Standard LSE Plan

Valley Clean Energy Alliance

2022 INTEGRATED RESOURCE PLAN

November 1, 2022

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I. Executive Summary

Valley Clean Energy Alliance ("VCE") is a not-for-profit locally run Community Choice Aggregator electricity provider serving customers in the cities of Woodland, Winters, and Davis, and unincorporated Yolo County. VCE's vision as an organization and as adopted by its Board in 2017 is shown in Figure 1. VCE began serving electric load in 2018, and substantially increased its portfolio of contracted resources during 2021 and 2022.

Figure 1 - VCE's Long-Term Vision

The long-term vision for VCE is to continuously improve the electricity choices available to VCE customers, while expanding local energy-related economic opportunities, by:

- Causing the deployment of new renewable and low-carbon energy sources;
- Evaluating and adopting best practices of the electricity service industry for planning and operational management;
- Substantially increasing the renewable electricity content of basic electricity service, with the ultimate goal of achieving zero carbon emissions electricity;
- Developing and managing customized programs for energy efficiency, on-site electricity production and storage;
- Accelerating deployment of local energy resources to increase localized investment, employment, innovation and resilience;
- Working to achieve the climate action goals of participating jurisdictions to shape a sustainable energy future;
- Saving money for ratepayers on their energy bills; and
- Remaining open to the participation of additional jurisdictions.

The portfolio of resources with which VCE has existing contracts includes 254.6 MW of generation and storage, of which 98.9% are under contracts of 10 years or more in length. 59.5 MW (23%) of these resources are currently operating, and the remaining 195.1 MW (77%) are in various stages of development.

VCE's 2022 Integrated Resource Plan ("IRP") is guided by its Board of Directors-established policy to provide its customers with 80% renewable energy by 2030 and its internal planning assumption of a 100% renewable energy target by 2035.

Development Process

For its 2022 IRP, VCE evaluated the Commission's requirements considering its own internal policies and planning targets and elected to submit a single Preferred Conforming Portfolio ("PCP") that reduces VCE's proportional amount of GHG emissions to levels lower than the GHG targets in the most stringent 2035 25 MMT Benchmark scenario.

The PCP was developed using a modeling framework that began with capacity expansion modeling, followed by production cost modeling, and concluded with local portfolio optimization. The modeling results used default inputs provided by the Commission in all aspects except for forward Resource Adequacy ("RA") prices which were based on VCE's internal proprietary forecast. The resulting portfolio solution is optimized as the least-cost portfolio that satisfies both the range of Commission-required constraints, or objectives, and VCE's own internal renewable energy and GHG emission reduction goals.

The portfolio was refined following review and evaluation by VCE staff of results and metrics from the RDT and CSP. The resulting PCP was then presented to VCE's Community Advisory Committee ("CAC") for review and comment in late September 2022 and presented to the Board of Directors for approval at the October 2022 meeting.

Summary of Findings & Narrative Sections

VCE's current portfolio of contracted resources is 91.2% solar (including standalone PV, hybrid, and co-located solar) with geothermal, small hydro, demand response, and battery storage resources making up the remainder. The PCP includes planned contracts for the addition of 164 MW of new resources, including 74 MW of new wind (including offshore wind) and 90 MW of new battery storage during the planning horizon. The resource diversification provided by the addition of new wind resources coupled with additional battery storage is intended to align the timing of generation and supply availability with the timing of customer demand.

Table 1 - Summary of Load and Generation Results (25 MMT)

	2030	2035
Retail Electric Demand	786	847
Wholesale Energy Demand (accounting for losses)	849	914
Net System Power	129	118
RPS-Eligible (Renewable) % of Retail Sales	92%	97%
GHG-free % of Retail Sales	93%	98%

VCE's PCP exceeds the state Renewables Portfolio Standard ("RPS") mandate by more than 50% and by 2035 is nearly entirely GHG emission-free, as shown in Table 1. The portfolio's GHG emissions are 10% or more below the most stringent target in the 25 MMT Benchmark scenario, as shown in Table 2. Except for the 2.9 MW small hydro resource contract, all of VCE's resource contracts are for a term of 10 or more years.

Table 2 - GHG Emissions of Preferred Conforming Portfolio vs. 25 MMT Target

	Units	Benchmark	VCE Emissions
2030 GHG Emissions	metric tons	85,000	72,000
2035 GHG Emissions	metric tons	70,000	61,000

VCE also engages its customers with information and opportunities for electric vehicle adoption, building electrification, demand response, net metering, and is even piloting dynamic rates for its agricultural customers through its AgFIT program. Further, the added generation diversity from new wind resources and 90 MW of new battery storage in its PCP reduces VCE's use of emission-intensive system power which not only contributes to the State's overall environmental objectives but also helps reduce power system impacts on disadvantaged communities statewide.

VCE has resources under contract or operating to meet its reliability obligations for both D.19-11-016 and D.21-06-035 as well as its zero-emitting Diablo replacement, long-duration storage, and zero-emitting 80% capacity factors resource obligations.

Additionally, VCE's PCP exceeds these state goals and fulfills the Commission's requirements at an average cost of less than $60/MWh through the planning horizon which will ensure it is able to continue to provide its customers with affordable clean electricity for the foreseeable future.

VCE's action plan, first and foremost, is to closely monitor the progress of construction and key milestones for its contracted new capacity that will come online between 2022 and 2026. To meet its most immediate

procurement need, VCE will explore opportunities and engage the market in 2023 for new storage capacity to come online by 2025. Also, during 2023, VCE will explore options for procurement of new wind capacity to come online by 2026. The majority of VCE's future procurement needs do not occur until 2030. VCE considers it is simply not timely at present to engage in focused procurement efforts for resource needs that far into the future.

The overall results of VCE's PCP for its 2022 IRP, including resources currently under contract and planned resources, are shown in Table 3.

Table 3 – Summary of Preferred Conforming Portfolio Resources (cumulative MW Nameplate Capacity)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
BTM Solar	62	66	71	77	83	90	96	103	109	116	122	128	134
CAM/CPE Capacity[1]	30.3	26.2	18.2	12.4	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
RA-only Resources (planned)		33	42	42	57	70	76	27	44	60	71	94	80
Contracted Operating Resources (as of August 2022)													
Solar PV	50	50	50	50	50	50	50	50	50	50	50	50	50
Small Hydro	2.9	2.9	2.9										
Demand Response[2]	7	7	7	7	7	7	7	7	7				
4-Hour BESS	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			
Contracted In-Development Resources (as of August 2022)													
Solar PV + Storage	165	185	185	185	185	185	185	185	185	185	185	185	185
8-Hour BESS			2.3	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Geothermal		5	5	5	5	5	5	5	5	5	5	5	5
Planned Resources													
New 4-Hour BESS		20	20	20	20	20	20	20	20	20	20		
New 6-Hour BESS								53	53	53	53	53	53
New 8-Hour BESS													17
New Onshore Wind				20	20	20	20	39	39	39	39	39	39
New Offshore Wind								9	9	9	9	9	35

Notes:
1. Year-ahead 2023 volumes for CAM and CAM DR RA; and 2024 and 2025 volumes for CAM CPE are assumed to remain constant throughout the 2023-2035 period.
2. This row is an RA-only contract.

II. Study Design

This IRP study was designed to provide VCE, its Board, management, and community with a resource plan and portfolio that meets VCE's needs for renewable energy content, minimal GHG emissions, resource diversity and cost-effectiveness as well as to demonstrate compliance with all regulatory and statutory

requirements. VCE's IRP was prepared based on internal policy objectives and planning targets established by the Board, and with review and approval of its CAC and input from the public.

VCE used the energy and peak demand load forecasts, and behind-the-meter photovoltaic ("BTM PV") values approved in the ALJ Ruling on June 15, 2022 as the basis for its IRP modeling. For hourly load shapes, VCE employed the default 2021 Integrated Energy Policy Report ("IEPR") "mid Baseline mid AAEE" hourly forecast for the CAISO system average.

To satisfy its own internal policies and planning objectives, VCE's portfolio results in GHG emissions less than its proportional share of both the 2030 30 MMT target and the 2035 25 MMT target and is submitting one PCP as part of its individual IRP filing. VCE's PCP is consistent with the Commission-adopted Preferred System Plan ("PSP") criteria by:

- Achieving GHG emissions below its proportional share of both 2035 GHG Benchmarks;
- Using its individual Commission-assigned load forecast;
- Using inputs and assumptions consistent with those used to develop the PSP as updated by IRP staff on June 15, 2022, including default capital cost and financing assumptions; and
- Completing all three filing items (Resource Data Template ("RDT"), Clean System Power calculator ('CSP"), and Narrative template) in accordance with the completeness definition.

Table 4 below shows VCE's retail load forecast for the 2023-2035 period as well as the expected wholesale peak load for September.

Table 4 - VCE Electric Demand and Peak Load (2023-2035)

Year	Energy Demand (GWh)	September Peak Demand (MW)
2023	727	207
2024	718	206
2025	729	210
2026	741	214
2027	752	219
2028	765	224
2029	774	227
2030	786	231
2031	799	236
2032	812	241
2033	822	243
2034	834	246
2035	847	249

a. Objectives

The overall objective of the IRP process is to provide guidance to VCE's Board, executive management, and customers on a portfolio that optimizes the tradeoffs between reliability, affordability, and GHG emission reductions over the planning horizon. Equally important, the IRP also assists the Commission in its efforts to identify cost-effective planned resources that support system reliability and statewide policy goals. The resource portfolio presented in this IRP is the outcome of a series of fundamental modeling exercises guided by input from VCE's Board, CAC, and the public regarding resource preferences, resource diversity, and cost effectiveness in meeting both statutory and regulatory requirements while also satisfying the Company's own environmental and power supply objectives.

The methodology taken by VCE for this IRP exercise is designed to achieve the following milestones:

- Satisfy the regulatory requirements of Public Utilities Code Section 454.51(a)(1).
- Satisfy all Commission specifications for conforming portfolios.
- Demonstrate how the PCP achieves VCE's 30 MMT and 25 MMT 2030 and 2035 GHG Benchmarks.
- Demonstrate continuous progress towards meeting or exceeding the state's RPS targets.
- Show how VCE's PCP contributes to overall system reliability and RA requirements.

b. Methodology

i. Modeling Tool(s)

For this IRP cycle, VCE contracted with First Principles Advisory and relied on a suite of modeling tools to develop its PCP to account for all the key modeling tasks included in a comprehensive planning exercise. For capacity expansion modeling and local portfolio optimization, VCE selected Blue Marble Analytics' GridPath modeling software. For production cost modeling of the CAISO system and broader Western Electricity Coordinating Council region, VCE selected Energy Exemplar's Plexos software. By working within a framework that incorporated capacity expansion modeling, local portfolio optimization, and production cost modeling - three core pillars of IRP-related modeling - VCE conducted a robust planning exercise to provide a roadmap for future procurement decisions and an improved understanding of the impacts resulting from uncertainty in future market and grid conditions.

GridPath[1] is an open-source modeling tool built and maintained by Blue Marble Analytics that performs 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 in addition to the existing wind-solar ELCC surface, and 2) transmission deliverability constraints for peak primary, peak secondary, and off-peak time periods were added to the linear problem formulation. In addition, GridPath was also modified to handle the CPUC-defined marginal ELCC values for each technology type across all years in the planning horizon. This last modification allowed VCE to account for the annual reliability constraint in the RDT when generating its optimal portfolio.

[1] A more detailed description of GridPath's capabilities and a copy of the latest public codebase is available on its GitHub page at https://github.com/blue-marble/gridpath.

For production cost modeling of the CAISO system and its surrounding BA neighbors, VCE used Plexos[2], industry-leading modeling software from Energy Exemplar. Working with First Principles Advisory, VCE updated its Plexos WECC zonal database with the inputs and assumptions for the 2022 IRP cycle and cross-referenced its Plexos database with the Plexos databases maintained by Energy Exemplar, the California Energy Commission, and CAISO. The version of Plexos used for this modeling exercise was v9.0 R09.

There are no material differences in functionality between the Commission's preferred modeling tools and VCE's selected modeling tools, since GridPath is comparable in functionality to RESOLVE and Plexos is similar to SERVM.

ii. Modeling Approach

The multi-step modeling framework used to create VCE's PCP begins with capacity expansion modeling, followed by production cost modeling, and concludes with local portfolio optimization. Model outputs are then added to the RDT and the CSP tools for review and evaluation of results. This iterative process enabled VCE to not only gain insight into the impact of projected market conditions on its future resource portfolio but also refine its decision making and procurement expectations by adding, removing, or otherwise modifying procurement constraints from one iteration to the next. The modeling framework and review process provided a detailed assessment of the tradeoffs among approaches to fulfilling VCE's internal targets and their associated costs, and ultimately improves VCE's ability to make informed procurement decisions to better meet its customers' needs with affordable low-carbon renewable energy.

Step 1 in the modeling framework is capacity expansion modeling of the CAISO system using GridPath to replicate the CPUC's IRP instance of E3's RESOLVE model. GridPath was run by First Principles Advisory using the same inputs and spatiotemporal settings as the RESOLVE model, and the results were benchmarked to the PSP. The resulting output is the selection of a group of candidate resources that have similar generation profiles but are not exactly proportional to VCE's share of the PSP portfolio. Although comparable results between the two models were attained, VCE used the output from RESOLVE to remove any discrepancies resulting from modeling basis error, since the GridPath results are utilized in the downstream production cost model. Nonetheless, with GridPath benchmarked to RESOLVE and displaying comparable results, VCE is now capable of conducting additional capacity expansion runs of the system with alternative assumptions for future planning exercises.

Step 2 in the modeling sequence uses the selected candidate resources from the capacity expansion model as inputs into the production cost model to simulate grid conditions at a higher spatiotemporal resolution. Like Step 1, VCE assumed the fuel and carbon price forecasts from the Unified RA and IRP Modeling Datasets 2022. Candidate resources were mapped to the appropriate geographic region based on the results of the CPUC's Resource-to-Busbar methodology defined for CAISO's 2021-2022 Transmission Planning Process ("TPP"). The production cost model performs a unit commitment and dispatch study that assesses system reliability, estimates GHG emissions, and generates zonal pricing for all hours in the year. Production cost modeling was conducted for a subset of calendar years in the IRP planning horizon (i.e., 2024, 2026, 2028, 2030, and 2035), and values for non-modeled years were estimated using linear interpolation. VCE did not implement any stochastic model runs in Plexos for this IRP cycle, but it plans to work with its consultants to investigate the added utility afforded by this analysis for future filings.

[2] Additional information on Plexos is available on Energy Exemplar's website at https://www.energyexemplar.com/.

Step 3 then uses Gridpath to optimize VCE's portfolio across the planning horizon by identifying the combination of candidate resources and existing baseline resources that will minimize cost while also achieving requirements for reliability, resource adequacy, RPS, and GHG emissions, etc. VCE used the price forecasts from the updated PSP portfolio in the optimization model to enable examination of tradeoffs among bundled energy PPAs, RA-only contracts, and market transactions in CAISO's day-ahead market. The portfolio optimization modeling also accounts for the VCE Board's policy goal of achieving 80% renewable energy by 2030 and internal staff planning target of 100% renewable energy by 2035, both of which exceed state mandates. Based on hourly commitment and dispatch modeling of VCE's existing baseline resource portfolio plus candidate resources, the optimization model outputs a portfolio that satisfies reliability, RA, RPS, and GHG emission constraints in a least-cost manner.

A conceptual summary of the modeling methodology is outlined in Figure 2.

Figure 2 - VCE 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, VCE 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. 

The optimal planned resource mix identified by GridPath is a function of multiple cost and price assumptions. For candidate projects, capital expenditures and operating and maintenance expenses are defined based on the values in the PSP, which are sourced from NREL's 2021 Annual Technology Baseline. For baseline projects, costs are defined in the model based on the terms and conditions of the PPA. For its production cost modeling, VCE used the fuel and carbon prices from the Unified RA and IRP Modeling Datasets 2022. For forward RA prices, VCE used its internal, proprietary forecast of monthly capacity prices calculated as annual averages. Taking these assumptions, along with other model input parameters, GridPath determines the least-cost portfolio that meets the reliability, GHG reduction, RPS, and other constraints.

VCE used the results from the RDT and CSP as metrics for portfolio analysis, and no post-processing calculations were used.

III. Study Results

This section shows the results from the work described in Section II. Detailed portfolio selection results for the single PCP with GHG emissions below the 25 MMT in 2035 GHG Benchmark are shown in the RDTs that are filed together with this IRP. VCE entered into contracts for much of its existing resource portfolio in 2021-2022 for resources delivering power in 2022-2026.

a. Conforming and Alternative Portfolios

VCE developed and is submitting a single PCP that achieves GHG emissions below its proportional share of the most stringent 25 MMT in 2035 GHG Emissions Benchmark. The underlying data and scenarios are defined in D.22-02-004 and the June 15, 2022 ALJ Ruling. The PCP was developed based on input from the Board of Directors, CAC, and the public, and was finalized after consulting VCE's CAC and Board of Directors. VCE did not develop any alternative portfolios for this IRP.

i. Existing Resources under Contract

The portfolio of resources with which VCE has existing contracts includes 254.6 MW of generation and storage, of which 98.9% are under contracts of 10 years or more in length. 59.5 MW (23%) of these resources are currently operating, and the remaining 195.1 MW (77%) are in various stages of development as indicated in the RDT files. VCE's portfolio of existing resources under contract are shown in Table 5.

Table 5 - Summary of Existing Resources Under Contract (Cumulative MW Nameplate Capacity)

	2023	2024	2025	2026
Contracted Operating Resources (as of August 2022)				
Solar PV	50	50	50	50
Small Hydro	2.9	2.9	2.9	
Demand Response	7	7	7	7
4-Hour BESS	2.5	2.5	2.5	2.5
Contracted In-Development Resources (as of August 2022)				
Solar PV + storage	165	185	185	185
8-Hour BESS			2.3	5.1
Geothermal		5	5	5

ii. Planned Future Contracts with Existing Resources

Currently, VCE has no plans to contract with other existing resources in the future.

iii. Planned Contracts with New Resources

VCE's PCP includes planned contracts with 164 MW of new resources, as shown in Table 6. Those planned resources include 74 MW of new wind, including offshore wind, and 90 MW of new battery storage during the planning horizon. VCE's modeling assumed a 10-year contract term for battery storage resources.

Table 6 - Summary of Planned Contracts with New Resources (Cumulative MW Nameplate Capacity)

	2024	2026	2030	2035
Planned Resources				
New 4-Hour BESS	20	20	20	
New 6-Hour BESS			53	53
New 8-Hour BESS				17
New Onshore Wind		20	39	39
New Offshore Wind			9	35

iv. Narrative Summary of Resources

<u>Existing resources that the retail seller owns or contracts</u>

- Indian Valley Hydro is a 2.9 MW hydroelectric resource that is delivering 6,448 MWh per year and is currently under a 5-year contract with VCE through mid-2025. VCE plans to continue using this resource beyond those five years if cost-effective and proven to perform as contracted. Currently, Indian Valley is not generating electricity due to drought conditions.
- Aquamarine Solar Facility is a 50 MW PV-only project in Kings County delivering approximately 134,684 MWh per year for a 15-year term.
- Putah Creek Energy Farm is a 3 MW PV/3 MW BESS in Yolo County providing approximately 8,000 MWh annually that came online in mid-October 2022.
- Gibson Solar is a 20 MW PV/6.5 MW BESS in Yolo County delivering approximately 54,262 MWh per year once it comes online in June 2024.
- Tierra Buena Battery Storage Facility is a 4-hour/2.5 MW (10 MWh) BESS in Sutter County that came online on June 3, 2022.

<u>New and existing resources that will be used to meet Mid-Term Reliability obligations adopted in D.21-06-035</u>

- Resurgence Solar I is a co-located solar + storage project 90 MW PV/75 MW BESS in San Bernardino County delivering 270,305 MWh anticipated online in mid-2023 for a 20-year term.
- Tumbleweed is a Long-Duration BESS (8 hours) in Kern County for which VCE's share is 2.86 MW (22.88 MWh). It is anticipated online in 2026.
- Goal Line is a Long-Duration BESS (8 hours) in San Diego County for which VCE's share is 2.25 MW (18 MWh). It is anticipated online in 2025.

- Ormat Geothermal Portfolio is a group of geothermal projects located in Nevada and Imperial County, CA that is expected to provide VCE with 5 MW and 33,745 MWh annually. The portfolio's projects are expected to come online as early as 2024. The VCE Board approved this project in July 2022.
- Fish Lake Geothermal is a geothermal project in Esmerelda County, Nevada that is expected to provide VCE with 0.42 MW and 3,510 MWh of annually with an expected online date of June 2024. The VCE Board approved this project in July 2022.
- Willow Springs Solar 3 is a hybrid solar + storage project with 72 MW PV/36 MW BESS in Kern County that will deliver approximately 219,600 MWh starting at the end of 2023.

Table 7 shows a summary of existing resources under contract, BTM PV assumptions, Cost Allocation Mechanism ("CAM") resources, planned new resource contracts, and planned RA-only resources in the PCP across the planning horizon. The PCP meets the Commission's IRP requirements. The detailed resource choices for each portfolio are shown in the RDT files that were submitted together with this Narrative.

Table 7 - Summary of Preferred Conforming Portfolio Resources (cumulative MW Nameplate Capacity)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
BTM Solar	62	66	71	77	83	90	96	103	109	116	122	128	134
CAM/CPE Capacity[1]	30.3	26.2	18.2	12.4	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
RA-only Resources (planned)		28.9	39.9	41.5	57.1	69.7	75.9	26.7	44.2	59.7	70.9	93.6	79.6
Contracted Operating Resources (as of August 2022)													
Solar PV	50	50	50	50	50	50	50	50	50	50	50	50	50
Small Hydro	2.9	2.9	2.9										
Demand Response[2]	7	7	7	7	7	7	7	7	7				
4-Hour BESS	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			
Contracted In-Development Resources (as of August 2022)													
Solar PV + Storage	165	185	185	185	185	185	185	185	185	185	185	185	185
8-Hour BESS			2.3	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Geothermal		5	5	5	5	5	5	5	5	5	5	5	5
Planned Resources													
New 4-Hour BESS		20	20	20	20	20	20	20	20	20	20		
New 6-Hour BESS								53	53	53	53	53	53
New 8-Hour BESS													17
New Onshore Wind				20	20	20	20	39	39	39	39	39	39
New Offshore Wind								9	9	9	9	9	35

Notes:
1. Year-ahead 2023 volumes for CAM and CAM DR RA; and 2024 and 2025 volumes for CAM CPE are assumed to remain constant throughout the 2023-2035 period.
2. This row is an RA-only contract.

v. Comparison between VCE's Preferred Conforming Portfolio and PSP Portfolio

New planned resources in VCE's PCP differ substantially from the new resources in the PSP Portfolio[3], as shown in Table 8. VCE's new planned resources include only battery storage and wind, while the largest portion of new resources in the PSP are from utility-scale solar. This variance is significant for several reasons: 1) VCE expects most load serving entities ("LSE") to generally follow the PSP portfolio and compete to procure new hybrid solar facilities; 2) VCE's existing resource portfolio is already heavily weighted towards solar plus storage ("PV+S") resources and the addition of new PV+S resources will contribute little to meeting its portfolio's reliability, resource adequacy, or other requirements; 3) VCE is a comparatively small LSE with little market power and by seeking to procure primarily new storage and wind resources while other larger LSEs are focused on PV+S procurement is likely to result in lower-cost procurement; and 4) the focus on long-term storage and wind resources provides VCE much-needed diversification in its resource portfolio and maximizes the value of newly procured resources.

Table 8 - Comparison of VCE's Conforming Portfolio and the PSP in 2035 (MW Nameplate Capacity)

2035 PSP Resource Type	PSP 2035 New Build MW	VCE's Proportional Share of PSP MW 2035[1]	VCE's New Build Conforming Portfolio by 2035 MW	MW Over/Under Proportional Amount in 2035	% of Proportional Share of PSP in 2035
Gas	0	0.0	0	0.0	N/A
Biomass	134	0.6	0	-0.6	0.0%
Geothermal	1,135	5.4	5	-0.4	92.6%
Wind	4,270	20.3	39	18.7	192.5%
Wind (Out of State, New Transmission)	4,828	22.9	0	-22.9	0.0%
Wind (Out of State, Existing Transmission)	-	0.0	0	0.0	N/A
Offshore Wind	4,707	22.3	35	12.7	156.7%
Utility-Scale Solar	21,794	103.4	185	81.6	178.9%
Battery Storage	17,742	84.2	173.5	89.3	206.1%
Long-duration Storage	1,000	4.7	22.1	17.4	465.8%
Load Shed DR	767	3.6	0	-3.6	0.0%

Notes:
1. Based on VCE's proportional share of load

As seen in the table above, VCE prefers more solar, in-state onshore wind, off-shore wind, battery storage and long-duration storage than is proportional because of its load shape and need to balance its solar portfolio currently under contract. VCE is not planning offshore wind until after 2032 because of the need for new transmission, among other considerations, such as price and market maturity and overall risk profile and viability considerations. In 2035 VCE plans significantly more offshore wind than is proportional to the updated PSP portfolio.

[3] CPUC. (June 2022). LSE Plan Filing Requirements RESOLVE Modeling Results. 16. Accessed September 30, 2022 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/lse-filing-requirement-resolve-results.pdf

b. Preferred Conforming Portfolios

VCE is using the same PCP to meet both its 30 MMT Conforming Portfolio and 25 MMT Conforming Portfolio requirements. This PCP represents a continuation of VCE's renewable energy-focused strategy that will allow it to reach its internal policy of providing 80% renewable energy by 2030. VCE contracted for new solar PV plus storage capacity in 2020-2021 and standalone energy storage and geothermal in 2022. VCE expects to continue expanding and diversifying its portfolio of renewable energy and energy storage over the forecast period by 1) adding more renewable energy resources by 2026 or 2027, 2) adding significant battery capacity in the 2024-2030 period to facilitate integration of renewables and provide new RA capacity, and 3) adding in-state or out-of-state wind resources in the 2026-2030 period. A summary of the PCP's resources and expected generation as well as estimated annual electric demand is shown in Table 9.

Table 9 - Summary of annual electric demand and generation by resource type for 25 MMT Preferred Conforming Portfolio (GWh)

	2024	2026	2030	2035
Retail Electric Demand	718	741	786	847
Wholesale Energy Demand (accounting for losses)	776	800	849	914
Net System Power	127	100	129	118
Geothermal	3	37	43	43
Small Hydro	6	-	-	-
Wind New PG&E	-	51	100	100
Wind Offshore Humboldt	-	-	40	168
Solar Baseline California	130	127	121	114
Hybrid or Paired Solar and Battery	519	514	505	495
Battery Storage (with losses)	(5)	(8)	(35)	(37)
RPS-Eligible (Renewable) % of Retail Sales	86%	91%	92%	97%
GHG-free % of Retail Sales	86%	91%	93%	98%

The portfolio generation summarized in Table 9 shows the expected performance of the PCP that is consistent with VCE's long-term preferences and conforms with Commission and statutory requirements. VCE's long-term operational goals include maintaining electricity prices that are competitive with PG&E retail prices while at the same time delivering a supply portfolio that is cleaner than PG&E's portfolio.

There are several reasons why VCE's PCP relies on a mix of renewable resources, including solar PV, wind, geothermal, small-scale hydro, and battery storage. First, a high level of renewable energy is preferred by VCE and its customers. Second, relying on a mix of resources provides a better match of renewable generation to VCE's load profile than a more solar-heavy portfolio, which could otherwise be preferred from a cost perspective. VCE's electricity demand is less than many other LSEs, which necessitates teaming up with other LSEs to develop and/or contract for non-solar resources. This joint procurement approach adds risk to the development and contracting cycle but offsets that risk by allowing VCE to access procurement opportunities, such as its geothermal resources, that would be otherwise precluded by its relatively small electricity demand.

VCE's PCP as shown in Table 10 conforms with the requirement for LSEs that use one PCP meeting the most stringent GHG emissions targets to apply the same portfolio to both the 25 MMT and 30 MMT RDT

and CSP. The main difference in the results for the 30 MMT CSP is the dispatch of the batteries in this scenario producing slight differences in RPS-Eligible (Renewable) % of Retail Sales and GHG-free % of Retail Sales. In the 25 MMT Conforming Portfolio, the batteries dispatch more often.

Table 10 - Summary of annual electric demand and generation by resource type for 30 MMT Preferred Conforming Portfolio (GWh)

	2024	2026	2030	2035
Retail Electric Demand	718	741	786	847
Wholesale Energy Demand (accounting for losses)	776	800	849	914
Net System Power	134	89	131	118
Geothermal	3	37	43	43
Small Hydro	6	-	-	-
Wind New PG&E	-	51	100	100
Wind Offshore Humboldt	-	-	40	168
Solar Baseline California	130	127	121	114
Hybrid or Paired Solar and Battery	519	514	505	495
Battery Storage (with losses)	(5)	(8)	(27)	(29)
RPS-Eligible (Renewable) % of Retail Sales	85%	92%	91%	97%
GHG-free % of Retail Sales	85%	92%	91%	97%

i. Compliance with Statutory and Regulatory Requirements

Section 454.52 (a) (1) of the Public Utilities Code sets out several requirements with which LSEs must comply in their IRPs:

A) Meet GHG emissions reduction targets established by the State Air Resources Board. VCE has estimated GHG emissions of 74,000 metric tons in 2030 and 62,000 metric tons in 2035, which are below the most stringent GHG Benchmarks established for VCE of 85,000 metric tons and 70,000 metric tons in 2030 and 2035, respectively, in the ALJ Ruling.

B) Procure at least 60 percent eligible renewable energy resources by December 31, 2030. VCE's PCP considered in this IRP will meet the statutory RPS requirements. VCE's PCP includes 92% RPS-eligible energy in 2030 and 97% RPS-eligible energy in 2035. The actual level of RPS achieved in each compliance period will depend on how market conditions and prices for renewable energy evolve and on whether VCE's renewable energy procurement policies change. VCE has a strong commitment to clean and local energy while maintaining competitive retail electric prices with a goal of 80% renewable energy established by its Board of Directors and an internal staff target of 100% renewable energy by 2035.

C) Just and reasonable rates. VCE's rates are approved by its Board in accordance with VCE policies. VCE's goal is to meet or beat PG&E's retail electric rates. VCE has always maintained retail rates that are competitive with those of PG&E.

D) Minimize impacts on ratepayers' bills. VCE's PCP selects the least-cost resource options to meet its requirements, including operational and capital investment costs. (VCE's IRP does not analyze costs like transmission and distribution costs that impact customer bills because, as a CCA, these costs are outside

of VCE's control and are the responsibility of PG&E.) Minimizing impacts on ratepayer bills is a top priority for VCE when it procures on behalf of its customers, in addition to striving for a cleaner resource portfolio that utilizes local resources in line with VCE customer preferences. See Section III.e for additional details.

E) Ensure system and local reliability., VCE incorporates in its resource plan the need for providing system and local RA at 100% plus the CPUC-required Planning Reserve Margin of the expected monthly peak load for VCE. The estimated costs for such capacity are incorporated in the PCP's resource costs. Additionally, VCE will incorporate into its long-term PPAs with intermittent renewable resources the ability to curtail output during times of negative market prices. The resource plans for the PCP includes procurement of battery storage RA capacity that go beyond current procurement mandates, including the replacement of Diablo Canyon capacity. More generally, VCE's PCP relies on a diverse mix of solar, on-shore and off-shore wind, hydro, energy storage, geothermal, and demand response resources. Its PCP thus helps support system reliability beyond VCE's proportional share of the market.

F) Beginning January 1, 2021, at least 65 percent of the procurement a retail seller counts toward the renewable portfolio standard requirement of each compliance period shall be from its contracts of 10 years or more. (Pub. Util. Code § 399.13 (b).) As shown in Table 7 and in the RDTs submitted with this IRP, 98.9% of capacity procured under VCE's existing contracts is procured for a length of 10 or more years, and VCE intends to continue its future planned procurement with contracts of 10 or more years in length, ensuring that the long-term requirement is met for the 2021-2024 compliance period and beyond.

G) Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities. VCE neither owns nor operates transmission or distribution systems, and therefore operates within the decisions and constraints of transmission and distribution system owners or operators. However, VCE supports diversity, sustainability, and resilience in the grid system by seeking a variety of resource types (e.g., solar, hybrid solar, geothermal, small hydro, on- and off-shore wind, demand response, etc.) located in a variety of places (e.g., across California and several counties in Nevada). VCE also recognizes the importance of a diverse, sustainable, and resilient grid system by seeking a resource mix that reduces curtailment events and the associated use of system power which often has much higher emissions than VCE's priority resources. Furthermore, members of VCE's CAC emphasize the importance of local resources and avidly encourage the procurement of local resources in VCE's portfolio.

H) Enhance distribution systems and demand-side energy management. Since the distribution system and demand side management programs are managed by PG&E, the primary responsibility for meeting these requirements and making such programs available to VCE customers lies with PG&E. VCE provides information to its customers on energy efficiency, electric vehicle adoption, the transition to time-of-use rates, net metering, OhmConnect demand management programs, and has implemented a demand management pilot program for its agricultural customers called AgFIT. In the future, additional load management programs and managed charging of electric vehicles may be adopted by VCE as they become available. VCE will continue to explore programs that can be offered in parallel with PG&E's customer programs.

I) Minimize localized air pollutants and other GHG emissions, with early priority on disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code. VCE's PCP minimizes local air pollutants and other GHG emissions and prioritizes disadvantaged communities ("DACs"). There are no power plants in VCE's DACs. VCE's PCP adds new renewable and energy storage resources, reducing VCE's reliance on system power. As a result, local air pollutants and GHG emissions will be significantly reduced without increasing burdens on existing DACs. Between 2030 and 2035, VCE's PCP reduces PM2.5

emissions by 20.0% from 2.661 tonnes/year to 2.128 tonnes/year, SO_2 emissions by 20.8% from 0.261 tonnes/year to 0.207 tonnes/year, and NOx emissions by 36% from 6.532 tonnes/year to 4.183 tonnes/year. Finally, VCE's focus on building financial reserves and cash flow is expected to result in new customer programs that provide additional benefits to customers, including those in DACs.

Replace Diablo Canyon Capacity (D.20-03-028). VCE intends to use the Willow Springs hybrid solar + storage facility to satisfy its share of Diablo Canyon replacement capacity, as shown in Table 12.

Procurement mandate (D.19-11-016). VCE has procured the reliability resources required under D.19-11-016 and D.21-06-035. The resource requirements for each tranche and the portion of contracted resources currently allocated are shown in Table 11 and Table 12, respectively.

Table 11 - Incremental Procurement Resources (D.19-11-016)

	Tranche 1	Tranche 2	Tranche 3
VCE Incremental Obligation	6.3 MW online by August 1, 2021	3.1 MW online by August 1, 2022	3.2 MW online by August 1, 2023
Leapfrog	6.3 MW (online June 2021)	——	——
Aquamarine (contract ID VCEA50002)	——	0.6 MW (online September 2021)	3.2 MW (online September 2021)
Tierra Buena (contract ID VESI10LLC)	——	2.5 MW (online June 2022)	——

Table 12 - Mid-Term Reliability Procurement (D.21-06-035)

Compliance Year	RPS eligible or Zero-Emitting			Diablo Replacement (Zero-Emitting)	Long-Duration Storage	Zero-Emitting (80% Capacity Factor)
	2023	2024	2025	2025	2026	2026
VCE Obligation (MW NQC)	8 MW	23 MW	6 MW	10 MW	4 MW	4 MW
VCE's Planned Method of Compliance	Resurgence Solar 1 Long-Term PPA	Resurgence Solar 1 Long-Term PPA	Resurgence Solar 1 Long-Term PPA	Willow Springs Solar + Storage Long-Term PPA	Tumbleweed Agreement & Goal Line Agreement	Ormat and Fish Lake Geothermal

vi. Additional Discussion

VCE is submitting a single PCP that achieves emissions reductions lower than its proportional share of the 25 MMT 2035 GHG Benchmark. Such a portfolio is justified by VCE's commitment and established purpose to provide GHG-free electricity from renewable energy sources to its customers and its internal policy to achieve 80% renewable energy by 2030 and internal planning target of 100% renewable energy by 2035. In pursuit of its own self-imposed requirements, VCE inevitably surpasses the most stringent 2035 GHG Benchmark required by the Commission.

A resource portfolio with such a high percentage of renewable energy requires a diverse mix of resources whose operating characteristics are complementary. The focus on adding new generating resources from on- and off-shore wind to VCE's existing solar-heavy portfolio will contribute to improved overall system reliability because wind resources will diversify the timing of electricity generation within VCE's portfolio, especially if other LSEs follow the PSP and mostly target development of new hybrid solar resources. Adding new wind resources will increase and expand the coverage of seasonal and hourly electricity generation in VCE's portfolio compared to the portfolio of LSEs implementing the solar-focused PSP. While substantial new standalone storage resources will work in concert with the expanded resource mix increase the flexibility of both charging and discharging as well as increase overall availability of VCE's standalone storage resources, enabling VCE's resource portfolio to adapt to system needs - be they preventing curtailments and negative power prices or responding to power supply shortfalls - in a more capable and reliable manner than either its current portfolio or the portfolio of LSEs whose procurement closely follows the PSP.

VCE's PCP does not include new natural gas resources or re-contracting with existing natural gas resources, and its current resource portfolio does not include any contracted natural gas resources.

c. GHG Emissions Results

This section discusses the emissions results for VCE's PCP as calculated by the CSP calculator. Because VCE is submitting a single portfolio that conforms to both GHG scenarios, the values listed below are from the 25 million metric tons ("MMT") version of the CSP. In that scenario, VCE's assigned GHG Benchmarks for 2030 and 2035 are 0.085 MMT and 0.070 MMT, respectively. VCE's PCP satisfies both of these requirements with reported emissions of 0.072 MMT in 2030 and 0.061 MMT in 2035.

Table 13 - Total Emissions for VCE's Preferred Conforming Portfolio (25 MMT)

Emissions Total	Unit	2024	2026	2030	2035
CO2	MMT/yr	0.072	0.059	0.072	0.061
PM2.5	tonnes/yr	0.565	0.423	2.613	2.080
SO2	tonnes/yr	0.064	0.051	0.257	0.203
NOx	tonnes/yr	4.386	4.091	6.469	4.119

VCE did not include any custom hourly load shapes or user-specified production profiles in the CSP calculator. The only inputs specified by VCE were the CPUC-issued retail sales and BTM PV forecasts on the Demand Inputs tab and the agency's portfolio information entered in the Supply Inputs tab, which are copied over from the RDT. With over 95% of its portfolio qualifying as either renewable or GHG-free over the entire IRP planning horizon, VCE is strategically positioned to achieve its internal environmental objectives.

Table 14 - RPS and GHG-Free Composition of VCE's Preferred Conforming Portfolio (25 MMT)

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	718	741	786	847
RPS-Eligible Delivered Renewable	GWh	620	676	723	825
GHG free	GWh	620	676	735	832
RPS-Eligible Delivered Renewable Percentage	% of retail sales	86%	91%	92%	97%

GHG-free Percentage	% of retail sales	86%	91%	93%	98%

d. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

Based on the CSP accounting methodology, the lower values for PM2.5 and SO_2 shown in 2024 and 2026 are the result of VCE's "net long" exposure in favorable hours relative to the defined system power profile. During these periods, VCE receives offsetting emissions credit for the excess GHG-free energy it provides to the grid. Please refer to the CSP calculator file for more information on the emission calculations used to generate the results in Table 15.

Table 15 – Total Emissions for VCE's Preferred Conforming Portfolio (25 MMT)

Emissions Total	Unit	2024	2026	2030	2035
PM2.5	tonnes/yr	0.565	0.423	2.613	2.080
SO2	tonnes/yr	0.064	0.051	0.257	0.203
NOx	tonnes/yr	4.386	4.091	6.469	4.119

The following tables provide a breakdown of the air pollutant emissions (e.g., PM2.5, SO_2, and NO_X) associated with VCE's PCP as calculated by the CSP. The air pollutants are primarily attributable to system power purchases. To minimize the generation of local air pollutants and their corresponding impacts on disadvantaged communities, VCE 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 16 - CSP Results for PM2.5 (25 MMT)

PM2.5	Unit	2024	2026	2030	2035
CHP	tonnes/yr	0.977	0.978	0.980	0.617
System Power	tonnes/yr	(0.411)	(0.555)	1.633	1.463
Total	tonnes/yr	0.565	0.423	2.613	2.080
Average emissions intensity	kg/MWh	0.0008	0.0006	0.0033	0.0025

Table 17 - CSP Results for SO_2 (25 MMT)

SO_2	Unit	2024	2026	2030	2035
CHP	tonnes/yr	0.104	0.104	0.104	0.066
System Power	tonnes/yr	(0.039)	(0.053)	0.153	0.137
Total	tonnes/yr	0.064	0.051	0.257	0.203
Average emissions intensity	kg/MWh	0.0001	0.0001	0.0003	0.0002

Table 18 - CSP Results for NOx (25 MMT)

NOx	Unit	2024	2026	2030	2035
CHP	tonnes/yr	4.549	4.521	4.458	2.437
System Power	tonnes/yr	(0.163)	(0.429)	2.011	1.682
Total	tonnes/yr	4.386	4.091	6.469	4.119
Average emissions intensity	kg/MWh	0.0061	0.0055	0.0082	0.0049

ii. Focus on Disadvantaged Communities

The California Environmental Protection Agency ("CalEPA") designates a geographic area as disadvantaged according to four criteria:[4]

- Census tracts receiving the highest 25% of overall scores in CalEnviroScreen 4.0.
- Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5% of CalEnviroScreen 4.0 cumulative pollution burden scores.
- Census tracts identified in the 2017 Disadvantaged Community ("DAC") designation, regardless of their scores in CalEnviroScreen 4.0.
- Lands under the control of a federally recognized Tribe.

VCE utilized the CalEnviroScreen 4.0 tool and CalEPA's 2017 DAC designation[5] to evaluate all census tracts in its primary service area of Yolo County. This analysis identified four census tracts that qualify as disadvantaged communities under the currently effective criteria – Tracts 101.01, 101.02, 102.03, and 102.04. Of these, only area 101.02, which is a largely rural census tract, is partially located in VCE's service territory. The total number of households in this census tract was 575 in 2020.[6]

VCE estimates that fewer than 100 of all customer accounts are located within this impacted area. Thus, less than 0.2% of all VCE customers are estimated to be in a DAC. According to the CalEnviroScreen 4.0 tool,[7] the key reasons for this census tract falling within the top 25% appears to be risks associated with a combination of pesticide exposures, groundwater threats, hazardous waste, impaired waters, and solid waste, coupled with the presence of sensitive populations (particularly those with asthma and cardiovascular disease) and socioeconomic factors such as unemployment. There are no power plants in this DAC.[8] The fact that the impacted areas are situated close to major transportation hubs likely contributes to the CalEnviroScreen 4.0 rating.

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[4] California Office of Environmental Health Hazard Assessment, *SB 535 Disadvantaged Communities* (accessed August 11, 2022). Available at: https://oehha.ca.gov/calenviroscreen/sb535.

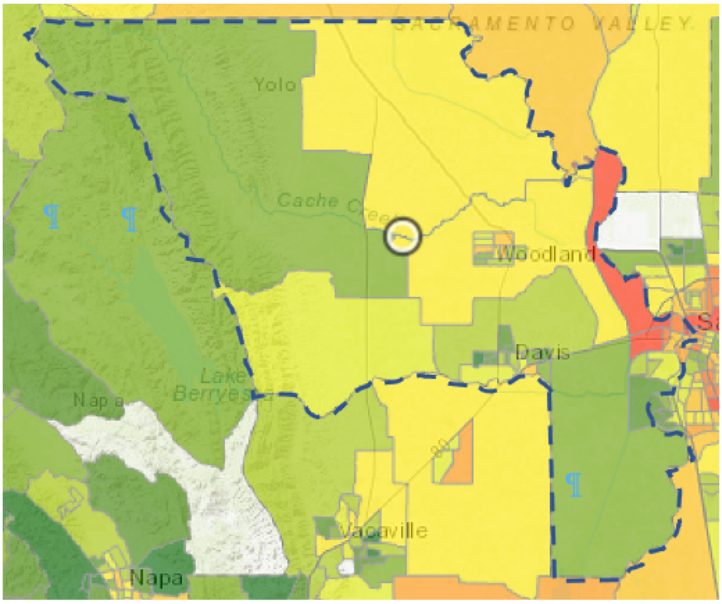
[5] California Environmental Protection Agency, *Designation of Disadvantaged Communities Pursuant to Senate Bill 535 (De Leon)* (April 2017). Available at: https://calepa.ca.gov/EnvJustice/GHGInvest/.

[6] 2020 US Census Bureau statistics for census tract 101.02 (https://data.census.gov/cedsci/profile?g=1400000US06113010102).

[7] Accessible at: https://oehha.ca.gov/calenviroscreen/sb535.

[8] The resources listed on the CEC's website (https://ww2.energy.ca.gov/almanac/electricity_data/web_qfer/county_group_cms.php) were cross-checked against tract 101.02.

Figure 3 - CalEnviroScreen 4.0 Results for Yolo County



VCE gets input on its portfolio from its Board of Directors and its CAC. Due to its size as a small LSE, VCE does not need to continually procure power to meet its load requirements, which limits the number of opportunities for stakeholders to provide input on the types of resources that are being procured. To the extent possible, VCE has acted to secure power supply options that are least cost for its customers, while also satisfying the Commission's various regulatory requirements surrounding renewable content, resource adequacy, and long-term contracts, as well as the objectives of the VCE Board.

VCE Staff presented an update on the 2022 IRP during the CAC's September 22, 2022 meeting. Advisory committee members did not provide any information that would impact the resource selection for VCE's preferred or conforming resource portfolio, but some members did indicate a preference for locally sited resources. VCE believes that battery storage resources are likely the best resource type to be sited locally, given their smaller physical footprint as compared to other types of resources. Land use is always an important consideration but it is very critical in the highly productive agricultural land in Yolo County, which result in additional permitting requirements for power generation projects.

The selection of resources in VCE's portfolio has an impact regionally and statewide, particularly in the extent to which VCE's resource portfolio decisions result in the use of and emissions from system power. Even though VCE has no power generation in DACs within its service territory, it recognizes the harmful impacts on DACs outside its service territory that result from the use of emissions-intensive system power. VCE constructs its portfolio to obtain the maximum reductions in GHG emissions and the maximum possible use of renewable energy as reasonable costs permit.

Over the planning horizon, VCE's net system power use increases by nearly 31% from 92 GWh in 2024 to 120 GWh in 2035. However, this increase is due entirely to increases in resource curtailment, as VCE's Net Purchases (before curtailment and exports) decrease by 78.1% from 46 GWh in 2024 to 10 GWh in 2035. Overall, as a percent of Net System Power, VCE's Net Purchases (before curtailment and exports) decline from 49.9% of Net System Power in 2024 to only 8.3% of Net System Power in 2035, a trend that

demonstrates VCE's efforts to minimize its dependence on system power and reduce the emissions and other impacts (e.g., impacts on DACs) associated with system power.

e. Cost and Rate Analysis

VCE's modeling framework identifies a portfolio that is optimized to minimize cost while fulfilling operational objectives. During the process of developing the PCP, it became apparent that diversifying the portfolio's resource mix by focusing on new wind generation resources and long-duration storage was very complementary to the existing resource portfolio's solar-heavy profile and increased the overall effective ELCC per unit of cost. Recognizing and focusing on attaining the maximum marginal return, or marginal performance, per additional unit of cost was the primary mechanism by which affordability was approached when developing the PCP.

Figure 4 below provides an estimate of the total net costs of the PCP listed in 2020$USD for select calendar years along with a breakdown by major cost category. The annual expense of VCE's portfolio is expected to average $44.011 million over the IRP horizon and experiences an average annual growth rate of 1.7%. VCE's reliance on the market for capacity and energy are minimal both in the near- and long-term as bundled PPAs are the principal procurement type in the portfolio through 2035. Table 19 illustrates VCE's portfolio costs expressed per MWh of retail demand. On a $/MWh basis, VCE's inflation-adjusted portfolio costs are expected to grow at an annual rate of 0.3%/year from 2024-2035.

Figure 4 - Estimated Annual Portfolio Costs in 2020$

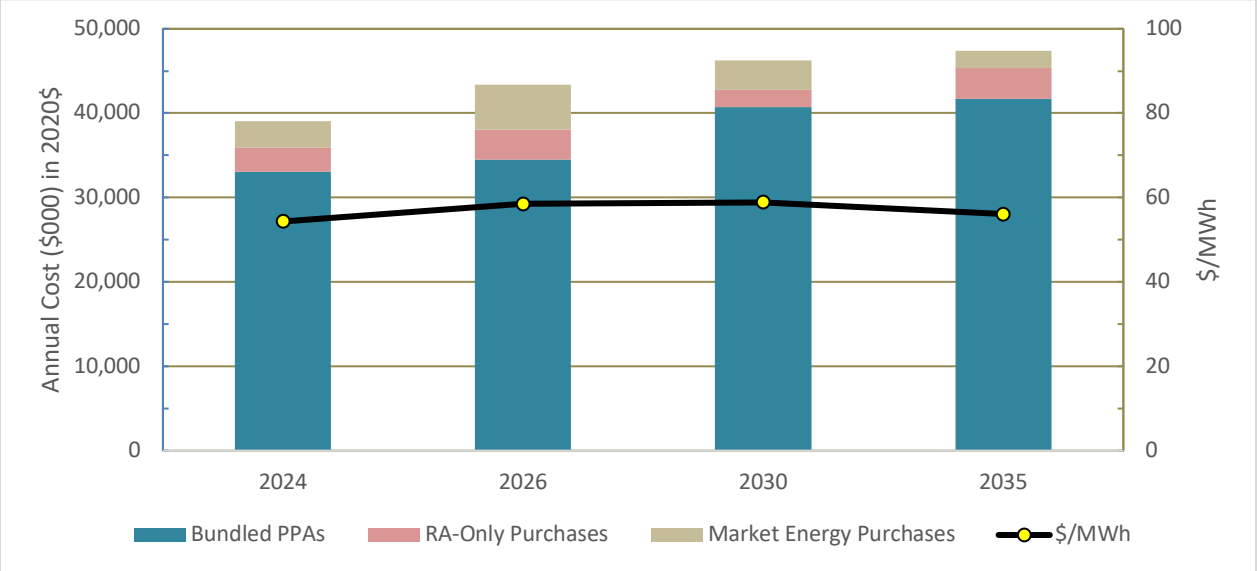


Table 19 - VCE's Preferred Conforming Portfolio Annual Net Expense (2020 $USD)

	2024	2026	2030	2035
Annual Expense ($k) – 2020$ USD	$39,053	$43,347	$46,247	$47,397
Retail Load (GWh)	718	741	786	847
$/MWh	$54.36	$58.53	$58.81	$55.99

VCE's rate policy and three product options allow it to calibrate rates to recover costs while providing multiple affordable options to its customers. Beginning in 2023, VCE plans to offer a Base Green product option at less cost than PG&E bundled rates. VCE plans to automatically provides the Base Green product price for California Alternative Rates for Energy and Family Electric Rates Assistance customers with Standard Green features. VCE's Standard Green product is competitively priced to PG&E's bundled rates and provides higher renewable content. VCE provides an additional UltraGreen product option priced at 1.5 cents per kilowatt-hour more than our standard service, so the additional cost for a typical customer is in the range of $7 to $10 per month.

f. System Reliability Analysis

VCE's single PCP satisfies its system reliability requirements for both the 30 MMT and 25 MMT scenarios. Like other LSEs, VCE's portfolio's contribution to overall system reliability is somewhat dependent on the overall portfolio composition of the state's bulk electric power grid. In developing its single PCP, VCE ensured fulfillment of its system reliability contribution in all years by implementing an approach that always adopted the more conservative value (i.e., value with the most system benefit) between the two GHG scenarios when defining its proportional share of the system's marginal resource need and when assigning the CPUC-defined marginal ELCC factors for each resource type.

This approach results in a PCP that features a slight overbuild in certain years from a reliability perspective that is partially offset by supporting VCE's ambitious renewable energy goals, but it means that the PCP is structured to meet the higher of the 30 MMT or 25 MMT scenarios' reliability requirement in each year. Any additional reliability VCE ends up contributing will assist the state in maintaining system reliability while it proceeds in decarbonizing its fuel sources. The tables and charts below display VCE's marginal reliability need and a corresponding breakdown of its marginal ELCC supply by contract type for both the 30 MMT and 25 MMT scenarios. Note that the supply values are not identical in the figures and tables because the ELCC values used to calculate the effective firm MWs supplied by the portfolio are separately assigned for each GHG scenario. Because a large portion of the supply projected to meet the agency's reliability requirements is not yet online, the agency's procurement team will monitor construction related milestones closely and update the commission with material updates in a timely manner.

Figure 5 - VCE Capacity by Contract Status (30 MMT)

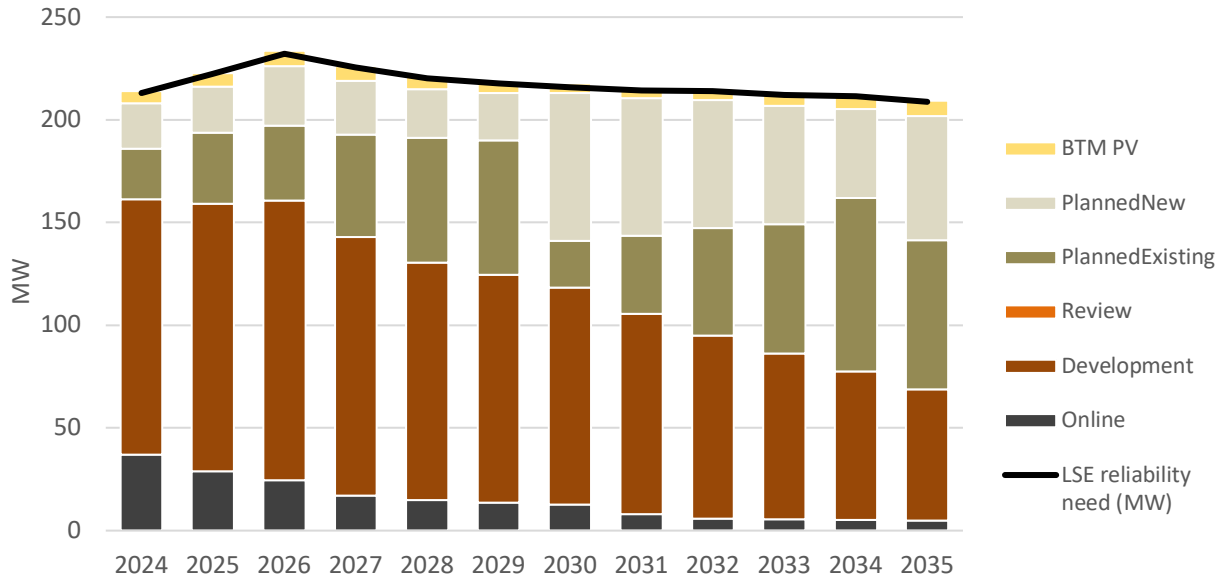


Table 20 - Load and Resource Table by Contract Status (30 MMT)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
LSE reliability need (MW)	213	222	232	225	220	218	216	214	214	212	211	209
ELCC by contract status (effective MW[1])												
Online	37	29	25	17	15	14	13	8	6	6	5	5
Development	125	132	140	131	120	115	110	102	94	85	77	69
Review	-	-	-	-	-	-	-	-	-	-	-	-
PlannedExisting	28	37	37	50	61	65	23	38	52	63	84	73
PlannedNew	18	18	24	22	19	19	67	62	58	53	39	56
BTM PV	6	7	8	7	6	5	5	5	6	6	7	8
LSE total supply (effective MW)	213	223	233	226	221	218	218	216	215	213	212	209
Net capacity position (effective MW)	0	0	1	0	1	1	2	1	1	1	1	1

Notes:
1. Effective MW refers to nameplate MW adjusted for ELCC values

Figure 6 - VCE Capacity by Contract Status (25 MMT)

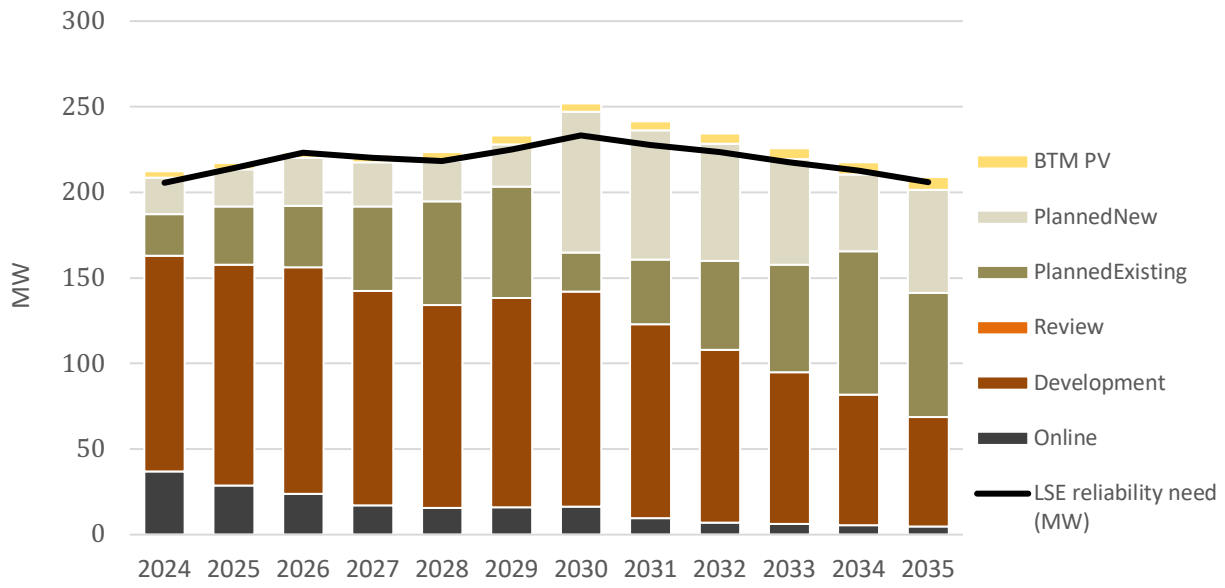


Table 21 - Load and Resource Table by Contract Status (25 MMT)

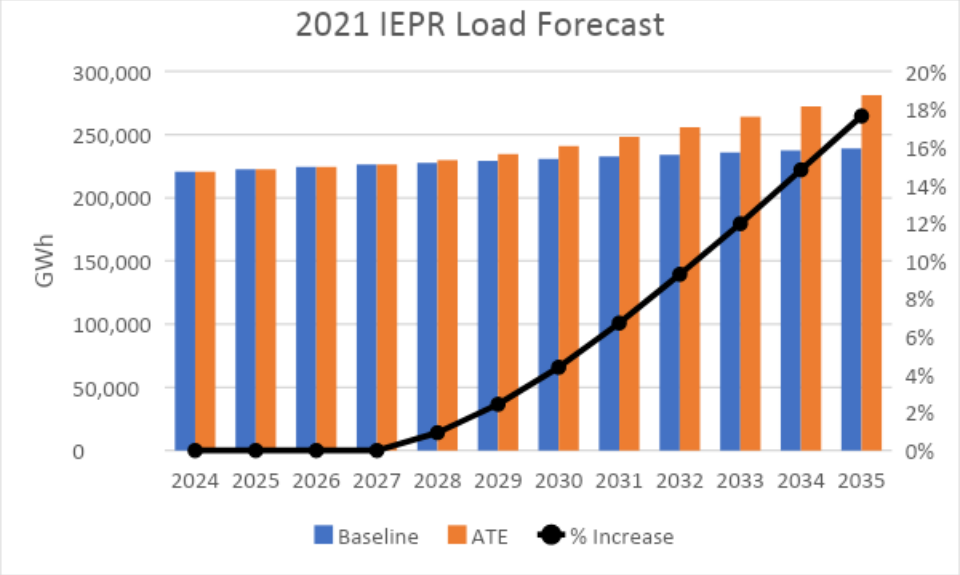
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
LSE reliability need (MW)	206	214	223	220	218	225	233	228	224	217	213	206
ELCC by contract status (effective MW)												
Online	37	29	24	17	15	16	17	10	7	6	5	5
Development	126	131	136	130	123	127	130	118	106	93	81	69
Review	-	-	-	-	-	-	-	-	-	-	-	-
PlannedExisting	28	36	36	49	61	65	23	38	52	63	84	72
PlannedNew	17	17	24	21	19	20	78	71	64	57	40	56
BTM PV	4	3	3	4	5	5	5	5	6	6	7	8
LSE total supply (effective MW)	212	217	223	222	224	233	252	242	234	226	217	209
Net capacity position (effective MW)	6	3	0	2	5	8	19	14	11	8	5	3
Notes: 1. Effective MW refers to nameplate MW adjusted for ELCC values												

g. High Electrification Planning

To estimate the impacts of additional demand for electricity, VCE analyzed the CEC's Additional Transportation Electrification ("ATE") scenario to determine the additional resources it would procure to serve this load while still achieving the same RPS and GHG emission targets. Figure 7 below illustrates the increase in demand relative to the Mid Baseline Scenario (AAEE Scenario 3; AAFS Scenario 3). The greatest

impacts are expected to appear starting at around 2030 and then ramp up considerably through 2035, ultimately resulting in about an 18% increase in annual demand.

Figure 7 - Percent Increase in CAISO Annual Load Assuming High Electrification



To assess the potential impacts to VCE of this high-electrification scenario, this increase was applied to VCE's load forecast, as shown in Table 22.

Table 22 - VCE Annual Demand for Baseline and Electrification Scenario

Service Area	LSE CPUC ID	LSE Name	YEAR	TYPE	Baseline IRP Sales Forecast (GWH)	ATE IRP Sales Forecast (GWH)
PGE	VCE	Valley Clean Energy Alliance	2023	CCA	727.3	727.3
PGE	VCE	Valley Clean Energy Alliance	2024	CCA	718.4	718.4
PGE	VCE	Valley Clean Energy Alliance	2025	CCA	729.1	729.1
PGE	VCE	Valley Clean Energy Alliance	2026	CCA	740.6	740.6
PGE	VCE	Valley Clean Energy Alliance	2027	CCA	751.7	751.7
PGE	VCE	Valley Clean Energy Alliance	2028	CCA	764.6	771.5
PGE	VCE	Valley Clean Energy Alliance	2029	CCA	774.1	792.7
PGE	VCE	Valley Clean Energy Alliance	2030	CCA	786.4	821.0
PGE	VCE	Valley Clean Energy Alliance	2031	CCA	798.8	852.3
PGE	VCE	Valley Clean Energy Alliance	2032	CCA	812.5	888.0
PGE	VCE	Valley Clean Energy Alliance	2033	CCA	822.4	921.1
PGE	VCE	Valley Clean Energy Alliance	2034	CCA	834.0	957.4
PGE	VCE	Valley Clean Energy Alliance	2035	CCA	846.6	995.6

To identify how such an increase in electricity demand would impact the PCP, the increased load profile from the ATE scenario was modeled. The results of this optimization exercise are shown below. [9]

Table 23 - VCE High Electrification Scenario

Resource Type	MW	Annual GWh	2035 GHG target	Transmission Zone	Substation/Bus	Alternative location	Note
In-state Wind	94	242	25 MMT	PGE	unspecified	SCE	2025
Offshore Wind	14	66	25 MMT	PGE	unspecified	SCE	2032
Offshore Wind	28	202	25 MMT	PGE	unspecified	SCE	2035
8-hr Storage	12	n/a	25 MMT	PGE	unspecified	SCE	2032
8-hr Storage	37	n/a	25 MMT	PGE	unspecified	SCE	2035

Assuming VCE's RPS and GHG emissions targets in 2030 and 2035 are unchanged under the ATE scenario, the portfolio would require procurement of additional wind resources and prioritizing longer-duration storage over shorter-duration storage. Under the ATE scenario, starting in 2026 VCE will need upwards of 90 MW of onshore wind (rather than 39 MW) and 40 MW of offshore wind instead of the originally presumed 35 MW of cumulative offshore wind acquired by 2035. In addition, the need for longer-duration storage increases as VCE would need to acquire about 50 MW of 8-hour storage compared to 17 MW in its PCP, although the increase in 8-hour storage would mostly displace the PCP's 6-hour storage.

The increase in storage duration is driven by the need to limit VCE's market purchases in off-peak hours throughout the year. These off-peak purchases incur system emissions and must be limited for VCE to satisfy its assigned GHG benchmarks. The longer duration allows storage to dispatch longer into evening and early morning hours. One critical aspect of the ATE scenario that is not yet well understood is how and when electric vehicles ("EVs") will interact with the grid. Depending on the nature of their interaction, EVs could have a multiplying or mitigating effect on the supply and demand balance in the power system.

h. Existing Resource Planning

Since its 2020 IRP, VCE has contracted for 255 MW of new nameplate capacity, 60 MW of which is currently operating. VCE has been building its resource portfolio while D.19-11-016, D.20-12-044, and D.21-06-035 were being issued, and therefore its approach has been to procure new resources to meet the requirements of these incremental procurement decisions while also procuring available resources to meet expected future needs. As a result of this forward-looking approach, VCE's PCP does not indicate a need for new generating capacity until 2026 and is planning to procure wind.

VCE's PCP includes a total of 366.6 MW[10] of resources in 2030, of which 254.6 MW, or 69%, are already under contract. In 2035, the PCP includes a total of 389.2 MW[11] of resources, of which 245.1 MW, or 63%, are already under contract. VCE's near-term resource need is limited to 20 MW of 4-hour storage, followed by 20 MW of on-shore wind in 2026, and the combination of two-to-four-year lead times and the comparatively small scale increase the likelihood that these resource needs will be fulfilled. The large

[9] The RA-Only contract volumes from the electrification optimization run are excluded from this table.

[10] Not including BTM PV or CAM Capacity

[11] Not including BTM PV or CAM Capacity

majority, 82.1% (92 MW) of the 112 MW of new resources needed by 2030 are not needed for more than seven years in the future or several times the length of a project's typical construction timeline. While VCE will be vigilant in identifying opportunities to secure these resources under contract, these resource needs are so far into the future that it is unrealistic to pursue contracts at the present, and VCE's future IRPs in 2024, 2026, and 2028 will provide updates on both the potentially changing nature of VCE's future resource needs and its progress towards procurement of IRP-identified resources.

VCE's near-term resource needs, i.e., within four years, represent less than 14% of its current resource portfolio. As a comparatively small LSE, VCE tends to procure resources as part of a joint effort with other CCAs or on a bilateral basis when an opportunity arises where a project may have some resource availability not fully subscribed by larger LSEs. VCE recognizes its niche role in procurement markets, and it operates within that role.

i. Hydro Generation Risk Management

VCE currently has 2.9 MW of small hydro under contract. That facility has not generated electricity for over a year due to in-state drought, but that facility represents about 1% of VCE's contracted resources and does not present a significant risk to expected costs, GHG emissions, or reliability. The facility presents no risk to VCE's PCP since the contract ends in 2025, and no other hydro resource contracts are specified in VCE's PCP so VCE's expected costs, GHG emissions, or reliability are in no way dependent on hydro resources.

j. Long-Duration Storage Planning

VCE has contracted for two long-duration battery energy storage system:

- Tumbleweed is a Long-Duration BESS (8 hours) in Kern County for which VCE's share is 2.86 MW (22.88 MWh). It is anticipated online in 2026.
- Goal Line is a Long-Duration BESS (8 hours) in San Diego County for which VCE's share is 2.25 MW (18 MWh). It is anticipated online in 2025.

VCE determined the contract quantities based on the requirements under D.21-06-035, particularly for the 2026 requirement year (Tranche 4) and based on the value of long-duration storage in shaping its generation portfolio.

The benefits of long-duration energy storage are 1) low marginal costs for storing electricity; 2) the provision of ancillary services to the electrical grid; 3) it is widely deployable and scalable; and 4) it has relatively short lead times for development when compared with the upgrading of grid transmission and distribution assets. The risks of long-duration energy storage are 1) current high capital costs; 2) supply-chain constraints on the minerals and other materials used to fabricate the systems (if BESS); and 3) if the system is stand-alone and not paired with a renewable resource, dependence on available, low-cost, and clean charge energy.

VCE sees substantial future potential in long-duration storage as a valuable grid resource. The PCP only contains 17 MW of planned 8-hour storage in 2035 due to the current projected cost of 8-hour storage, but as discussed in Section III.g a key adaptation to a high-electrification future scenario involves 8-hour long-duration storage displacing most of the PCP's planned 53 MW of 6-hour storage. Recent advances in

battery technology and chemistry coupled with economies of scale resulting from rapidly increasing production of battery storage as well as other potential energy storage options represent the potential for significant opportunities to attain ever-higher shares of renewable energy in the resource mix at continually decreasing cost. As the costs for long-duration storage decline, VCE anticipates these resources to constitute a greater share of its resource portfolio.

k. Clean Firm Power Planning

Through CC Power, VCE contracted with other CCAs for a portion of a new 13 MW geothermal plant in Nevada and a portion of a 125 MW portfolio of new geothermal projects in Nevada and California. Almost all of these resources are expected to be outside the CAISO balancing authority in northern Nevada or the Imperial Irrigation District and will require Maximum Import Capability (MIC) to be secured to deliver energy and capacity. MIC at northern Nevada delivery points is limited, and suppliers indicate that transmission capacity on NV Energy to southern Nevada is constrained. MIC expansion at northern Nevada delivery points such as Gonder, Summit, and Silver Peak would considerably decrease the risk of these projects not being able to provide clean firm capacity to CAISO. Transmission projects that focus on better connecting CAISO with northern Nevada resources, such as alleviating the Control substation constraint for the Oxbow line, could also de-risk northern Nevada as a source of clean firm resources and potentially reduce significant wheeling costs through other transmission providers.

The CC Power 125 MW portfolio also may contain a new resource inside CAISO at the Geysers. However, the Phase 1 results of its Cluster 14 study indicate that required network upgrades are costly and not high priority—with a potential completion no earlier than 2029, which is after the envisioned extension in the mid-term reliability order. This may result in substituting an import resource.

As part of the above-mentioned contract, VCE contracted for the following geothermal facilities to meet its “clean firm power” requirements under D.21-06-035:

- Ormat Geothermal Portfolio is a group of geothermal projects located in Nevada and Imperial County, CA that is expected to provide VCE with 5 MW and 33,745 MWh annually. The portfolio’s projects are expected to come online as early as 2024. The VCE Board approved this project in July 2022.
- Fish Lake Geothermal is a geothermal project in Esmerelda County, Nevada that is expected to provide VCE with 0.42 MW and 3,510 MWh annually with an expected online date of June 2024. The VCE Board approved this project in July 2022.

VCE arrived at the amounts included in its portfolios by evaluating the requirements of D.21-06-03 and calculating its needed capacity. The benefits of including these resources in VCE’s portfolio are to provide a more reliable source of power to the grid and to enhance the flexibility of VCE’s portfolio while still reducing emissions overall.

The potential of these resources on a system level is to assist the State of California with any decision it may make to avoid continuing the use of nuclear power and on an LSE level is to provide a foundation of diverse reliability. The risks of including geothermal in VCE’s portfolio mix includes operational risks given that geothermal projects are subject to force majeure, technical risks given the technology maintenance needs, economic risks such as increasing operating costs, and the risks associated with permitting. For the Ormat Geothermal Portfolio and Fish Lake Geothermal resources specifically, transmission allocation

rights are the key risk. VCE is mitigating this risk by having applied for transmission rights effective in 2024 through the term of the two agreements. VCE is interested in procuring more geothermal resources if they are cost competitive or added to its ordered procurement requirements.

l. Out-of-State Wind Planning

VCE's PCP contains no out-of-state wind due to current transmission limitations, but VCE plans to examine availability of out-of-state wind on an annual basis. Out-of-state wind resources are generally very complementary to VCE's existing resource portfolio, providing higher ELCCs and varied generation timing compared to existing resources.

m. Offshore Wind Planning

VCE is planning to procure offshore wind after 2030 when more capacity becomes available at a more affordable price with more transmission capacity. The CEC's offshore wind goal[12] of 5,000 MW by 2030 is more than 10 times VCE's total 2035 resource portfolio and nearly 35 times larger than the 2035 new resource need in VCE's PCP. Offshore wind projections appear very complementary and valuable to VCE's resource portfolio but given the scale of the resource compared to VCE's total portfolio, VCE will have to evaluate opportunities to procure offshore wind as they become available.

n. Transmission Planning

VCE recognizes that transmission upgrades may constitute cost-effective investments that enhance system reliability by increasing the deliverability of existing and new generation facilities. Based on the information available at this time, VCE does not expect to incur any transmission-related restrictions on its procurement strategy beyond those already identified for baseline and planned resources.

With its baseline resources, VCE has four projects that are currently in development and require transmission upgrade projects. For additional information on these projects, please refer to the RDT. For its planned resources, the only resource category that may require an upgrade to existing transmission deliverability is the agency's plan to procure offshore wind in the 2030-2035 timeframe. VCE will look to procure offshore wind starting in 2030 and again in 2032 or 2035 in the Morro Bay, Humboldt Bay region, or elsewhere depending on costs, availability, and other considerations. As listed in the 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.[13] VCE is assuming 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 capital expenditure-based price for offshore wind in those future years. As for its plan to procure wind in the near-term horizon, VCE conducts Procurement RFOs to assess market conditions related to costs, location, and timing of new resources. It will emphasize the addition of wind

[12] https://www.energy.ca.gov/news/2022-08/cec-adopts-historic-california-offshore-wind-goals-enough-power-upwards-25

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

to the portfolio, but the final amount, location, and timing will ultimately depend on the market pricing offered by project developers.

Two projects described below are in the process of securing transmission:

- Fish Lake Geothermal (COD June 2024): The Fish Lake geothermal project will connect to the Silver Peak substation in NV Energy territory. It is currently finalizing its interconnection agreement and expecting execution shortly. The developer does not anticipate any transmission-scale upgrades—just an upgrade to the Silver Peak substation. CC Power members have secured 2023 MIC in preparation for a long-term MIC reservation.
- Ormat Geothermal Portfolio (COD starting Oct 2024): The Ormat portfolio of geothermal projects are expected to mostly be import resources in northern NV Energy territory or the Imperial Irrigation District. Projects are at various stages of maturity in their subsurface characterization, permitting, and interconnection. The RDT contains a representation of what the portfolio might look like (entered as 7 projects with potential substations). Ormat has limited ability to deliver at southern Nevada import points (Mead and Merchant), so MIC expansion will likely be needed at Summit, Gonder, and Silver Peak to deliver up to 125 MW. One potential CAISO resource in the portfolio (at the Geysers – queue position 1859) recently received Phase 1 results from its Cluster 14 study indicating that it is impacted by a costly network upgrade with a completion date no earlier than 2029—which may require it be substituted for an import resource.

The agency currently has no firm restrictions regarding the location of any of its planned candidate resources, as long as FCDS status is attainable. At this time, VCE has no stated preference for their listed projects not to be relocated by the CPUC/CAISO, assuming similar availability and costs for the replacement project. Lastly, the information discussed in this section is not investment grade.

IV. Action Plan

As part of its action plan and its continuous operations, VCE will monitor closely the progress of construction and key milestones for its contracted new capacity that will come online between 2022 and 2026.

In order to secure sufficient long-term RPS eligible resources for its preferred portfolio in the 2023-2035 period, VCE plans to conduct solicitations for new capacity in the 2023-2024 period covering needs in 2024-2027, and likely also a solicitation in 2025 or 2026 to cover needs for renewable energy and storage in the 2028-2035 period. VCE will participate in joint solicitations, such as the CC Power solicitation through which it recently secured geothermal capacity, to the extent possible and when advantageous, but it will also pursue direct contracting with projects as opportunities become available.

VCE expects all its generating capacity additions to be RPS-eligible renewable energy, currently estimated to be a total of 30-40 MW including new northern California wind – identified in the IRP models (RESOLVE) as Solano Wind. Northern California wind was selected based on the generation profile, but the actual procurement will depend on the resources available at the time of procurement. The timing, scope, and scale of future procurement activity will depend on the successful completion of VCE's in-development projects, its electric demand growth over the next few years, and changes in the regulatory environment.

VCE does not expect any procurement barriers to impede its future contracting for new renewable energy resources, but notes that even though a balanced RPS portfolio is desirable, the limited resource availability and lead time required for some resources, such as wind and biofuels-based generation, may lead to a "solar-heavy" RPS and IRP portfolio in the near- and mid-term timeframe. The key risk affecting both VCE's RPS and IRP portfolios is reliance on new resources that have yet to prove that they can successfully complete construction within the timelines contracted, and that once completed they will deliver the contracted volume of energy and capacity as expected.

VCE's PCP consists of a combination of solar PV, wind, hydro, demand response, geothermal, and battery storage. Even though battery storage is quickly moving to the mainstream in terms of resource choice for capacity in California, this technology remains largely unproven at the large scale and for the long-term lengths of projects currently being deployed across California. Storage performance, particularly over time, may therefore become both a risk and barrier if actual performance falls short of expectations. These risks and barriers are something all LSEs in California have in common.

Battery storage also faces potential supply disruptions or limitations due to a combination of rapidly rising demand and potential supply shortfalls of key raw materials. The competition between stationary power and transportation battery applications is likely to have a positive effect over time on both cost and performance but could prove disruptive in the near term if limited production capabilities result in suppliers favoring transportation markets over stationary markets. The rapid growth in battery demand is also straining the supply of raw materials such as lithium, nickel, cobalt, and graphite, etc. which could exacerbate the competition between transportation and stationary markets, resulting in increased prices and limited battery availability. The upside to this competition and potential supply constraints is the rapid advancement of battery technology and novel chemistries.

For two reasons, VCE does not see any unmanageable risks in its portfolio due to retirements of existing renewable energy sources. First, the only existing renewable energy resources under contract are the Indian Valley small scale hydro plant which was expected to provide 6,450 MWh of energy each year but hasn't generated electricity in over a year due to drought conditions and VCE has already demonstrated its ability to replace that forgone output and the Aquamarine solar facility which just began operations slightly more than a year ago. Second, over the next 3-5 years, VCE expects to eliminate its need for procurement of market RECs from existing resources as its other contracted resources complete construction and begin operation. Compliance with the RPS will therefore not depend on retaining existing resources but will instead rely on the long-term performance of newly built renewable resources.

a. Proposed Procurement Activities and Potential Barriers

VCE plans to contract for additional resources by 2024. The IRP action plan calls for engaging the market in the 2023-2024 period to facilitate the addition of new 4-6-hour energy storage and wind energy and capacity in the 2024-2027 period and again in 2027 or 2028 to cover resource needs in the 2028-2032 period. It is VCE's practice to engage the market for PPAs for specific technology resource needs as the needs become clear; additionally, VCE may consider resource ownership in the future.

All new resources apart from standalone storage are planned to be RPS-eligible, and VCE has a preference for further diversifying its portfolio with more on-shore and off-shore wind resources if those resources are available and are competitively priced. As the cost of battery storage is expected to continue to decline, VCE also expects to continue to gradually increase its use of BESS to meet its resource adequacy

goals and to enhance the use of solar energy to extend beyond daylight hours. In fact, VCE sees increased use of batteries as one component of its compliance strategy whereby using BESS to improve its integration of renewables will also help to support compliance with the 25 MMT Conforming Portfolio goal.

Regarding costs and benefits of CAM resources, VCE has accounted for CAM capacity in its resource plan and assumes these resources will provide capacity for RA purposes but not contribute energy to meet VCE load. It should be noted that the operations and the costs of these resources are completely outside of VCE's control and the costs and benefits of these resources are therefore hard to assess. In VCE's modeling it is assumed this capacity will remain available and that VCE will pay market rates for the CAM capacity provided. The main benefit of CAM capacity is that it reduces VCE's RA obligation. If the CAM resources were to also cost less than other comparable RA resources, they could also bring economic benefits to VCE's ratepayers.

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

As shown in Table 24, all resources necessary to meet D.19-11-016 requirements are under contract and have begun operating.

Table 24 - Incremental Procurement Resources (D.19-11-016)

	Tranche 1	Tranche 2	Tranche 3
VCE Incremental Obligation	6.3 MW online by August 1, 2021	3.1 MW online by August 1, 2022	3.2 MW online by August 1, 2023
Leapfrog	6.3 MW (online June 2021)	——	——
Aquamarine (contract ID VCEA50002)	——	0.6 MW (online September 2021)	3.2 MW (online September 2021)
Tierra Buena (contract ID VESI10LLC)	——	2.5 MW (online June 2022)	——

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

As shown in Table 25, all resources necessary to meet D.21-06-035 requirements are under contract and in development.

Table 25 - Mid-Term Reliability Procurement (D.21-06-035)

Compliance Year	RPS eligible or Zero-Emitting			Diablo Replacement (Zero-Emitting)	Long-Duration Storage	Zero-Emitting (80% Capacity Factor)
	2023	2024	2025	2025	2026	2026
VCE Obligation (MW NQC)	8 MW	23 MW	6 MW	10 MW	4 MW	4 MW

VCE's Planned Method of Compliance	Resurgence Solar 1 Long-Term PPA	Willow Springs Solar + Storage Long-Term PPA	Tumbleweed Agreement & Goal Line Agreement	Ormat and Fish Lake Geothermal

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

VCE has contracted with two projects (Ormat and Fish Lake) for 5 MW of geothermal capacity which will exceed its 4 MW requirement for zero-emitting resources with an 80% or higher capacity factor. This resource was procured through the joint CC Power solicitation, and the primary risk aside from the timeliness of commercial operations is securing transmission rights.

VCE's 4.2 MW share of the 13 MW Fish Lake geothermal project is expected to be commissioned in June 2024. As represented in the RDT, the project has high viability scores with subsurface characterization complete, a nearly finalized interconnection agreement, and partial financing. CC Power has also secured the MIC at the project's delivery point sufficient to claim a long-term reservation.

VCE's 5 MW of the Ormat portfolio of up to 125 has several risks. The contract included an illustrative facility list indicating a possible first COD in October 2024 and final COD in 2026. VCE used the illustrative facility list to calibrate the representation of the Ormat portfolio in the RDT, which is likely to mostly rely on resources in northern NV Energy territory or the Imperial Irrigation District. Unlike Fish Lake, many of the projects in Ormat's portfolio are still dependent on subsurface characterization and need additional permitting. Importantly, although CC Power is hopeful the Ormat contract will provide 125 MW of capacity for MTR, only 64 MW is guaranteed. Because specific projects are not yet identified, CC Power has also not been able to secure MIC—which is scarce in northern Nevada and may be difficult to obtain. Although Ormat can provide some transmission service to southern Nevada, MIC expansion at Gonder, Silver Peak, and Summit or transmission upgrades will likely be required to deliver the maximum capacity of the portfolio to CAISO.

CC Power currently holds bi-weekly meetings with Ormat and plans to closely follow development progress in the Ormat portfolio. An update will be provided to the CPUC on timing and scope of the contract in the planned February 2023 regulatory filing. If it is determined unlikely Ormat can deliver 125 MW by June 2028, VCE will consider offering a solicitation for replacement capacity independently or through CC Power in 2023.

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

VCE's share of the long-duration storage requirements is 4 MW. VCE intends to use 4 MW of the available 5.1 MW capacity from the Tumbleweed and Goal Line contracts to meet this obligation.

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

VCE's share of the Diablo Canyon Replacement is 10 MW. To meet VCE's requirement of 10 MW of its 2023-2025 incremental procurement under D.21-06-035 for zero-emitting energy, VCE will operate the battery portion of Willow Springs, a 72 MW solar plus 36 MW storage facility, on a five-hour dispatch schedule from the hours ending 5 pm to 10 pm.

d. All other procurement requirements

Notwithstanding the 10 MW of the 2023-2025 procurement requirements for the Diablo Canyon Replacement capacity, VCE's share of this requirement is 8 MW in 2023, 23 MW in 2024, and 6 MW in 2025. All three years' requirements will be met by the Resurgence solar + storage project which has a 90 MW PV system coupled with a 75 MW/300 MWh battery energy storage system, which is more than double the capacity required to fulfill this obligation.

iii. Offshore wind

VCE's PCP includes 35 MW of offshore wind capacity by 2035. Offshore wind in California remains in early-stage development. The public comment period on the proposed sale notice ended August 1, 2022[14] and publication of a final sale notice has not yet occurred. Once the leases are sold, project plans will be subject to subsequent environmental, technical, and public reviews prior to a BOEM decision on whether the proposed development should be authorized. It is too early in the development process to reasonably predict when, if, and in what manner VCE's offshore wind procurement may occur, but the risks presented by offshore wind resources are greatly minimized since the PCP does not include offshore wind resources until 12 years in the future.

iv. Out-of-state wind

VCE's PCP also includes 39 MW of on-shore wind by 2030, none of which is currently planned to be sourced from outside California. Out-of-state wind procurement remains a possibility but is unlikely to be considered for procurement until or unless transmission capacity becomes available.

v. Other renewable energy not described above

VCE's PCP includes 17 MW of 8-hour long-duration storage in 2035. VCE plans to solicit this capacity 2-3 years in advance of its need, either through a joint solicitation such as the CC Power solicitation or by directly contracting with a project. VCE acknowledges that 8-hour storage resources may become necessary prior to 2035 depending on changing regulatory requirements and the impacts of increased electrification and will monitor developments that could impact the timing of its need for 8-hour storage and respond as conditions warrant.

vi. Other energy storage not described above

VCE's PCP includes 20 MW of 4-hour battery storage starting in 2024 and 53 MW of 6-hour battery storage starting in 2030. These resources will be procured either as part of a competitive solicitation (including potentially a joint solicitation) or directly, with procurement efforts starting 2-3 years in advance of the resource need. VCE intends to engage the market in mid-to-late 2023 for storage projects identified as needed in 2024.

vii. Other demand response not described above

VCE has 7 MW of the Leapfrog demand response project that is currently operating. Future participation in other demand response projects is a possibility, even though additional demand response resources

[14] 87 FR 32,443

were not selected in the PCP. VCE will monitor available demand response project capacity and evaluate opportunities as they arise.

viii. Other energy efficiency not described above

VCE encourages energy efficiency and provides its customers with information on energy efficiency programs and incentives including heat pumps, air sealing, water heating, tax incentives and rebates, financing programs, and more. Additionally, VCE participates in PG&E programs offerings such as the Energy Savings Assistance Program which offers energy savings assistance to income-eligible customers.

ix. Other distributed generation not described above

VCE's customer base currently has a higher rate of BTM PV adoption compared to the state average, and VCE will continue to monitor BTM PV adoption trends within its service area and incorporate changes into its procurement planning as necessary.

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

VCE has a wide range of EV information available for its customers on the location of charging stations in its service territory, EV models, savings calculators, and financial incentives. It closely monitors developments in transportation electrification pilot programs, regulations, and rates as a means of facilitating EV adoption in its service area and planning for future impacts and opportunities from increasing EV market penetration.

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

VCE offers information on building electrification technologies, incentives, and financial assistance programs to its customers, and closely monitors regulatory developments in this area to inform planning and procurement.

xii. Other

VCE and its partners are piloting a dynamic rate for agricultural electricity users in its AgFIT program and are actively exploring other similar opportunities.

b. Disadvantaged Communities

VCE's rates are designed to provide economic benefits for all ratepayers, including those residing in DACs. It should also be noted that the DAC area identified in VCE's service territory does not appear to have any significant land suitable for renewable energy development, due to the predominant land use types such as prime farmlands, Williamson Act Lands, conservation easements, and Sacramento River bypass (flood) channels.

Until further notice, PG&E will continue to make its existing energy efficiency and demand response programs available to VCE customers. In addition, VCE operates two programs that will help air quality

and energy affordability for all VCE customers, including residents of DACs, as described in the following summaries.

Transportation Electrification. VCE has initiated its Transportation Electrification Program ("TEP"), which is designed to focus on customer-facing activities that advance local electrification of the transportation system. VCE is currently working on development of targeted outreach and education for its transportation electrification programs to customers located in TEPs. Decarbonizing the transportation sector is of high priority to VCE and its local government member agencies due to their central implementation role of State transportation goals. With a high level of emissions generated by the transportation sector in California (50%)[15] and an even higher percentage of overall emissions from the transportation sector at the local level in Yolo County,[16] VCE is in the best position to catalyze transportation electrification at the local level. VCE's multi-year goals for the TEP include: 1) Accelerate electrification of transportation and move consumer spending from gallons to kWh; 2) Improve air quality in service territory and adjacent locations; 3) Build upon the Climate Action Plans of Yolo County, Woodland, Winters, and Davis; and 4) Become a trusted source of information within our community regarding electrification.

One current example of VCE's efforts on the TEP includes securing a $2.9 million dollar grant from the Sacramento Area Council of Governments that lays the foundation for increased public EV charging opportunities and multi-modal transportation hubs in Yolo County. To date, Electrify Yolo has resulted in the installation of one charging station in downtown Woodland and two charging stations in Winters. Seven sites are under assessment in unincorporated Yolo County. All projects are planned for completion by December 31, 2023. Additionally, VCE provides an online education tool[17] for customers to find information regarding EVs such as: EV benefits, EV facts, a savings calculator, a CO_2 reduction calculator, EV models, an EV charger locator, and available credits and rebates.

Energy Efficiency. VCE's Energy Efficiency ("EE") Program focuses on providing relevant and actionable EE information to VCE customers.[18] VCE has developed an online EE graphic that identifies the most common household EE measures along with links to available rebates, with the objective to help customers reduce energy usage, reduce emissions related to energy usage and save customers money.

VCE also conducts regular outreach to its customers to increase customer satisfaction and retention, including targeted efforts to demonstrate its commitment to customers in DACs. For example, VCE updates its website annually with resources for customers having trouble paying bills and participates in the Commission's Arrearage Management Plan.[19] During 2021, VCE also conducted a call-out campaign to 200 customers in arrears to inform them of available resources to pay their bills such as the California Alternate Rates for Energy Program, the Family Electric Rate Assistance Program, the Medical Baseline Assistance program, and the Arrearage Management Program. Additionally, VCE investigated the feasibility of participating in the Commission's Disadvantaged Communities Green Tariff Program, and

[15] https://www.energy.ca.gov/about/core-responsibility-fact-sheets/transforming-transportation
[16] https://www.yolocounty.org/home/showpublisheddocument/61642/637146088140070000
[17] The EV customer education and decision support tool is found on the VCE website at: https://valleycleanenergy.org/electric-vehicles
[18] The EE customer education and decision support information is found on the VCE website at: https://valleycleanenergy.org/energy-efficiency/
[19] *See*, https://valleycleanenergy.org/financial-assistance/

ultimately determined that it was not feasible to participate in the program due to the low number of customers eligible for the program.

Additionally, VCE is working to increase the accessibility of the information it shares with customers, particularly Spanish speakers. VCE has performed, or is performing, the following activities in support of this effort:

- Translated the material and information listed on its website into Spanish.[20]
- Ensuring all new collateral is translated into Spanish within 3 months of introduction.
- Analyzing satisfaction levels for customer calls in languages other than English and Spanish through VCE's contact center.
- Analyzing opt-out rates when customers request a Spanish-speaking customer service representative or Spanish on VCE's Interactive Voice Response phone system.
- Increasing social media posts in Spanish.

c. Commission Direction of Actions

VCE does not seek any direction or action from the Commission at this time beyond requesting certification of its IRP pursuant to statute.

V. Lessons Learned

Below are some considerations for the CPUC with regards to improving its programmatic approach to IRP procurement.

- Timeliness of Inputs and Assumptions: VCE understands the complexity of holding the IRP process and developing the assumptions and inputs necessary for LSEs to finalize the narrative, RDT, and CSP files for submission. However, there were times when Commission Staff released information late in the process. Improvements on the timeliness of the inputs and assumptions would help LSEs to achieve compliance with all IRP requirements. VCE respectfully encourages the Commission to consider in its planning timelines that many CCAs like VCE require not only Board review and approval of IRPs but also community review and input from advisory committees. These reviews and approvals are integral to the identity, purpose, and mission of many CCAs, and an IRP timeline recognizing these requirements would acknowledge that the effective deadline for IRP development is at least a month prior to the Commission's IRP filing deadline.
- Standardizing Communication: There were instances when information on IRP requirements that should have been made public were only provided to select stakeholders through private emails and meetings rather than emailed to the whole service list or posted on the website.
- Technology Neutrality: VCE encourages the Commission to value resources based on their emissions and operational characteristics rather than specifying technology types to allow LSEs to identify the solutions that best fit into their portfolio and to lessen the risk of price hikes for one type of resource required of all LSEs competing in the same market for the same resources.

[20] *See*, https://valleycleanenergy.org/es/inicio/

- Allowing Excess Procurement to Count toward Future Requirements: The CPUC should take steps to ensure that it does not discourage excess procurement—and allows that procurement to count towards future orders.
- Provide Regulatory Certainty: VCE encourages the Commission to adopt durable rules and processes to bring greater stability to the regulatory framework within which VCE and other suppliers must plan and operate. Frequent rule changes disrupt VCE's ability to execute long-term planning activities and adopted planning elements while minimizing customer costs. Such regulatory changes can also result in disproportionately high costs and administrative burdens, which would prompt related customer rate increases; certain regulatory changes may necessitate duplicative procurement efforts and/or stranded investments.