VALLEY CLEAN ENERGY ALLIANCE

Staff Report

TO: Valley Clean Energy Alliance Community Advisory Committee

FROM: Mitch Sears, Interim General Manager
Gary Lawson, Sacramento Municipal Utility District (SMUD)

SUBJECT: Portfolio Guide

DATE: January 11, 2018

RECOMMENDATION

Staff is requesting the Community Advisory Committee (CAC) recommend to the VCEA Board to adopt the attached Portfolio Guide.

BACKGROUND AND ANALYSIS

At the January 18, 2018 VCEA Board meeting, VCEA staff will be recommending that the Board adopt the full version of the Portfolio Guide. A draft version of the guide is attached. The version attached has been redacted to exclude portions of Section 7, Procurement Approach and Hedging Strategy which contains commercially sensitive confidential information.

Purpose

Once the CPUC certifies VCEA's implementation plan, and immediately upon VCEA's execution of the Service Agreement with PG&E and filing of the requisite $100,000 security with the CPUC, SMUD will begin procuring VCEA's portfolio to meet VCEA's goals of servings its Yolo county committees with renewable and clean energy starting June 1. We expect those procurements to begin at the end of this month. This Portfolio Guide lays the framework for how SMUD, as VCEA's Wholesale Energy Services Provider, will go about these power procurements.

Scope

The Portfolio Guide addresses each of the energy products that VCEA will need in its portfolio to meet its renewable and clean energy targets, as well for supplying the price hedging products necessary to fix VCEA's energy cost on a forward basis. The products discussed are:

Renewables

The renewable energy supply will form the foundation of VCEA's clean portfolio to achieve the 42% target renewable content established by the Board. Renewables will be procured in volumes sufficient to cover VCEA's default power product (Light Green) as well as its opt-up, 100% renewable product (Ultra Green).

Non-RPS Carbon Free
The non-RPS carbon free power makes up the balance of VCEA's targeted 75% clean portfolio.

Resource Adequacy
Resource adequacy is the generating capacity that VCEA is obligated by law to provide to support system reliability, and is based upon the monthly peak capacity of VCEA's loads plus a 15% reserve margin.

CAISO Market Power
As a Load Serving Entity within the CAISO market, VCEA's daily power needs will be supplied directly from the CAISO market. SMUD will purchase market power on a Day-Ahead basis for VCEA, based upon daily forecasts of VCEA's hourly loads.

Price and Locational Hedging Products
The pricing of the market power purchased from the CAISO is not known in advance. In order to fix its energy costs in advance, VCEA must find supplier that will sell it market power at contractually fixed prices. Alternatively, VCEA must find an entity that is willing to financially fix the cost of market power.

Carbon Allowances
VCEA may need to import clean power from an out-of-state entity that has large hydro in its power portfolio. Such a supplier (known as an asset controlling supplier) may have small amounts of carbon emitting resources in its portfolio. In order to offset that small carbon component, VCEA will need to procure carbon Allowances.

CONCLUSION

Staff is seeking a recommendation from the Community Advisory Committee in support of Board adoption of the attached Portfolio Guide.

ATTACHMENT A

Valley Clean Energy Procurement Guide

DRAFT

Valley Clean Energy Alliance

Procurement Guide

1/4/2018

Table of Contents

1 Purpose and Scope

The intent of the VCEA Procurement Guide is to provide a roadmap of how the power portfolio for VCEA will be procured in the short run. This is not a resource plan, insofar as a resource plan deals with issues such as the long term resource goals of a CCA. Ultimately long term resource goals will end up in procurement actions. Because no specific long term goals have been established, no specific~~s~~ goals are included ~~yet~~ in this Procurement Guide. This guide covers:

- Principles Guiding Portfolio Development
- Channels for Procurement
- Regulatory Requirements
- Steps to Procurement
- Portfolio Composition
- Procurement Approach and Hedging Strategy

2 Principles Guiding Portfolio Development

The portfolio developed for VCEA will be ~~developed based on~~guided by the following principles. The portfolio will:

- Meet standards defined by the CAISO's Reliability Requirements Business Practice Manual
- Satisfy CPUC Resource Adequacy requirements
- Comply with annual RPS content standards
- Consist of the product mix from renewables and clean energy as directed by VCEA
- Target the level of hedging as directed by VCEA
- Adhere to ~~the~~ risk mitigating directives and delegations of the EROC
- Adhere to applicable Federal, regional, and local requirements.

3 Channels for Procurement

SMUD will ~~leverage its~~ access power makets and ~~to various marketing channels~~ to transact on behalf of VCEA using the following types of marketing channels:

- Direct Solicitation - SMUD will use its existing relationships to seek ~~favorable~~ suitable bilateral agreements with counterparties directly
- Electronic Exchange Platforms - SMUD will use its access to platforms such as ICE(Intercontinental Exchange) to research markets and transact
- Electronic Auction Platforms - SMUD will use its access to platforms such as EnerNoc to create and enter auctions for desired products
- Brokers - SMUD will use its existing agreements with brokers to help locate trade partners for desired products

Considerations for the channel(s) used include:

- Type of product
- Market liquidity
- Credit Quality and Availability
- Timing
- Cost/fees
- Existing Counterparties and Transactions
- Resource and Counterparty diversity
- Market Conditions

4 Regulatory Requirements

4.1 Resource Adequacy

As a Load Serving Entity (LSE), VCEA is subject to the Resource Adequacy (RA) program imposed by the CPUC and adopted by the CAISO. The RA program is designed to ensure sufficient resources to operate the grid reliably. An LSE is required to demonstrate on an annual and monthly basis that it has procured enough capacity to support 115% of its peak loads from physical resources not already committed elsewhere. The required amounts are determined by the CPUC based on forecasted load. The RA program contains three components:

System Total RA Requirements

System The total RA requirements of an LSE is are determined based on each a LSE's CEC adjusted forecast plus a 15% planning reserve margin. LSEs must procure and provide their total RA requirement using Local Capacity and System Capacity. Addtionally, some of the RA capacity must have flexible ramping capabilities to meet the need of the CAISO to follow rapid changes in load. The RA program contains three components:These types of RA resources are discussed below.

Local RA Requirements Resources

Local RA capacity is provided from generating resources located in areas where there are transmission contraints impacing the ability to serve load. The requirement for Local RA requirementsResources is are determined by the CAISO based on an annual CAISO study using a 1-10 weather year and an N-1-1 contingency impacting those constrained areas. The responsibility for providing RA from Local Capacity is prorated out to LSEs based upon their load.

System RA

The balance of the total RA Requirement can be supplied from qualifying generating resources that are not in areas with local capacity contraints.

Flexible RA Requirements

Flexible RA Requirements are based on an annual CAISO study that currently looks assesses at the largest three hour ramp for each month needed to run the system reliably. Flexible capacity can be provided from either Local or System RA resources.

Local RA Requirements

Local requirements are determined based on an annual CAISO study using a 1-10 weather year and an N-1-1 contingency.

4.2 Renewables Portfolio Standards

The portfolio must meet the RPS requirements set by the CPUC. The percentage of the portfolio that must be supplied by RPS-eligible sources each year is detailed below. Compliance will be determined by the renewable energy credits (RECs) retired within the multi-year compliance periods.

Table 4.1. Annual RPS Minimum Requirements

Compliance Period	Year	RPS Percentage
3	2018	29.0%
	2019	31.0%
	2020	33.0%
4	2021	34.8%
	2022	36.5%
	2023	38.3%
	2024	40.0%
5	2025	41.7%
	2026	43.3%
	2027	45.0%
6	2028	46.7%
	2029	48.3%
	2030	50.0%

The California Energy Commission (CEC) certifies the RPS-eligibility of renewable resources. The Western Renewable Energy Generation Information System (WREGIS) assigns Renewable Energy Certificates (RECs) and tracks REC ownership used as evidence for compliance with renewable portfolio requirements. The CPUC enforces the RPS for LSE's under its jurisdiction.

There are three Portfolio Content Categories of renewable resources under RPS, determined by how the REC and associated energy are delivered to California for use by LSEs in California. Table 4.2 below shows the categories and their definition.

Table 4.2. RPS Product Content Categories

Portfolio Content Category	Definition
PCC 1	Bundled energy and REC delivered to the California power grid without substituting electricity from another source. Renewables generated inside CA are by default PCC 1, but out-of-state generators must meet certain scheduling guidelines. The minimum amount of procurement allowed from PCC1 for compliance period 3 (2017-2020) is 75%.
PCC 2	Bundled energy and REC where the energy can be substituted with non-renewable sources imported into the state. An out-of-state wind resource where the shortfall in energy is firmed up by another resource falls into this

	category.
PCC 3	Unbundled REC with no obligation for physical delivery of energy. The maximum amount of procurement allowed from PCC3 for compliance period 3 is 10%.

5 Steps to Procurement

Develop load forecast for relevant market/operating period

Estimate initial Resource Adequacy and RPS requirements necessary to satisfy regulatory requirements

Receive input from VCEA regarding preferred portfolio mix of renewables, ~~and~~ clean energy and other resources

Perform ~~latest~~ market ~~survey~~ reconnaissance to estimate~~for~~ current prices ~~to~~ aand provide VCEA feedback on cost estimates for targeted portfolio mix

Based upon ~~Begin initial~~ market survey and VCEA input, ~~to~~ prepare for solicitation

Obtain authorization and ~~D~~delegation to ~~T~~transact

Go to market and execute transactions. If market conditions or regulatory requirements change significantly, provide feedback to VCEA and adjust course as directed.

Report results of procurement process

Manage daily operations of portfolio management

Monitor portfolio/counterparty credit and limits/market exposure

6 Portfolio Composition

6.1 Renewables

The renewable content established by VCEA's Board for its 2018 portfolio is 42%, with the breakout between the RPS minimum requirements and the additional discretionary renewable content shown in in Table 6.1 below. The table shows the 42% renewable content target carried forward in time, although the Board has made no specific determination of portfolio content beyond the end of 2018. ~~However,~~

Table 6.1 VCEA Renewable and Clean Energy Portfolio Content

			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Renewable Content			**42.0%**	**42.0%**	**42.0%**	**42.0%**	**42.0%**	**42.0%**	**42.0%**	**42.0%**	**43.3%**	**45.0%**
	PCC 1	Calculated	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
	PCC 2	Calculated	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
	PCC 3	Calculated	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	RPS Required Minimums		**29.0%**	**31.0%**	**33.0%**	**34.8%**	**36.5%**	**38.3%**	**40.0%**	**41.7%**	**43.3%**	**45.0%**
		PCC 1	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
		PCC 2	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
		PCC 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Incremental Discretionary Renewables		**13.0%**	**11.0%**	**9.0%**	**7.2%**	**5.5%**	**3.7%**	**2.0%**	**0.3%**	**0.0%**	**0.0%**
		PCC 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		PCC 2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		PCC 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Non Renewable Carbon Free			**33.0%**	**33.0%**	**33.0%**	**33.0%**	**33.0%**	**33.0%**	**33.0%**	**33.0%**	**31.7%**	**30.0%**
Total Carbon Free			**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**	**75.0%**

However, VCEA's likely long term goal ~~is~~ may be to increase the renewables and clean energy content of the portfolio. As such, for procurement and hedging purposes, It will be assumed that VCEA's mix will be at least 42% renewable going forward. The 42% renewable energy component exceeds the 2018 minimum RPS requirement of 29% by 13%.

~~VCEA's 2018 targeted resource mix consists of 75% clean energy of which 42% will be RPS-eligible. This exceeds the 29% minimum renewables component by an additional 13%.~~

The renewables component will consist of 75% from PCC 1 and 25% from PCC 2 for the 29% minimum renewable content required for compliance with RPS. The additional 13% discretionary renewable content will be supplied 100% from PCC-2 resources. The amount of PCC-3 renewables targeted for procurement is zero. However, PCC 3 could be ~~required~~ utilitzed to make up for any shortfalls in renewable energy content in a given year stemming from volumetric changes in expected versus actual load. This could occur ~~is~~ if VCEA's load ~~is~~ in a given year is greater than planned for. Use of PCC-3 ~~is~~ would only be used as insurance that VCEA meets its desired power mix for the year when additional procurement of PCC 1 and 2 products is not feasible. Excess PCC1 and PCC-2 beyond what are needed in any given year, can be rolled over into the following year, as required.

Projected REC requirements for 2018 and 2019 are shown below in Table 6.2, based on initial load forecasts. Note that 2018 load is a partial year load, reflecting VCEA's June 1, 2018 launch.

Table 6.2. Targeted Total Renewable Energy Volumes for 2018-2019, MWhs

	2018 Total	2019 Total
Retail Load	446,476	757,840
RPS % Target	42.0%	42.0%
Total RECs	187,520	318,293
PCC1	97,109	176,198
PCC2	90,411	142,095

6.2 Non-RPS Carbon Free

As Table 6.1 shows, the total targeted clean energy component of VCEA's portfolio is 75%. For 2018, this means the remaining 33% of clean energy not supplied from RPS qualifying resources will likely be sourced~~come~~ from non-RPS qualifying large hydro resources.

Supplies of large hydro will primarily come from the Northwest. Suppliers of large hydro either may offer the power directly sourced from a specific hydro project or from their overall system. In the case of large hydro coming from a specific generator, the carbon factor of the power imported will be 0.00 tonnes CO2/MWh.

Entities that have significant large hydro in their systems and that register their system power with the California Air Resources Board (CARB) are called Asset Controlling Suppliers. The clean power they provide is called ACS power. ~~The r~~Registered ACS suppliers have some carbon emitting resources besides the large hydro in their system. CARB assigns a~~n~~ corresponding emission factor to each Asset Controlling Supplier. As such, there will be a carbon loading that is greater than 0.00 tonnes CO2/MWh, ~~but still very low~~determined by CARB. (For example, Powerex's current system carbon loading, as listed by CARB, is 0.0254 tonnes CO2/MWh.)

If power from an Asset Controlling Supplier is used to ~~procure~~ provide the Non-RPS ~~C~~carbon ~~F~~free power, the volume of power from the Asset Controlling Supplier will have to be ~~greater than~~scaled up to the amount of Non-RPS ~~C~~carbon ~~F~~free power needed to meet VCEA's Non-RPS Carbon Free power targets. Appendix B shows the calculation method that will be used to adjust the Non-RPS Carbon Free volumes. The calculation factors the ratio of the emission factor of the Asset Controlling Supplier and the carbon emission factor for market power from the CAISO. The increase in ACS power displaces additional market power purchases to the point that the avoided emissions of the displaced market power equals the carbon emission of

the imported ACS power, leaving the same carbon reduction impact as if power with zero carbon emissions were imported.

6.3 Resource Adequacy

Preliminary estimates for RA requirements have been prepared based on forecast~~ed~~ load. These are shown in table 6.3 below.

Table 6.3. Estimated Resource Adequacy Volumes, MW

Estimated RA Requirements	2018											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total RA	-	-	-	-	-	200	236	216	182	125	87	92
Greater Bay Area	-	-	-	-	-	0	31	31	31	31	31	31
PG&E Other	-	-	-	-	-	0	48	48	48	48	48	48
System	-	-	-	-	-	200	158	137	103	46	9	14
Flexible	-	-	-	-	-	0	28	27	45	44	48	55

Estimated RA Requirements	2019											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total RA	91	83	82	113	158	229	239	214	180	126	89	93
Greater Bay Area	30	30	30	30	30	30	30	30	30	30	30	30
PG&E Other	47	47	47	47	47	47	47	47	47	47	47	47
System	14	6	4	35	80	151	161	137	103	49	12	16
Flexible	41	48	39	38	35	32	27	26	43	42	46	53

The above RA ~~requirement~~ estimates will be updated when VCEA receives its CPUC RA determination, which will be after VCEA files for this determination in early February, 2018.

6.4 CAISO Market Power

Because VCEA customers reside in the CAISO balancing authority, their load will be served physically by CAISO Market Power. VCEA is therefore subject to paying the price ~~of~~ at the Load Aggregation Point (LAP) where it is assumed to take power.

Day Ahead traders will analyze and create daily load forecast profiles. Forecasted hourly loads for VCEA will be bid into the CAISO Day Ahead market by 10am the prior day. All awards from the Day Ahead market will carry over to the real time market. Any deviations in VCEA's actual load from what is scheduled in the Day Ahead ~~to Real Time load~~ will pay or be paid at the Real Time market ~~difference between~~ prices ~~in the DA and RT markets~~.

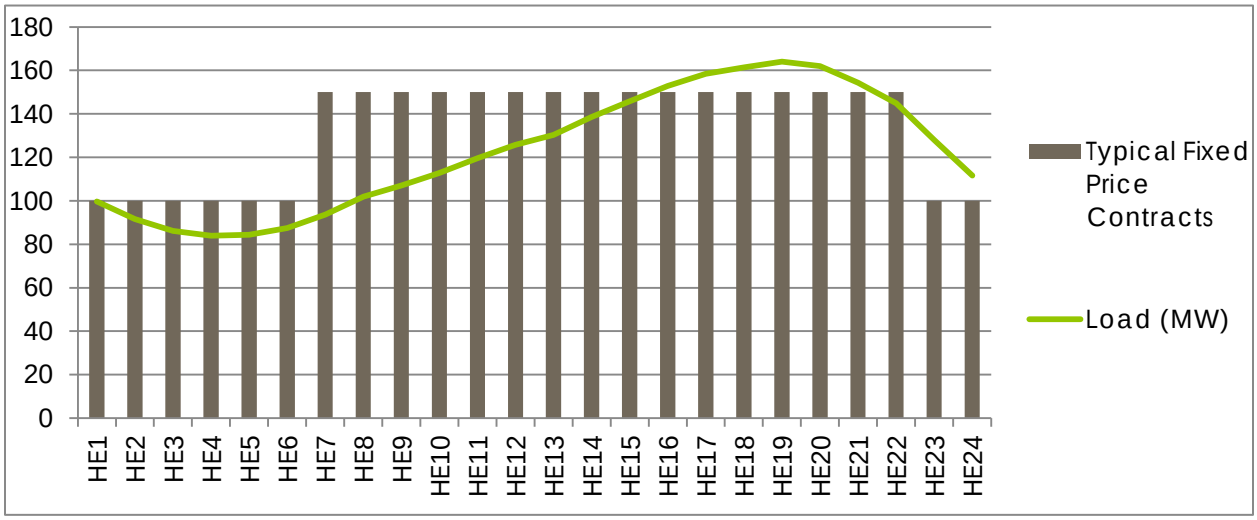
6.5 Hedging Products

Options to ~~minimize~~ mitigate~~the~~ price risk of the CAISO market include: 1. NP-15 Futures; 2. Fixed price delivery contracts; and, 3. Congestion revenue rights~~; and, 4. convergence bidding~~.

NP-15 Futures (Physical or Financial)

NP-15 futures allow a buyer to fix the price for specified forward periods at set volumes of energy delivery. This hedges against the volatility of ~~the~~ Day Ahead clearing prices in the CAISO market but does not protect against congestion and loss charges between the NP15 trading hub and VCEA's Load Aggregation Point. These futures products are traded in standard lots of 25MW for yearly, quarterly, monthly durations, for off and on-peak hours daily. While the futures contract can be designed such that the monthly energy equals the forecast~~ed~~ energy load for VCEA during that month, futures are typically at flat quantities across ~~P~~peak and/or non-~~P~~peak hours, so the shape doesn't track VCEA's system load shape perfectly. This leaves VCEA short in some hours, and long in other hours, even though on a monthly basis the energy volume of the futures contract(s) equals VCEA's forecast~~ed~~ load. Figure 6.5 shows an example of how on a typical day, the standard futures contract could be structured to deliver the same energy quantity as forecast~~ed~~ for load. NP-15 futures can either be purely financial, or can involve the physical delivery of power.

Chart 6.1 Standard Futures Product vs. Load Profile



Bilateral Fixed Price Delivery Contracts (Physical or Financial)

With bilateral fixed priced delivery contracts, a buyer and seller can agree on a fixed price, duration, and point of delivery at any CAISO Aggregated Pricing Node or Physical Generator location. This aproach fixes the energy price at the agreed delivery point but does not protect against congestion and losses between delivery point and VCEA's LAP. Fixed price delivery contracts can also be delivered and shaped into schedulable quantities on a daily basis in order to better match hourly fixed price energy delivery to VCEA load. This provides a more "perfect" hedge than flat on ~~P~~peak and off ~~P~~peak ~~F~~financial ~~H~~hedging instruments. Shapeable products

have a price premium as compared to non-shapeable products. Bilateral fixed price delivery contracts can either be purely financial, or can involve the physical delivery of power.

Congestion Revenue Rights

Sellers are not likely to enter fixed price contracts for delivery direct to load. Congestion Revenue Rights (CRR's) can be used to hedge against congestion between the point a ~~S~~seller supplies power (a "source" node) and location where ~~an entity~~the buyer has load (a "sink" node). The CRR owner for those respective source and sink nodes would be entitled to the congestion charges between the source and sink, as calculated by the CAISO. This would, in effect, offset the congestion charges incurred by the difference in price the buyer receives at source node and price ~~pays~~ paid at the sink node. Holders of CRR's can also be obligated to incur charges if the congestion is in the opposite direction to the power flow they are intended to hedge against.

CRR's are made available to LSEs two ways: 1. Load Serving Entity allocation; and, 2. Through the CRR auction process conducted by the CAISO.

CRRs are limited in that they are designed to cover energy flows that are blocked into ~~O~~on-~~P~~peak and ~~O~~off-~~P~~peak periods. They are not shapeable.

6.6 Carbon Allowances

For large hydro power imported from the Northwest from any Asset Controlled Supplier, Carbon Allowances will need to be procured to offset the minimal carbon loading that comes with the power imported into California. Allowances will not be procured on a forward basis for the imported ACS ~~P~~power, but will be procured by SMUD on behalf of VCEA at quarterly CARB auctions.

7 Procurement Approach and Hedging Strategy

7.1 Load Assumed for Procurements

Retail Load

The initial load forecast for VCEA is shown in Attachment A. If all eligible PG&E customers were to join the VCEA program, the forecast of retail energy and capacity loads would be as shown in the two columns with the heading "Retail Load w/No Opt Outs." However, the underlying assumption in the financial modeling and initial procurements is that 10% of potential VCEA customers choose to opt out of participation in the VCEA program. The resulting forecast of retail energy and capacity loads that will be procured for VCEA are shown in the two columns with the heading "Retail Load 10% Opt Outs."

Renewable and clean energy resources will be procured as a percentage of ~~the~~ retail load, assuming ~~the~~ 10% opt-outs.

System Load

System Load is the wholesale load of VCEA. The System Load ~~for VCEA~~ is the Retail Load factored up for Distribution Losses. The ~~s~~System Load forecast of energy and capacity for VCEA is shown in the columns of Appendix A with the heading, "System Load."

Procurement of ~~R~~resource ~~A~~adequacy and ~~P~~price ~~H~~hedging will be done on the forecast of system load also assuming 10% opt-outs.

Post Launch

After ~~Launch~~Launch, the amount of customers opting out will be better known. In July, 2018, an assessment of the actual opt outs will be performed and the load forecast will be adjusted accordingly. Any material short positions for 2018 supply will be covered with additional purchases of products in August pursuant to recommendtaions from SMUD and authorization from VCEA and the EROC.

The Following Sections Contain Commercially Sensitive/Confidential Information

7.2 Volumetric Risk

Information Redacted

Hedging Products

Information Redacted

Renewables

Information Redacted

Non RPS Carbon Free

Information Redacted

Resource Adequacy

Information Redacted

7.3 Market Price Risk

Information Redacted

Fixed Price Market Power

Information Redacted

Information Redacted

7.4 Locational Price Risk

Information Redacted

7.5 Procurement Timing for Hedging

Information Redacted

Appendix A Initial Load Forecast

Month	Retail Load w/No Opt Outs		Retail Load 10% Opt Outs		System Load		
	Energy, MWhs	Peak, MW	Energy, MWhs	Peak, MW	Energy, MWhs	Peak, MW	Min, MW
June, 2018	47,056	209	42,351	188	40,822	197	3
July, 2018	97,239	238	87,515	214	91,777	225	67
August, 2018	91,432	219	82,288	197	86,296	206	68
September, 2018	75,290	194	67,761	174	71,061	183	59
October, 2018	64,363	140	57,927	126	60,748	132	54
November, 2018	58,852	105	52,967	94	55,547	99	52
December, 2018	61,853	110	55,668	99	58,379	104	53
January, 2019	61,992	108	55,793	97	58,510	102	53
February, 2019	53,515	102	48,163	92	50,509	96	53
March, 2019	57,570	97	51,813	88	54,336	92	48
April, 2019	59,272	127	53,344	114	55,942	120	48
May, 2019	72,854	166	65,569	150	68,762	157	57
June, 2019	86,449	233	77,804	210	81,594	220	70
July, 2019	97,802	239	88,022	215	92,309	225	69
August, 2019	91,390	216	82,251	194	86,257	204	68
September, 2019	75,678	190	68,110	171	71,427	180	60
October, 2019	64,547	139	58,092	126	60,921	132	55
November, 2019	58,756	105	52,880	95	55,455	99	52
December, 2019	62,219	109	55,997	98	58,724	103	54
January, 2020	61,917	109	55,726	98	58,440	103	53
February, 2020	55,278	103	49,750	92	52,173	97	54
March, 2020	57,731	99	51,958	89	54,489	93	47
April, 2020	59,409	126	53,469	113	56,072	119	50
May, 2020	72,570	160	65,313	144	68,494	151	58
June, 2020	87,377	232	78,639	209	82,469	219	67
July, 2020	98,096	239	88,287	215	92,586	226	71
August, 2020	91,042	217	81,938	195	85,928	204	68
September, 2020	75,645	191	68,081	172	71,396	181	61
October, 2020	64,003	139	57,603	125	60,408	131	55
November, 2020	58,834	105	52,951	94	55,529	99	52
December, 2020	62,724	109	56,451	98	59,201	103	56

Year	Retail Load w/No Opt Outs		Retail Load 10% Opt Outs		System Load		
	Energy, MWhs	Peak, MW	Energy, MWhs	Peak, MW	Energy, MWhs	Peak, MW	Min, MW
2018	496,085	238	446,476	214	464,630	225	52
2019	842,044	239	757,840	215	794,746	225	48
2020	844,628	239	760,165	215	797,185	226	47

Appendix B ACS Power Volume Adjustment

	Asset Controlling Supplier CO2 Emission Factors for 2018[1]	
	Asset Controlling Supplier	**CARB-assigned Emission Factor**
	Bonneville Power Administration (BPA) ARB ID #4000	0.012000 tonnes/MWh
	Powerex ARB ID #3101	0.025400 tonnes/MWh
	Tacoma Power ARB ID #104567	0.015500 tonnes/MWh
	Carbon Loading of Unspecified Power	
	The standard CO2 emission rate for natural gas under U.S. Environmental Protection Agency and state regulations[2]	0.053165 tonnesCO2/MMBtu
	Market Heat rate[3]	11,000 BTu/kWh
	Market Power Carbon Emissions	0.584815 tonnes/MWh
	ACS Power Requirement Adjustment, Assuming Supplier is Powerex	
	Carbon Free Power Requirement	146,207 MWh
	Volume Adjustement Factor for ACS, (CARB-Assigned Emission Factor/ Market Power Carbon Emissions)	4.3433%
	ACS Power Requirement	152,557 MWh
Notes:		
1	https://ww2.arb.ca.gov/our-work/programs/mandatory-greenhouse-gas-emissions-reporting/acs	
2	U.S. EPA Greenhouse Gas regulation, Subpart C, Table C-1 and C-2, http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&sid=f095b41950528f0d4d3090382efcd1ce&tpl=/ecfrbrowse/Title40/40cfr98_main_02.tpl	
3	Assumed	

Appendix C Definitions

Asset Controlling Supplier (ACS)

Any supplier of energy from resources outside of California that are provided with a specific carbon loading associated with their specific generating resource or system power.

Commodity Price/Market Price

The price at which electricity, gas, capacity, and renewable attributes are bought and sold.

Congestion Revenue Right

Congestion Revenue Rights (CRR) are financial instruments used in the Day Ahead market to hedge the difference in price between two locations caused by congestion.

Counterparty

An entity to which an exposure to financial risk might exist.

Customer Load

A single customer's power usage that receives power from the electric system.

Day-Ahead

Refers to the ~~following~~ day before actual power flow begins. For exampale, ~~I~~in the CAISO, the Day-Ahead market for Tuesday's flow date closes on Monday at 10am.

Energy Products

Means all commodities and commodity related products, both physical delivery and financial instruments, related to meeting the wholesale energy, regulatory, hedging, and or risk management needs of VCEA. The types of products include, but are not limited to: Energy; Capacity; Resource Adequacy; Local Capacity; System Capacity; Ancillary Services; Environmental Attributes (including but not limited to RECs, Carbon Allowances, and other required environmental attributes); Forwards; Futures; Swaps; Options; Congestion Revenue Rights; and other energy and commodity related products as needed.

Enterprise Risk Oversight Committee (EROC)

This is the committee, established in accordance with the VCEA Board Wholesale Energy Risk Management Policy Manual, initially adopted December 14, 2017, as it may be revised.

Financial Product

A contract in which the value is derived from an underlying physical commodity but which does not require physical delivery or receipt of the commodity.

Long Position

A long position means there is not an open or short position, and that excess supply exists. In addition, as load forecasts are updated, if an excess exists, that excess is also considered a long position. For the renewable power purchase example (see *Open Position*), if 60,000 MWhs has been procured for a 50,000 MWh need, a long position of 10,000 MWhs will exist.

Open Position

For any given timeframe, any commodity requirement that is unfilled is considered to be an open position. For instance, if there is a requirement to procure 50,000 MWhs of renewable power in a calendar year, until 50,000MWhs of renewable power purchases have been secured, there will be an open position equal to the remaining MWh value needed to reach 50,000 MWhs.

Physical Product

A contract which requires the seller to physically deliver, and the buyer to physically receive a given commodity.

Price Risk (or Market Price Risk)

Price Risk is the risk that prices for power are different than have been assumed for financial planning and budgeting. Price risk is hedged by procuring fixed-price forward contracts for power.

Portfolio

The aggregation of commodity related products (both physical and financial) procured to serve load and meet other policy goals.

Portfolio Manager

A core service provided by the WESP which broadly encompasses the responsibility for managing the purchase and sale of energy commodity related products in the commodity portfolio in an effort to serve load and meet other policy goals.

Real-Time

Refers to the actual day in which power flows. In the CAISO, the Real-time market opens at 1pm the day before flow date and closes for each hour 75 minutes prior to the start of scheduled flow.

Renewable Energy Certificate (REC)

A REC is evidence of the production equal to one megawatt-hour of generation from a certified renewable energy resource.

Retail Load

The summation of all customers' loads that receive power from the electric system.

Short Position

A short position is an open position. The volumetric value of a short position is determined by the shortfall in volume compared to the requirement. For the renewable power purchase example, if 30,000 MWhs of the 50,000 MWh requirement has been procured, a short position of 20,000 MWhs remains.

System Load

The summation of all customers' loads that receive power from the electric system. System Load includes applicable transmission and/or distribution losses.

Volumetric Risk

The effect of fluctuations in demand for load or for production of generation from a generator.

Western Renewable Energy Generation Information System (WREGIS)

The Western Renewable Energy Generation Information System (WREGIS) is an independent, renewable energy tracking system for the region covered by the Western Electricity Coordinating Council (WECC)