Staff Report Item 14

TO: East Bay Community Energy Board of Directors

FROM: Supria Ranade, Director of Power Resources

SUBJECT: **Power Supply Procurement and Hedging**

DATE: January 17, 2018

Recommendation

Receive update and provide feedback on EBCE Energy Supply and Hedging**.**

Summary

East Bay Community Energy (EBCE) is scheduled to begin supplying clean, reliable and cost effective electric service to its customers in June 2018. Northern California Power Agency (NCPA) is actively working with EBCE to develop a power supply procurement and hedging strategy that will enable EBCE to accomplish the following goals: (i) provide cost effective electric service to its customer, (ii) optimize the value of its supply portfolio, (iii) satisfy various regulatory and content requirements (including Renewable Portfolio Standards (RPS) and carbon free hydropower), (iv) maintain reliable electric service for its customers, v) pursue procurement of local resources. Inherent in these goals is the need to manage risks related to transacting energy, capacity, and energy related products, based on the policies and requirements established by EBCE. Based on these considerations, among others, EBCE's Director of Power Resources and NCPA provides the following power supply procurement and hedging recommendations for your consideration.

Risk Management Strategies

An important aspect of implementing a power supply procurement and hedging strategy is developing strategies to mitigate risks associated with market price volatility, counterparty risk, and risks inherent in energy product trading activities. The key strategies used by EBCE and NCPA to develop the recommendations contained herein are outlined below.

Balanced Portfolio

EBCE and NCPA's power supply procurement recommendations strive to develop and maintain an integrated and balanced power supply portfolio to cover EBCE's load serving obligations and maintain the value of EBCE's supply assets, while managing EBCE's supply resources within its financial requirements and budget.

Recommended Coverage Requirements

To mitigate EBCE's exposure to market price volatility risk, EBCE NCPA's power supply recommendations contained herein are based on the following recommended coverage requirements as well as determining the total ; whereby, NCPA recommends that EBCE procure sufficient power supply to manage its open energy positions in accordance with the recommended coverage ratios provided in Table 1 (Time-Price Coverage Matrix), coupled with a Cost Value at Risk (CVaR) metric to mitigate risk on a portfolio level.

TABLE 1
Time-Price Coverage Matrix

Months to Delivery		Price Matrix Percentile						
		>60%	60%	50%	40%	25%	10%	<10%
		Covered Position as a % of Forecasted Load						
0+	3	80%	80%	85%	85%	90%	90%	100%
3+	6	70%	70%	75%	80%	80%	90%	100%
6+	9	70%	70%	75%	80%	80%	80%	90%
9+	12	60%	60%	70%	80%	80%	80%	90%
12+		60%	60%	70%	80%	80%	80%	90%

Chart 1
Load Duration Curve - 2018

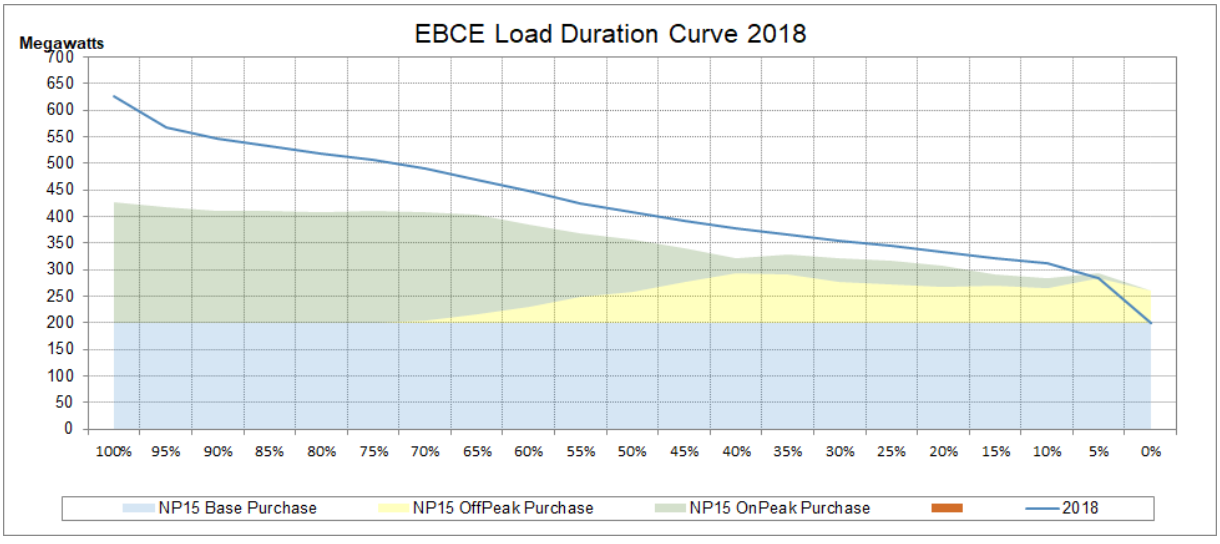
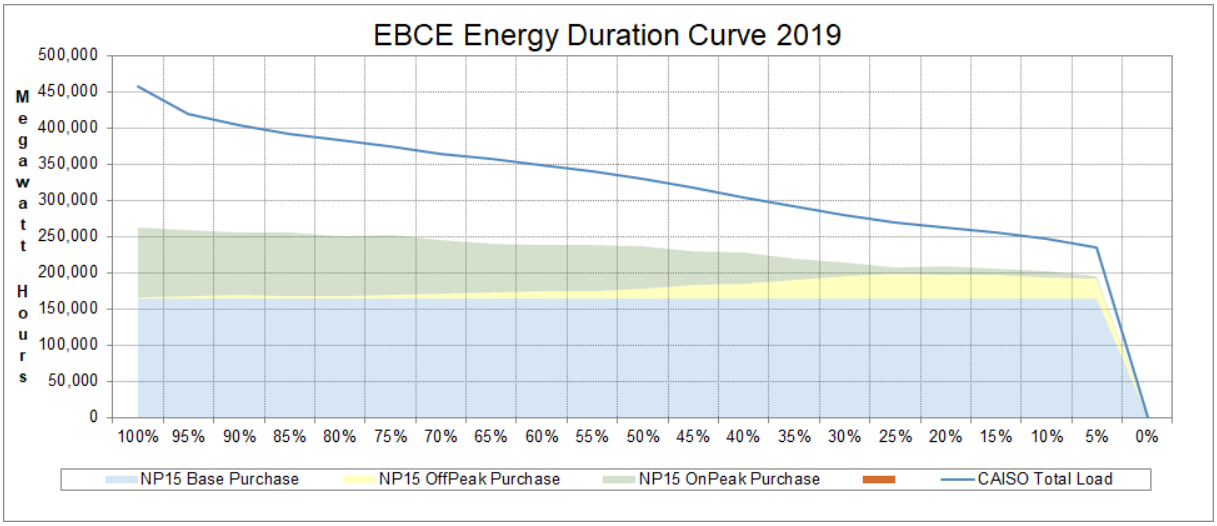


Chart 2
Load Duration Curve - 2019



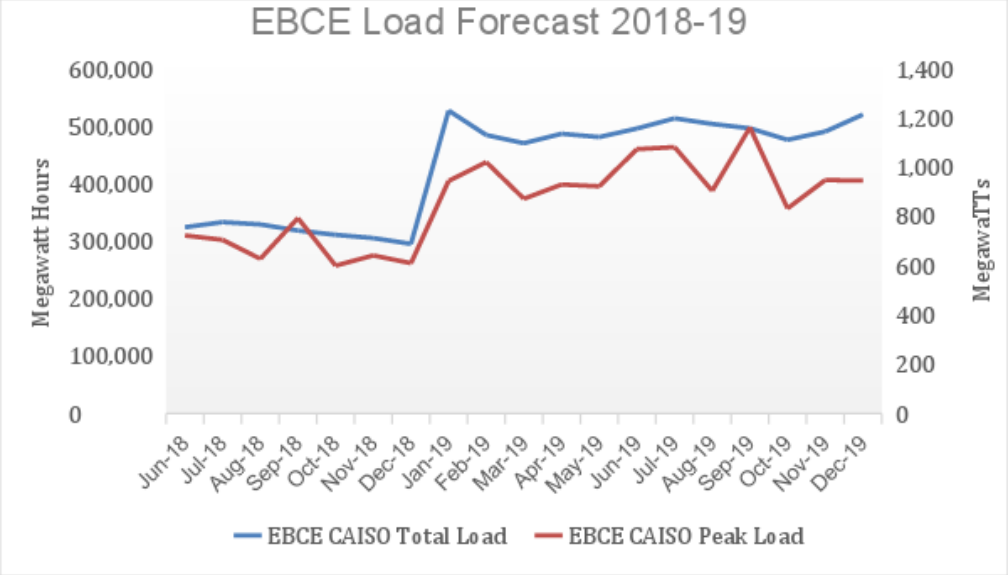
Financial Requirements

The power supply recommendations contained herein are designed to create a power supply portfolio with an overall cost that is consistent with the financial requirements of EBCE's adopted rate structure. Whereby, the total cost of energy, and energy related products, purchased by EBCE generates sufficient margin to fund EBCE's cost of operations, as further set forth in EBCE's budget.

Load Forecast

The EBCE load forecast developed by NCPA for calendar year 2018 is based on actual load served by Pacific Gas and Electric Company (PG&E) in Alameda County during calendar year 2016 (source data supplied by PG&E). For calculating the load forecast used to determine EBCE's supply needs. For future procurement recommendations developed by NCPA, NCPA staff will work to develop a more comprehensive forecasting model that will be used to calculate EBCE's load serving requirements. As a result, NCPA and EBCE believe that the calendar year 2016 actual load data can be used as a reasonable proxy for the procurement recommendations herein. For ECBE, demand variability will be largely attributable to three factors: (1) changes in demand related to the weather, (2) changes in demand related to economic activity, and (3) changes in demand related to customers joining and exiting ECBE service. This third portion of demand uncertainty is unique to CCA's and the risks associated with it need to be carefully considered when load forecasting. The calendar year 2018 load forecast upon which recommendations are based can be found in Table 2 below.

Chart 3: EBCE Load Forecast 2018-19



Procurement Recommendations

The following summarizes EBCE's power supply procurement recommendations for EBCE during the period of June 2018 through December 2019. The joint recommendations include purchasing the following energy and energy related products: (i) base load energy, (ii) shaped energy, (iii) renewable energy, (iv) carbon-free hydropower and (iv) Resource Adequacy capacity.

Energy

- ***Base Load Energy Supply***

EBCE recommends issuing solicitations (request for proposals), in coordination with NCPA, to purchase the base load energy volumes contained in Table 3 below. The base load energy volumes may be purchased from one or more eligible counterparties, and may be purchased in varying contract durations (e.g., annual product, quarterly product, monthly product).

TABLE 2
Base Load Energy
Note: The purchase costs contained in Table 3 are based on forward price curves that are dynamic and change over time; therefore, the actual purchase costs for the base load energy contained in Table 3 may be greater than or less than the costs represented in Table 3.

Year	Month	Base Purchase	Base Contract Price	Base Purchase Costs
2018	6	144,000	$ 33.75	$ 4,859,959
2018	7	148,800	$ 36.72	$ 5,463,590
2018	8	148,800	$ 38.84	$ 5,779,454
2018	9	144,000	$ 37.19	$ 5,354,741
2018	10	148,800	$ 37.49	$ 5,579,208
2018	11	144,200	$ 36.04	$ 5,197,412
2018	12	148,800	$ 37.14	$ 5,526,371
	TOTAL	1,027,400	$ 36.75	$ 37,760,734

- ***Shaped Energy Supply***

EBCE recommends issuing solicitations (request for proposals), in coordination with NCPA, to purchase the shaped energy volumes contained in Table 4 (Off Peak Supply), Table 5 (On Peak Supply), and Table 6 (Super Peak Supply) below. The shaped energy volumes may be purchased from one or more eligible counterparties, and may be purchased in varying contract durations (e.g., annual product, quarterly product, monthly product).

TABLE 3
Shaped Energy
(On Peak & Off Peak Supply)

OffPeak Purchase	OffPeak Contract Price	OffPeak Purchase Costs	OnPeak Purchase	OnPeak Contract Price	OnPeak Purchase Costs
42,560	$ 29.81	$ 1,268,850	104,000	$ 36.63	$ 3,809,146
41,280	$ 31.99	$ 1,320,349	92,000	$ 40.79	$ 3,752,459
34,320	$ 33.86	$ 1,162,027	95,040	$ 42.44	$ 4,033,346
36,960	$ 33.45	$ 1,236,153	92,160	$ 40.46	$ 3,728,628
21,840	$ 33.71	$ 736,261	77,760	$ 40.23	$ 3,128,044
22,470	$ 32.45	$ 729,149	76,000	$ 38.93	$ 2,958,422
20,640	$ 33.14	$ 683,946	68,000	$ 40.58	$ 2,759,569
2,435,451	$ 3.98	$ 9,684,423	2,187,231	$ 11.47	$ 25,077,063

Note: The purchase costs contained in Table 4, Table 5 and Table 6 are based on forward price curves that are dynamic and change over time; therefore, the actual purchase costs for the base load energy contained in Table 4, Table 5 and Table 6 may be greater than or less than the costs represented in Table 4, Table 5 and Table 6.

Lowering Environmental Impact of Energy Supply: EBCE's Comprehensive Approach

To support Alameda County's renewable, climate, and low-cost energy goals, EBCE recommends developing a power mix which includes both renewable energy and carbon free resources which considers both the generation and lifecycle assessments of power generation. EBCE's Director of Power Resources will give a presentation detailing the benefits and costs of each resource mix to recommend three options towards a comprehensive energy strategy.

Renewable Energy

Pursuant to the State of California Renewable Portfolio Standard Program (RPS), as codified at California Public Utilities Code Section 399.11, *et seq.*, EBCE is required to supply a defined amount of its retail sales with certified renewable energy resources. More specifically, for the current RPS compliance period, which ends in 2020, EBCE is required to service at least 33% of its retail sale from the following categories of renewable energy resources: at least 75% with Category 1, and no more than 10% Category 3. During the draft, it was determined that EBCE would not be procuring Category 3 RECs and instead meeting compliance with Category 1 and 2. EBCE will be placing a strong preference on local and in-state California resources to the extent available and cost effective.

Carbon-Free

To support clean energy and climate action goals of Alameda County jurisdictions (**see Table 4 below**) and to maintain cost effective energy, EBCE recommends supplying a defined amount of its retail sales with carbon-free resources. For example, carbon-free hydropower in California and the greater WECC has significantly contributed to lowering the carbon intensity of electric power mix, being the largest non-nuclear carbon-free energy resource in the US (EIA, 2017). EBCE recommends the following procurement options for calendar year 2018 pending adoption of a defined renewable energy goals. EBCE will place a strong preference on in-state California resources to the extent available and cost effective.

Table 4. Climate Goals of EBCE Alameda County Jurisdictions

EBCE Jurisdiction	Climate Action Plan Goals	Citation
Alameda County	15% reduction of 2005 levels by 2020; 80% reduction by 2050	Alameda County (Unincorporated Areas) Community Climate Action Plan *(Adopted Feb 2014)*
Albany	25% below 2005 levels by 2020; 60% by 2035 and net zero emissions by 2050	City of Albany Climate Action Plan *(Adopted April 2010)*
Berkeley	33% below 2000 levels by 2020; 80% by 2050	City of Berkeley Climate Action Plan *(Adopted June 2009)*
Dublin	15% below 2010 levels by 2020	City of Dublin Climate Action Plan *(Adopted Nov 2010)*
Emeryville	40% below 2004 levels by 2030 and 80% by 2050	City of Emeryville Climate Action Plan 2.0 *(Adopted Nov 2016)*
Fremont	25% by below 2005 levels by 2020	City of Fremont Climate Action Plan *(Adopted Nov 2008)*
Hayward	20% below 2005 baseline emissions levels by 2020; 62.7% by 2040; 82.5% by 2050	City of Hayward Climate Action Plan Policies & Programs *(Adopted July 2014)*
Livermore	15% below 2008 levels by 2020	Livermore Action Plan *(Adopted Nov 2012)*
Oakland	36% below 2005 levels by 2020	Oakland Energy and Climate Action Plan *(Adopted Dec 2012)*
Piedmont	15% below 2005 baseline emissions levels by 2020 (v1); *40% below its 2005 baseline by 2030 and 80% by 2050 (v2)*	Piedmont Climate Action Plan 2.0 *(in progress)*
Union City	20% reduction below 2005 levels by 2020	Union City Climate Action Plan *(Adopted Nov 2010)*

EBCE to provide pricing ranges for each example in memo attachments for the purpose of discussing current market pricing for renewable energy and carbon products.

- **Example 1: Total Clean Energy**
  55%; Renewable Energy (RPS): 35%;
  Carbon Free: 20%

Purchase a volume of California and WECC located Renewable Energy Products equal to EBCE's renewable portfolio standard compliance products to meet 35% target; portfolio composition includes Category 1 and 2 products. Purchase a volume of California and WECC carbon free products to meet 20% goals for carbon free energy.

- **Example 2: Total Clean Energy:**
  65%; Renewable Energy (RPS): 40%;
  Carbon Free: 25%

Purchase a volume of California and WECC Renewable Energy Products equal to EBCE's renewable portfolio standard compliance products to meet 40% target; portfolio composition includes Category 1 and 2 products. Purchase a volume of California and WECC carbon free products to meet 25% goals for carbon free energy.

- **Example 3: Total Clean Energy**
  75%; Renewable Energy (RPS): 45%
  Carbon Free: 30%

Purchase a California and WECC Renewable Energy Products equal to EBCE's renewable portfolio standard compliance products to meet 45% target; portfolio composition includes Category 1 and 2 products. Purchase a volume of California and WECC carbon free products to meet 30% goals for carbon free energy.

- **Example 4: Total Clean Energy**
  100%; Renewable Energy (RPS): 50%
  Carbon Free: 50%

Purchase a California and WECC Renewable Energy Products equal to EBCE's renewable portfolio standard compliance products to meet 50% target; portfolio composition includes Category 1 and 2 products. Purchase a volume of California and WECC carbon free products to meet 50% goals for carbon free energy.

Energy Risk Management
EBCE will then take the results of this pricing discussion and integrate in a more comprehensive discussion on portfolio risk management within EBCE's portfolio design parameters. EBCE's recommendation will be for EBCE and NCPA to develop a portfolio strategy path forward framed around risk management, in order to provide clean and low-cost electricity to Alameda County for the long-term.

Resource Adequacy Capacity

EBCE, operating as a Load Serving Entity (LSE) in the California Independent System Operator (CAISO) Balancing Authority Area (BAA) is subject to Resource Adequacy requirements. Resource Adequacy requirements have been established for LSEs by the CPUC, or by other Governmental Bodies for competent jurisdiction. Resource Adequacy requirements including system capacity requirements, local capacity requirements, and flexible capacity requirements. Based on the Resource Adequacy requirements that are applicable to EBCE, NCPA recommends that EBCE purchase the Resource Adequacy capacity products contained in Table 8.

Upon execution of the energy supply recommendations contained herein, EBCE's forecasted load requirements for calendar year 2018 will be covered at the levels contained in memo attachments.

Total Power Supply Procurement Cost

Based upon each of the procurement recommendations contained herein, the total cost of power supply for the coverage ratios recommended at this time is contained in memo attachments.

Procurement Schedule

Upon confirmation of EBCE and NCPA's power supply procurement and hedging recommendations provided herein (or upon modification of such recommendations and subsequent confirmation of the revised recommendations), EBCE and NCPA proposed the following schedule to implement the final recommendations:

- Step 1 (January 2018) – Develop supporting material required to consummate the procurement recommendations
    - Develop & Finalize EEI Master Agreement, Confirmation
    - Develop & Finalize WSPP Agreements
- Step 2 (January 2018) – Discuss credit/collateral requirements with prospective suppliers
- Step 3 (March-April 2018) – Develop, issue, and process responses for Request for Proposals (RFP) for energy and capacity purchases
    - EBCE and NCPA to develop procurement strategy
    - Present offers received based on RFP process, submit recommendations for supplier selection to EBCE staff
    - Coordinate execution and processing of energy and capacity purchases

Attachments:

A. Energy Supply Analysis presentation

Energy Supply Analysis

Item 14

January 17, 2018

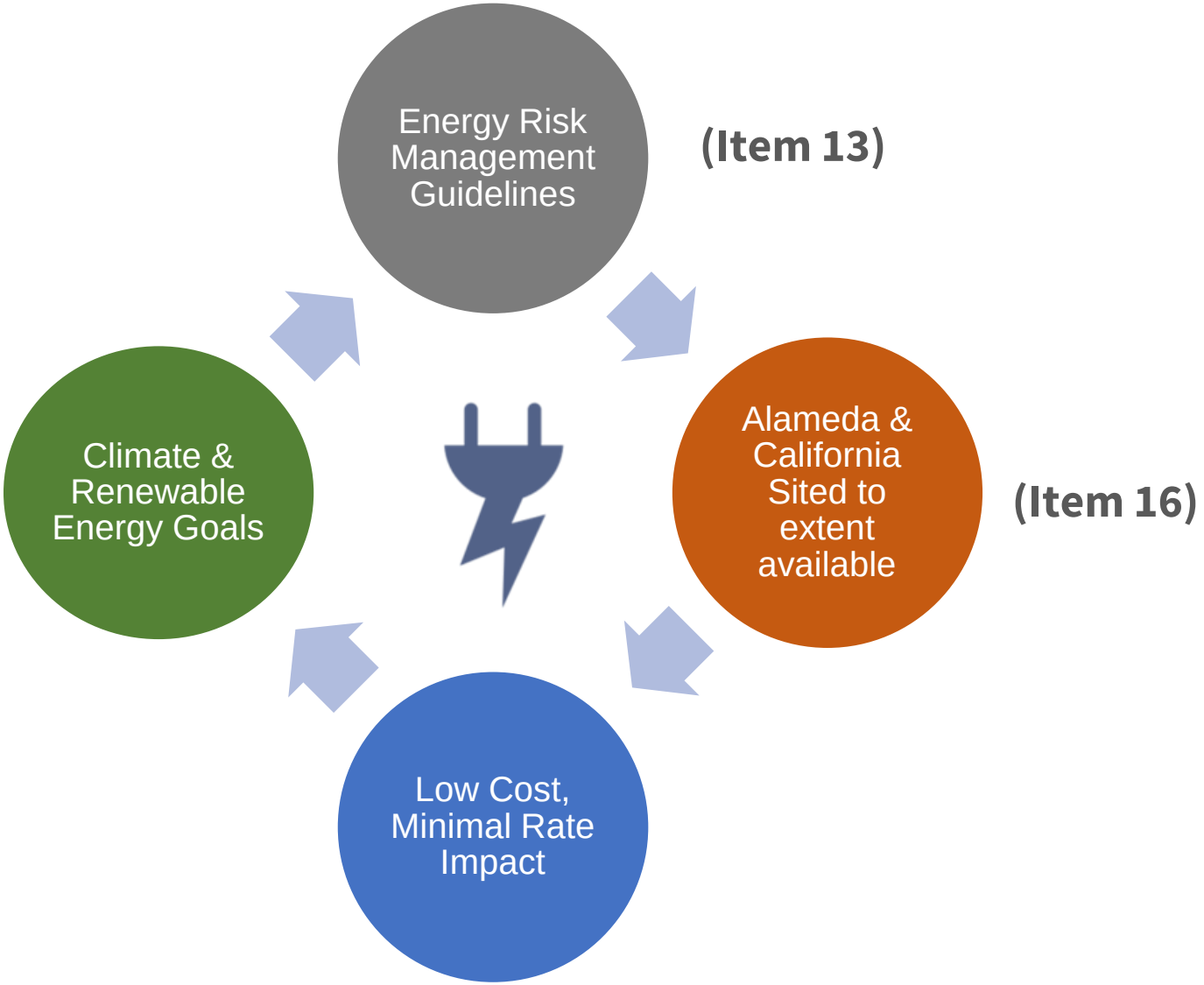
EBCE Board Meeting

Supria Ranade

Director of Power Resources

East Bay Community Energy

EBCE Power Resources Parameters



Climate & Renewable Energy Goals

Climate Goals

- All jurisdictions that EBCE will be serving have a Climate Action Plan, addressing lowering emissions by a certain % over time

Renewable Energy Goals

- EBCE and other CCAs strive to provide affordable renewable energy, at amounts that exceed the California renewable portfolio standard

Alameda Climate Goals

EBCE Jurisdiction	Climate Action Plan Goals	Citation
Alameda County	15% reduction of 2005 levels by 2020; 80% reduction by 2050	Alameda County (Unincorporated Areas) Community Climate Action Plan (Adopted Feb 2014)
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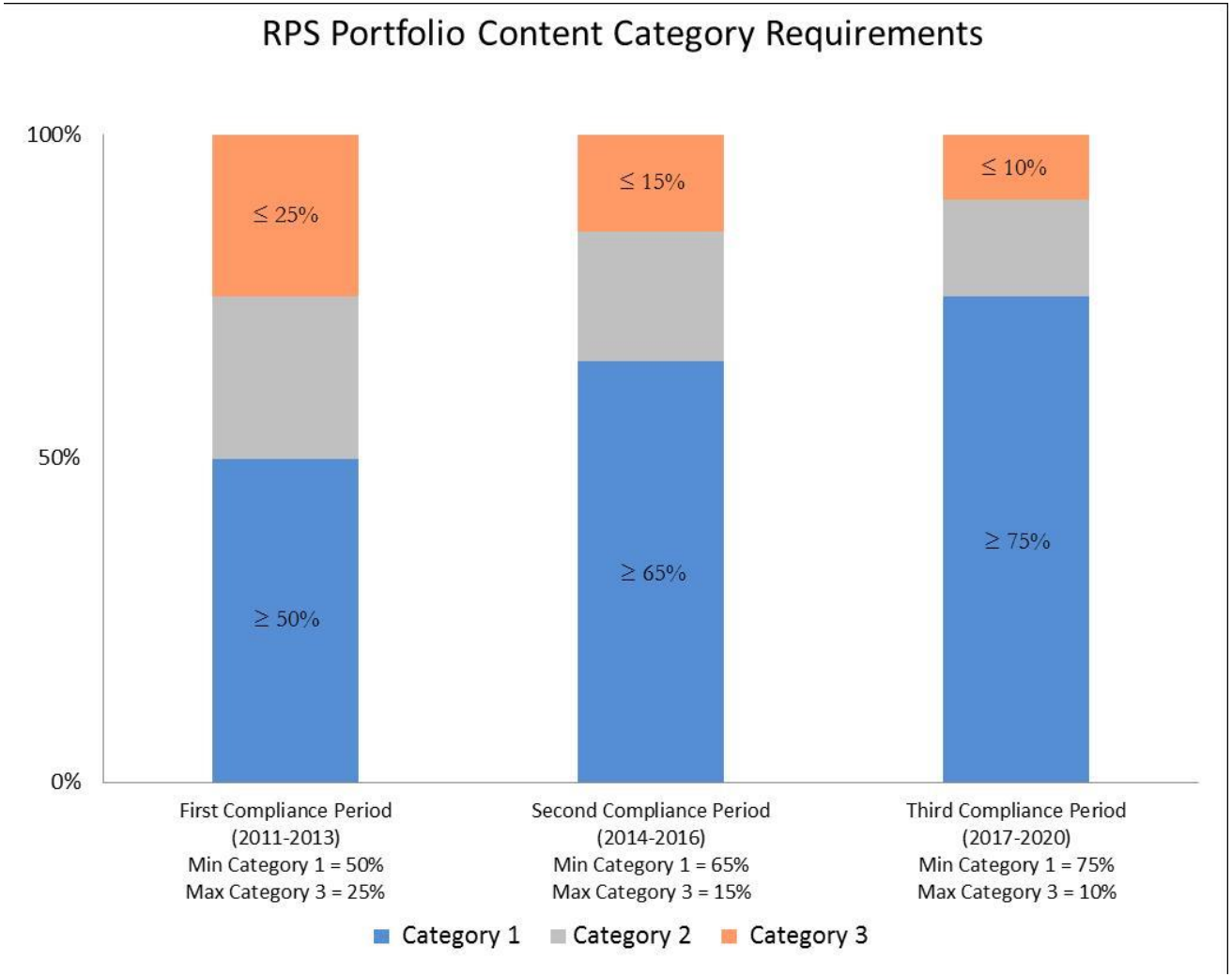
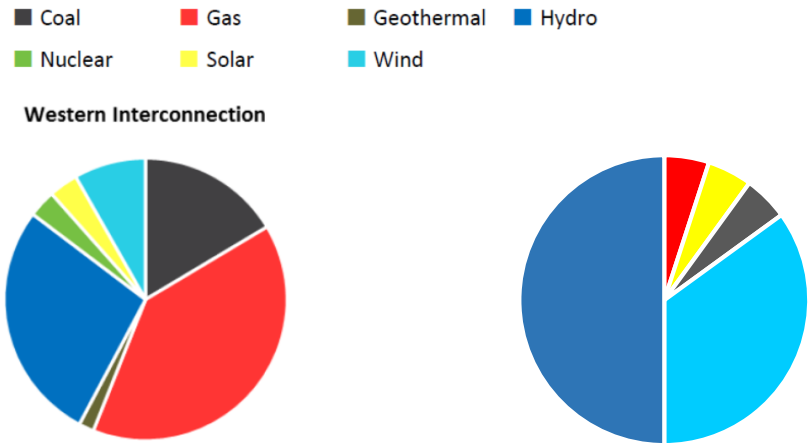
California Renewable Portfolio Standard



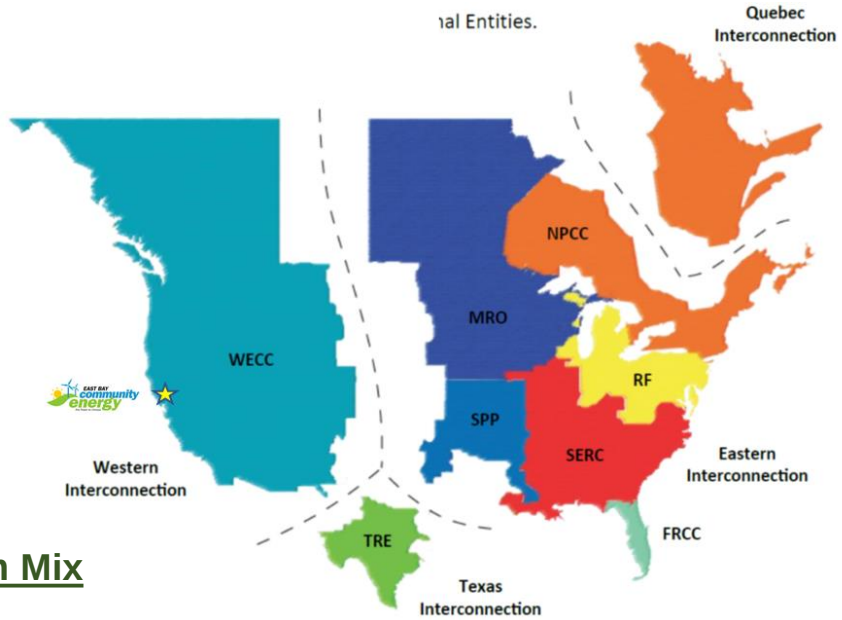
Source: *California Public Utilities Commission, RPS Procurement Rules*

General Supply Picture

WECC vs CCA Resource Mix



EBCE resides in WECC



Average WECC System Mix
Coal: 26%
Nuclear: 7%
Gas: 32%
Solar: 2%
Geothermal: 3%
Wind: 5%
Hydro: 23%
Unspecified: Ranges

Average CCA System Mix
Coal: 0%
Nuclear: 0%
Gas: 13%
Solar: 5%
Geothermal: 4%
Wind: 41%
Hydro: 28%
Unspecified: Ranges

Source: *2016 State of the Interconnection*, *Western Electricity Coordinating Council*

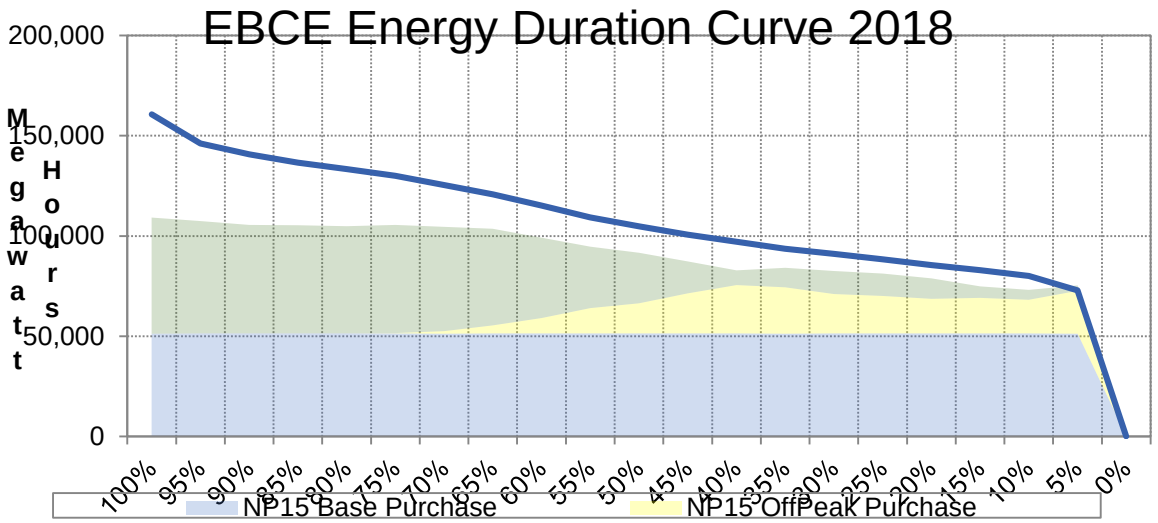
EBCE 2018-19 Load Forecast

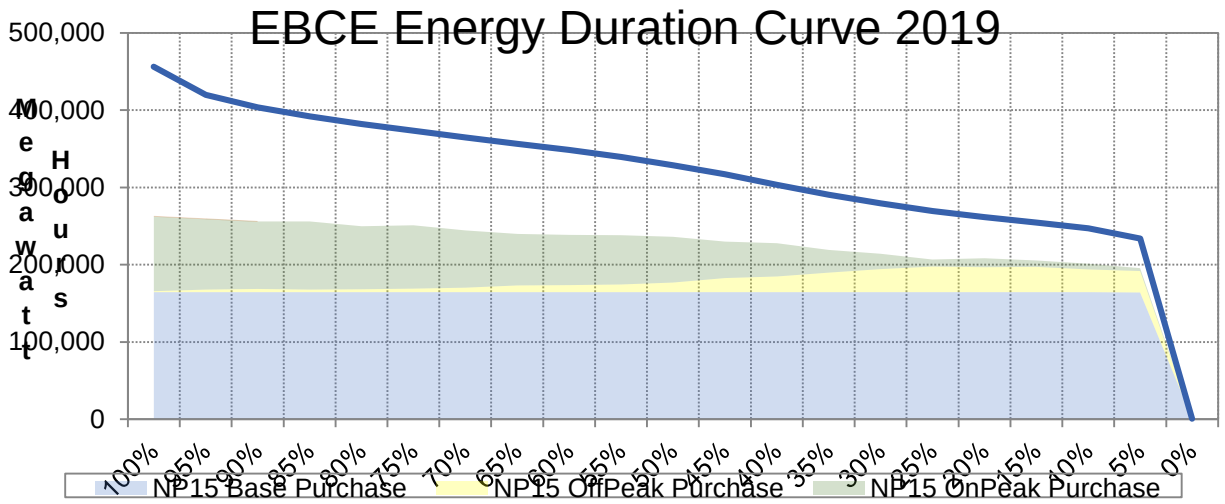
Year	Month	EBCE Residential Accounts	EBCE Non Residential Accounts	EBCE Retail Residential Load	EBCE Retail Non Residential Load	EBCE Retail Total Load	EBCE CAISO Total Load	EBCE CAISO Peak Load
2018	6	2,765	55,028	1,452	307,179	308,631	324,062	723
2018	7	2,765	55,028	1,535	315,583	317,118	332,974	705
2018	8	2,765	55,028	1,555	311,737	313,292	328,957	628
2018	9	2,765	55,028	1,573	301,526	303,099	318,254	793
2018	10	2,765	55,028	1,533	294,514	296,047	310,850	600
2018	11	2,765	55,028	1,761	288,884	290,645	305,177	642
2018	12	2,765	55,028	2,035	279,019	281,054	295,107	610
2019	1	547,350	55,028	207,773	294,261	502,034	527,135	944
2019	2	547,350	55,028	175,448	285,959	461,407	484,477	1,021
2019	3	547,350	55,028	167,754	280,126	447,881	470,275	872
2019	4	547,350	55,028	163,618	299,957	463,575	486,754	930
2019	5	547,350	55,028	159,434	298,642	458,077	480,980	922
2019	6	547,350	55,028	167,973	304,275	472,248	495,860	1,073
2019	7	547,350	55,028	170,544	318,574	489,118	513,574	1,082

EBCE 2018-19 Energy Duration

Year	Load_Percentile	CAISO Total Load	Total Purchases	NP15 Base Purchase	NP15 OffPeak Purchase	NP15 OnPeak Purchase
2018	100.0%	160,609	109,200	51,200	0	58,000
2018	95.0%	146,098	107,500	51,400	0	56,100
2018	90.0%	140,659	105,520	51,400	0	54,120
2018	85.0%	136,650	105,340	51,400	0	53,940
2018	80.0%	133,329	104,840	51,400	0	53,440
2018	75.0%	130,067	105,520	51,400	230	53,890
2018	70.0%	125,417	104,570	51,200	1,370	52,000
2018	65.0%	120,737	103,650	51,400	4,010	48,240
2018	60.0%	115,227	99,180	51,400	7,700	40,080
2018	55.0%	109,360	94,690	51,400	12,680	30,610
2018	50.0%	104,791	91,590	51,400	15,120	25,070
2018	45.0%	100,599	87,280	51,400	19,930	15,950
2018	40.0%	97,101	82,870	51,400	24,210	7,260
2018	35.0%	93,652	84,130	51,200	23,290	9,640
2018	30.0%	91,029	82,590	51,400	19,640	11,550
2018	25.0%	88,405	81,260	51,400	18,640	11,220
2018	20.0%	85,496	78,940	51,400	17,270	10,270
2018	15.0%	82,944	74,940	51,400	17,740	5,800
2018	10.0%	80,075	73,160	51,400	16,770	4,990
2018	5.0%	72,936	75,400	51,200	21,410	2,790
2018	0.0%	199	260	200	60	0
2019	100.0%	456,190	262,420	164,250	1,430	96,740
2019	95.0%	419,527	259,130	164,250	3,550	91,330
2019	90.0%	403,491	256,020	164,250	4,500	87,270
2019	85.0%	392,020	255,860	164,250	3,470	88,140
2019	80.0%	382,192	249,630	164,250	3,770	81,610
2019	75.0%	373,451	251,040	164,250	4,560	82,230
2019	70.0%	364,510	244,350	164,250	5,880	74,220
2019	65.0%	356,550	239,970	164,250	8,760	66,960
2019	60.0%	348,647	238,640	164,250	9,330	65,060
2019	55.0%	339,393	237,990	164,250	9,990	63,750
2019	50.0%	328,664	236,150	164,250	12,750	59,150
2019	45.0%	317,005	229,850	164,250	18,470	47,130
2019	40.0%	303,377	227,830	164,250	20,580	43,000
2019	35.0%	290,645	219,090	164,250	25,470	29,370
2019	30.0%	279,476	214,240	164,250	29,900	20,090
2019	25.0%	269,413	206,520	164,250	33,340	8,930
2019	20.0%	261,571	208,490	164,250	32,380	11,860
2019	15.0%	254,693	205,410	164,250	33,040	8,120
2019	10.0%	247,239	201,290	164,250	29,490	7,550
2019	5.0%	233,883	195,395	163,875	27,710	3,810
2019	0.0%	425	455	375	80	0

EBCE 2018-19 Energy Duration

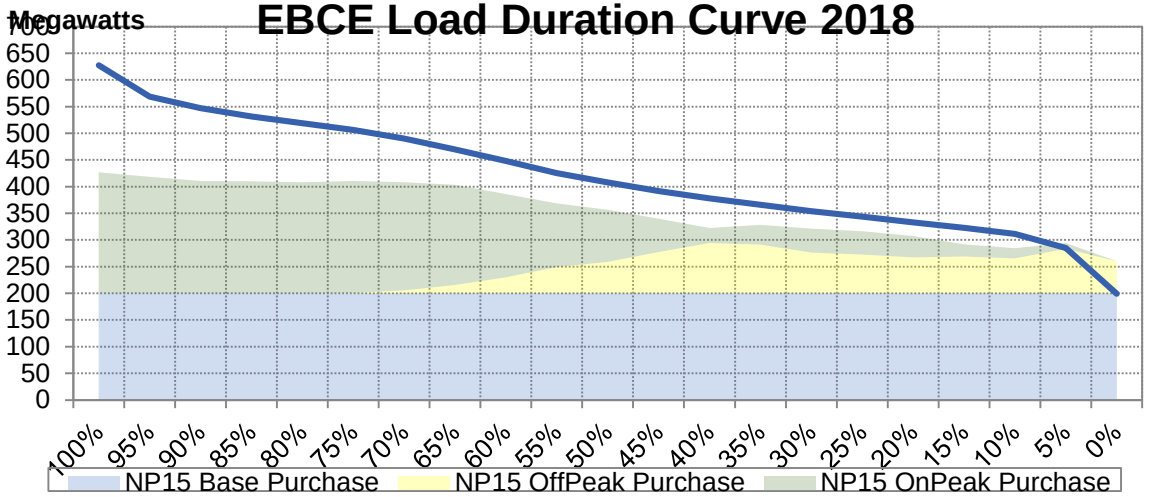


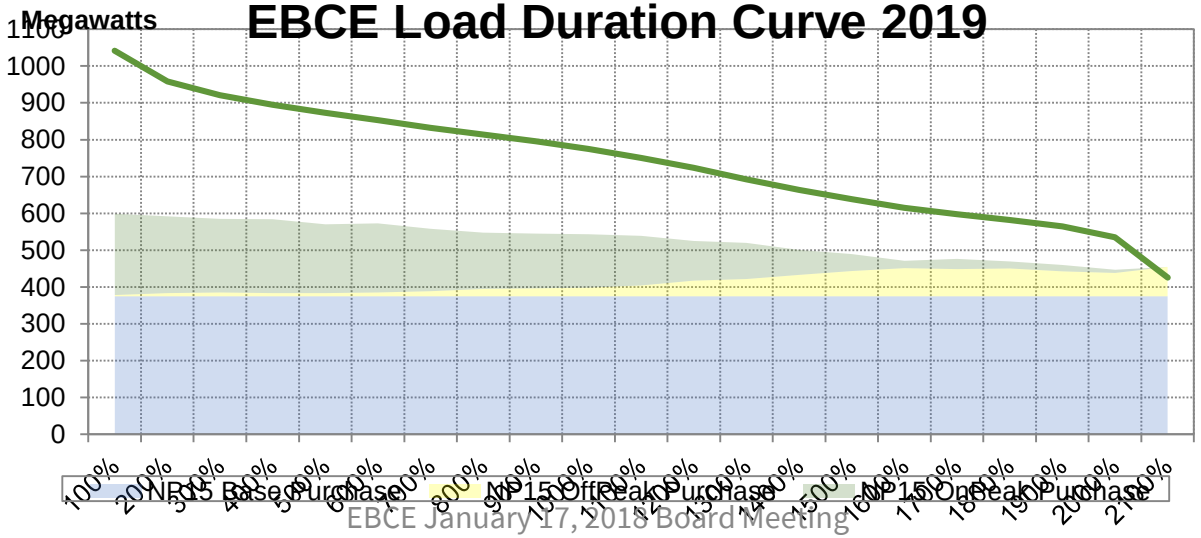


EBCE 2018-19 Load Duration

Year	Load_Percentile	CAISO Total Load	Total Purchases	NP15 Base Purchase	NP15 OffPeak Purchase	NP15 OnPeak Purchase
2018	100.0%	627	427	200	0	227
2018	95.0%	568	418	200	0	218
2018	90.0%	547	411	200	0	211
2018	85.0%	532	410	200	0	210
2018	80.0%	519	408	200	0	208
2018	75.0%	506	411	200	1	210
2018	70.0%	490	408	200	5	203
2018	65.0%	470	403	200	16	188
2018	60.0%	448	386	200	30	156
2018	55.0%	426	368	200	49	119
2018	50.0%	408	356	200	59	98
2018	45.0%	391	340	200	78	62
2018	40.0%	378	322	200	94	28
2018	35.0%	366	329	200	91	38
2018	30.0%	354	321	200	76	45
2018	25.0%	344	316	200	73	44
2018	20.0%	333	307	200	67	40
2018	15.0%	323	292	200	69	23
2018	10.0%	312	285	200	65	19
2018	5.0%	285	295	200	84	11
2018	0.0%	199	260	200	60	0
2019	100.0%	1042	599	375	3	221
2019	95.0%	958	592	375	8	209
2019	90.0%	921	585	375	10	199
2019	85.0%	895	584	375	8	201
2019	80.0%	873	570	375	9	186
2019	75.0%	853	573	375	10	188
2019	70.0%	832	558	375	13	169
2019	65.0%	814	548	375	20	153
2019	60.0%	796	545	375	21	149
2019	55.0%	775	543	375	23	146
2019	50.0%	750	539	375	29	135
2019	45.0%	724	525	375	42	108
2019	40.0%	693	520	375	47	98
2019	35.0%	664	500	375	58	67
2019	30.0%	638	489	375	68	46
2019	25.0%	615	472	375	76	20
2019	20.0%	597	476	375	74	27
2019	15.0%	581	469	375	75	19
2019	10.0%	564	460	375	67	17
2019	5.0%	535	447	375	63	9
2019	0.0%	425	455	375	80	0

EBCE 2018-19 Load Duration





EBCE January 17, 2018 Board Meeting

EBCE Supply Options

Renewable Energy

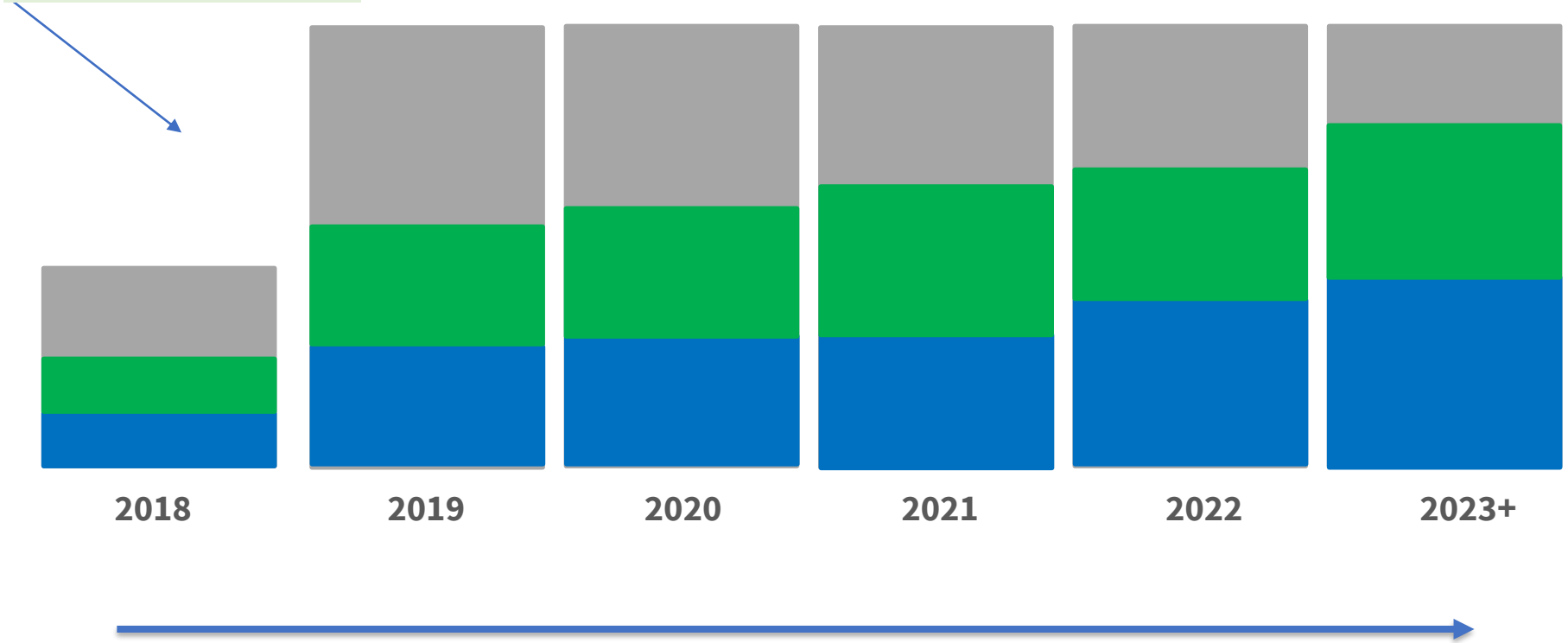
Carbon-Free

System

(no Nuclear, Coal)

EBCE Portfolio Design & Planning

EBCE Board to decide path forward on clean energy supply mix



Upon approval of the Board on 1/17, EBCE will strive to meet and exceed clean energy content of the supply mix

Renewable Energy **Carbon Free**

EBCE All-In Energy Pricing Cost Options

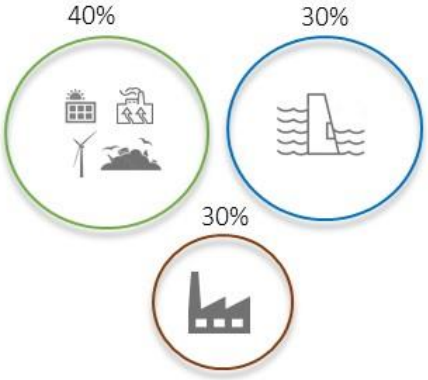
Ex 1: 50% Clean Energy:
30% RPS; 20% Carbon-free

$49.00 - $51.00/MWh*

Ex.2: 60% Clean Energy:
35% RPS; 25% Carbon-free

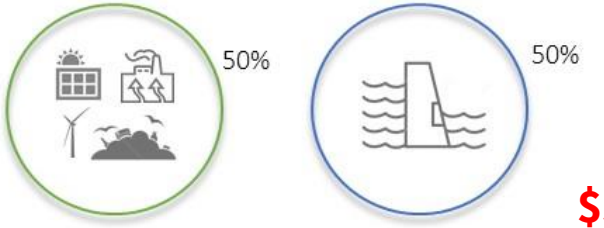
$51.00 - $53.50/MWh*

Ex. 3: 70% Clean Energy:
40% RPS; 30% Carbon-free



$52.00 - $54.00/MWh*

Ex. 4: 100 Clean Energy:
50% RPS; 50% Carbon-free



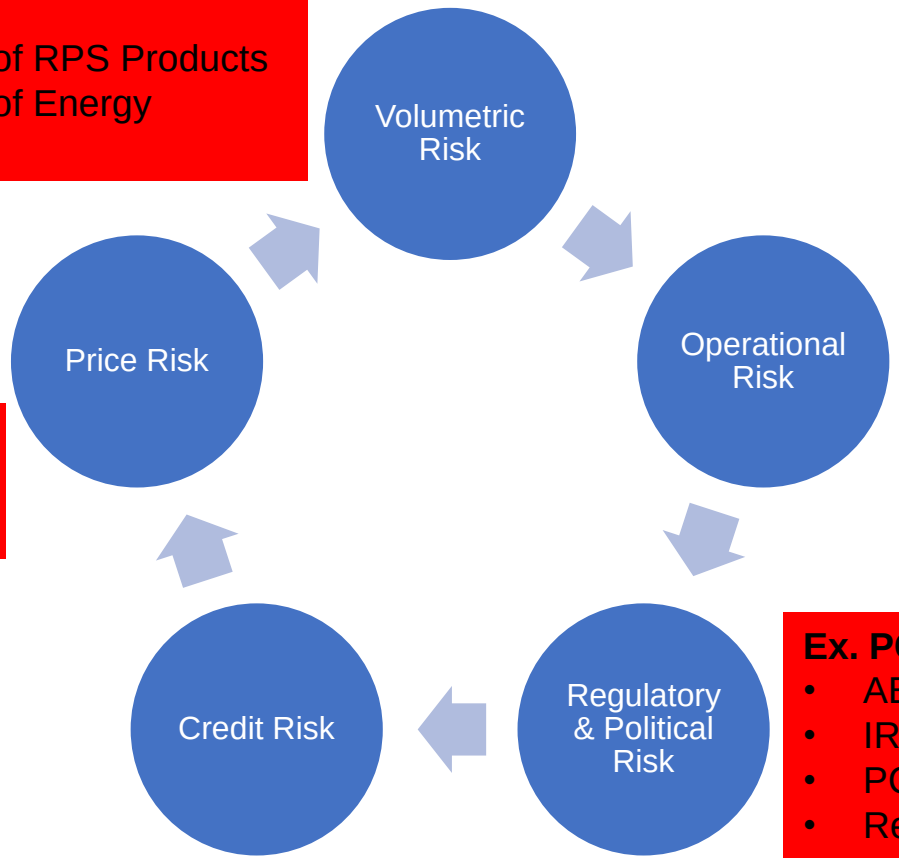
$53.00 - $60.00/MWh*

****Note: The purchase costs contained in this are based on this price curves that are dynamic and change over time; therefore, the actual purchase costs for the energy products contained here may be greater than or less than the costs represented.**

Bringing back Item #13: Risk

(Price is not the only determinant of true portfolio costs)

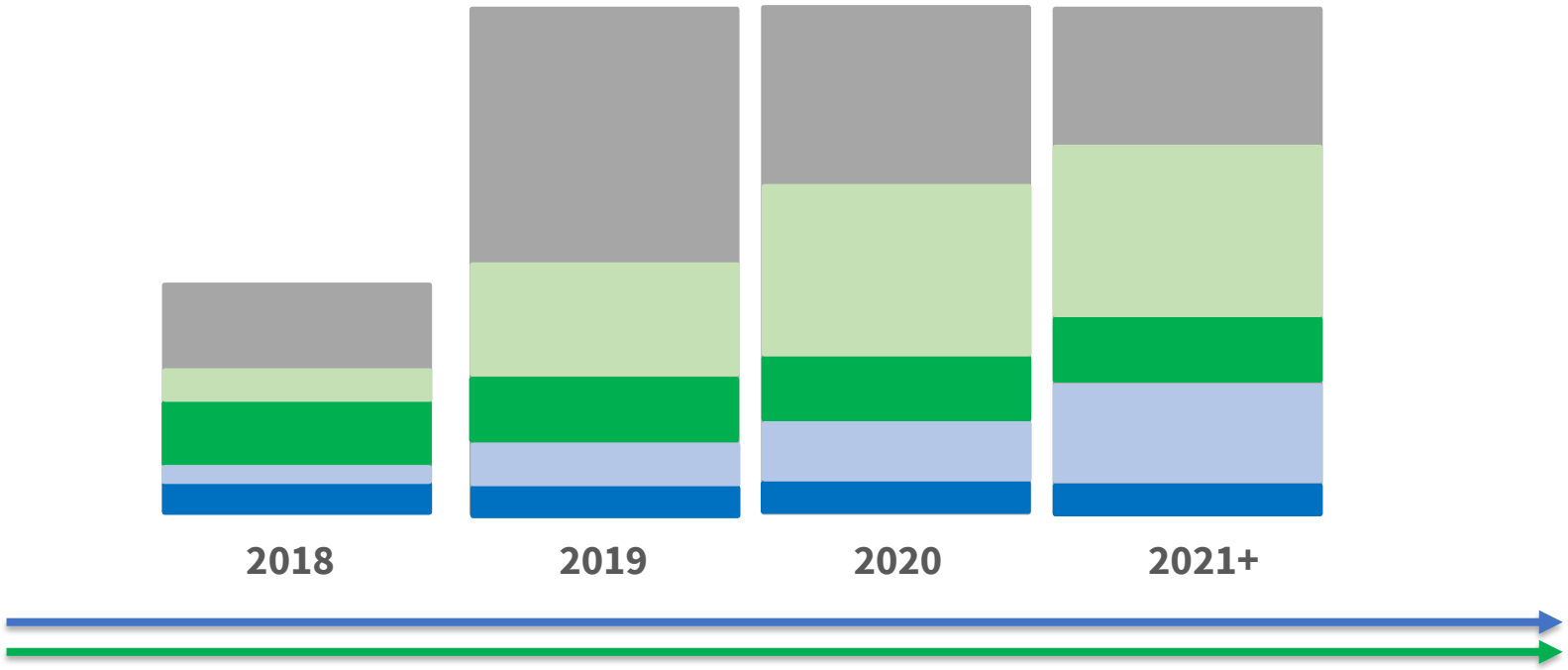
Ex. Supply Risk:
- Supply/Demand of RPS Products
- Supply/Demand of Energy Products



Ex. Shape Risk:
Duck Curve is getting "real and bigger" *Source: Greentech Media*

Ex. PCC2 Risk:
- AB 1110
- IRP Proposed Decision
- PCIA
- Resource Adequacy

EBCE Recommendation



Upon approval of the Board on 1/17, EBCE will develop targets to (1) meet and exceed the CA RPS and (2) support Alameda County's climate goals

Renewables Base | Renewables Goal | Carbon Free Base | Carbon Free Goal