv3_092322.xlsm.

E. Transmission Congestion and Interconnection Deliverability Slow Incremental Resource Development

EBCE anticipates that the challenges of bringing incremental generating resources online will continue in light of congested transmission capacity across the CAISO system and scarce interconnection deliverability for new resources connecting to the grid. The Commission should consider what steps it may take to support efforts by CAISO and others to alleviate transmission congestion and deliverability scarcity for generation interconnection projects serving California load.

F. IRP-Directed Procurement Risks Displacing LSE Portfolio Management and Procurement Goals

EBCE is concerned that the CPUC's IRP process may have the effect of displacing EBCE's own portfolio management autonomy. Recognizing that the Commission is eager to encourage additional procurement beyond LSE need,[52] given EBCE's relatively small size within the broader LSE landscape, the Commission's procurement direction risks overwhelming EBCE's ability to procure resources that reflect our mission and guidance from our Board.

EBCE is cognizant of its place within the broader LSE landscape. EBCE fully appreciates our obligation to serve load with a resource portfolio that complies with EBCE Board guidance as well as State reliability and emission requirements. However, EBCE notes that the Commission's conclusions based on its analysis of individual LSE-submitted resource portfolios has often resulted in significant additional procurement requirements for EBCE, and other LSEs generally. EBCE has a responsibility to manage its resource portfolio in accordance with the direction set by EBCE's member city and municipal representatives. Yet EBCE's IRP analysis, and the resulting preferred conforming portfolio, are based on assumptions regarding EBCE's load change over time, availability of transmission capacity over the planning horizon, relative market energy prices, and costs associated with procurement of then-existing or new resources across the Western Interconnection. In other words, EBCE's IRP portfolio is highly dependent on these assumptions and projections. Whether a particular resource or technology best suits EBCE's future portfolio needs within the IRP planning context should guide but not constrain EBCE's portfolio management decision-making or strategy.

Where EBCE receives a directive from the Commission to procure capacity or energy from specific resource technologies, this 'forced portfolio adjustment' risks displacing other procurement EBCE

[52] *See* 9/8 ALJ Ruling at p. 8.

might have undertaken. EBCE ultimately is striving to achieve a 24/7 coincident clean energy portfolio to meet its customers' load. Commission procurement direction constrains EBCE's procurement autonomy.

Glossary of Terms

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

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

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

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

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

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

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

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

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

Conforming Portfolio*: the LSE portfolio that conforms to IRP Planning Standards, the 2030 LSE-specific GHG Emissions 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.*

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

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

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

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

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

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

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

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

Long term*: more than 5 years unless otherwise specified.*

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

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

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

Loss of Load Expectation (LOLE): *a metric that quantifies the expected frequency of loss-of-load events per year. Loss-of-load is any instance where available generating capacity is insufficient to serve electric demand. If one or more instances of loss-of-load occurring within the same day regardless of duration*

are counted as one loss-of-load event, then the LOLE metric can be compared to a reference point such as the industry probabilistic reliability standard of "one expected day in 10 years," i.e. an LOLE of 0.1.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix

The following figures and tables show the results tables from the CSP for the CPUC 30 MMT scenario.

Table 22 CO_2 Emissions Summary of EBCE's Preferred Conforming Portfolio - 30 MMT Scenario[53]

CO_2	*Unit*	2024	2026	2030	2035
Coal	*MMt/yr*	0.000	0.000	0.000	0.000
CHP	*MMt/yr*	0.167	0.167	0.167	0.100
Biogas[54]	*MMt/yr*	0.000	0.000	0.000	0.000
Biomass[54]	*MMt/yr*	0.000	0.000	0.000	0.000
System Power	*MMt/yr*	1.136	0.829	0.544	0.480
Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000
Total	***MMt/yr***	**1.303**	**0.997**	**0.710**	**0.580**
Average emissions intensity	*tCO_2/MWh*	0.193	0.145	0.099	0.077
Oversupply Emissions Credits	*MMt/yr*	0.14	0.18	0.20	0.27

Table 23 CSP Summary of EBCE's Preferred Conforming Portfolio – 30 MMT Scenario

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	6,740	6,887	7,180	7,540
RPS-Eligible Delivered Renewable	GWh	4,348	5,276	6,375	7,129
GHG free	GWh	4,348	5,276	6,375	7,131
RPS-Eligible Delivered Renewable Percentage	% of retail sales	65	77	89	95
GHG-free Percentage	% of retail sales	65	77	89	95

[53] CHP emissions shown in Table 22 represent EBCE's pro rata share of behind-the-meter Combined Heat and Power (CHP) interconnected to the CAISO-controlled electric grid. CHP emissions are determined by the CSP calculator as a function of LSE load, unrelated to the 'actual' GHG-emission profile of any specific LSE's resource portfolio. EBCE is required to include this allocation in its CSP.

[54] As shown in the tables below, EBCE is allocated particulate emissions associated with the VAMO allocation of Biomass / Biogas attributes. However, the CSP assigns no CO2 emissions for these resources.

Table 24 Preferred Conforming Portfolio of PM 2.5 Emissions – 30 MMT Scenario

PM2.5	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	9.17	9.17	9.14	5.61
Biogas	tonnes/yr	4.34	4.36	4.14	1.28
Biomass	tonnes/yr	36.96	35.06	26.12	19.84
System Power	tonnes/yr	29.51	24.51	16.71	17.74
Total	tonnes/yr	79.97	73.09	56.11	44.47
Average emissions intensity	kg/MWh	0.01	0.01	0.01	0.01

Table 25 Preferred Conforming Portfolio SO_2 Emissions – 30 MMT Scenario

SO2	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	0.98	0.97	0.97	0.60
Biogas	tonnes/yr	3.17	3.16	3.06	0.95
Biomass	tonnes/yr	14.21	13.48	10.05	7.63
System Power	tonnes/yr	2.77	2.30	1.56	1.66
Total	tonnes/yr	21.13	19.92	15.64	10.84
Average emissions intensity	kg/MWh	0.00	0.00	0.00	0.00

Table 26 Preferred Conforming Portfolio NO_x Emissions – 30 MMT Scenario

NOx	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	42.79	42.57	42.02	22.34
Biogas	tonnes/yr	14.26	14.23	13.75	4.29
Biomass	tonnes/yr	111.38	105.59	78.66	59.76
System Power	tonnes/yr	35.28	28.94	20.58	21.90
Total	tonnes/yr	203.70	191.33	155.02	108.29
Average emissions intensity	kg/MWh	0.03	0.03	0.02	0.01