Standard LSE Plan

Silicon Valley Clean Energy

2022 INTEGRATED RESOURCE PLAN

November 1, 2022

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I. Executive Summary

Silicon Valley Clean Energy (SVCE) is pleased to present herein its 2022 Integrated Resource Plan (IRP). SVCE is a community choice aggregation program (CCA) operated by the Silicon Valley Clean Energy Authority (SVCEA), a California joint powers authority (JPA) composed of twelve cities plus the unincorporated areas of Santa Clara County. As a JPA, SVCEA is a local government agency that operates on a not-for-profit basis and is controlled by, and accountable to, the communities it serves.

SVCE is focused on helping its member communities advance their greenhouse gas (GHG) reduction goals by providing a clean source of energy and supporting economy-wide decarbonization through electrification while maintaining cost competitive rates and furthering system reliability. SVCE appreciates this opportunity to highlight its progress so far and to contribute to the statewide IRP planning exercise.

SVCE's accomplishments since its launch in 2017 include achieving an annual carbon-free[1] content since inception which includes an aggressive Renewable Portfolio Standard (RPS) of approximately 50%; successfully offering a voluntary 100% RPS product to approximately 4% of its load; demonstrable progress towards meeting Senate Bill (SB) 350 long-term RPS procurement mandates through the successful execution of fourteen long-term power purchase agreements (PPAs); strong performance in meeting California's Resource Adequacy (RA) mandates; and an expansive list of program offerings to promote decarbonization and electrification within SVCE's service territory. All this was achieved while maintaining competitive rates relative to the incumbent investor-owned utility (IOU) and building a financially stable organization. SVCE has been awarded an investment grade credit rating by Moody's of Baa2 and A Stable by S&P. These ratings were awarded because of SVCE's ability to meet all procurement mandates, demonstration of strong leadership, and ability to understand and manage risk and build a financially viable organization.

The 2022 IRP is SVCE's third IRP. In the process of creating it, SVCE engaged its community, stakeholders, and Board of Directors to establish high-level goals, objectives and a vision for where SVCE needs to be in and before 2035. SVCE's planning and electricity procurement efforts will help meet California's aggressive and necessary GHG reduction goals while charting a path towards providing SVCE's customers carbon-free electricity to promote electrification in an affordable and reliable manner. To this end, SVCE has identified three key goals: GHG reductions, affordability and reliability. It is not sustainable or responsible to present a portfolio which merely looks at one of these goals without considering the consequences for the others. This is demonstrated through SVCE's prior and ongoing procurement efforts, which balance aggressive deployment of solar photovoltaics (PV) with paired storage facilities, wind and additional long-term purchases of new and existing geothermal and long-duration storage resources.

In this IRP, SVCE presents three Conforming Portfolios all of which exceed the 25 MMT target. The Preferred Portfolio presents the expected least cost, best fit portfolio which allows SVCE to achieve a 65% RPS target by 2030, while maintaining a 100% carbon-free energy portfolio on an annual basis. SVCE includes in this IRP filing two other Conforming Portfolios. The first achieves a 75% RPS portfolio by 2030 which is maintained thereafter and the second explores the required resources to achieve a 100% RPS portfolio by 2035. These cases are intended to explore the viability and affordability of a

[1] SVCE tracks its emissions in the California Energy Commission (CEC) Power Source Disclosure report. In 2020 and 2021, SVCE reported 7 and 18 lbs of CO_2e/MWh, respectively.

more aggressive RPS target while simultaneously reducing hydro reliance and meeting the organization's annual GHG-free goals.

In addition to the three Conforming Portfolios, SVCE completed analysis of several sensitivities intended to address specific questions posed in this narrative. This includes a high electrification plan and a policy sensitivity to understand the impact of an offshore wind order, should the California Public Utilities Commission (CPUC or the Commission)issue one. SVCE presents the results of these sensitivities within this document for the purpose of addressing these planning questions but does not include them as formal conforming or alternate portfolios.

The modeling and results for this IRP, as described in Sections II and III below, relied heavily on Ascend Analytics, including both the Automated Resource Selection (ARS) capacity expansion tool and the PowerSIMM production cost model. Combined, these tools developed least cost, best fit portfolios for SVCE which achieve the necessary reliability, RPS and GHG metrics for each portfolio. In Section IV, SVCE discusses its procurement activities to date along with potential barriers, risks and other activities which may impact the viability and likelihood of the Preferred Conforming Portfolio presented herein coming to fruition. Finally, in Section V, SVCE considers additional changes to the IRP process which may improve California grid planning.

In the coming years, SVCE's procurement activities will focus on balancing additional new renewable procurement with existing cost-effective contracts, diversifying its renewable portfolio in order to better match its renewable generation profile to its customers demand curve, and planning for potential changes in the large hydro market as environmental conditions evolve and more retail suppliers are interested in carbon-free power. SVCE is also investing heavily in programs to help its communities further decarbonize via electrification of buildings and transportation while advancing energy efficiency and effective integration of new loads onto the grid, as shown in Figure 1.

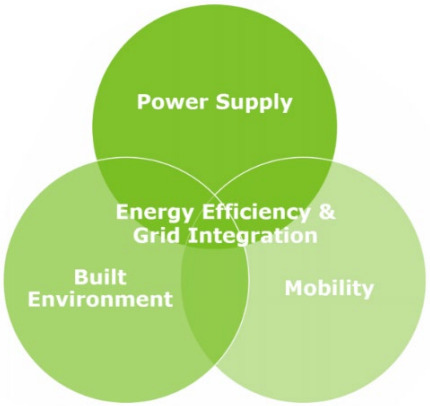

Figure 1. SVCE's approach to deep decarbonization is to impact all four elements

II. Study Design

a. Objectives

SVCE's purpose in undertaking this modeling exercise was twofold. First and foremost, SVCE sought to produce an IRP that would represent SVCE's procurement policies as comprehensively as possible while simultaneously meeting the compliance requirements of this IRP process. Second, SVCE sought to undertake analysis that would be internally useful for planning purposes and instructive on how SVCE might wish to modify its procurement strategy in the future should market conditions make the current approach less feasible or more expensive.

In order to achieve these goals, SVCE took a three-phase approach, beginning in June 2022. The first phase involved conversations with SVCE's Board of Directors about emerging trends in the California grid and how they relate to key procurement decisions and aspects of SVCE's procurement strategy. Key considerations included hydro reliance, reliability, demand side innovation and clean energy goals and metrics. Each of these considerations are discussed in further detail in this document. An important output of the discussions was the decision for SVCE to focus solely on portfolios which exceed its share of the 25 MMT targets.

Based on Board feedback, SVCE ultimately decided to assess the impact of three Conforming Portfolios, each of which exceed the 25 MMT 2035 benchmark provided by the Commission. After modeling and analysis, SVCE has settled on a 65% RPS portfolio in 2030 as its Preferred Conforming Plan. This represents the Board-adopted target of 60% RPS by 2030, with additional RPS to meet the needs of its GreenPrime customers and select large customers. While the organization assessed numerous alternatives in the process of developing this IRP, it provides two other Conforming Portfolios. The first achieves a 75% RPS target by 2030 and the second achieves a 100% RPS target by 2035. These portfolios were assessed to better understand the costs, viability and portfolio risks associated with increasing renewables and reducing reliance on hydro and other GHG-free resources in the future while maintaining a 100% clean energy portfolio on an annual basis.

After portfolio assumptions were developed, SVCE began the modeling process as described below. In developing modeling assumptions SVCE utilized the assigned load forecast and built model constraints into its capacity expansion tool to ensure that each portfolio met or exceeded its share of the 25 MMT targets as well as RA targets.

b. Methodology

i. Modeling Tool(s)

To evaluate the potential future portfolios described in the previous Section II.a SVCE employed the PowerSIMM modeling platform developed by Ascend Analytics. The ARS module of PowerSIMM was used for resource selection, and the dispatch module was used to investigate hourly operations, risk and cost of potential future portfolios. An overview of the modeling framework employed for development of the 2022 IRP portfolios is shown in Figure 2.

ARS is PowerSIMM's capacity expansion module. ARS selects the least-cost resource procurement or retirements which satisfy the model constraints. The models begin with a dispatch of existing and

candidate resources to determine variable costs, energy generation, carbon emissions, and renewable generation over the time horizon of the study. SVCE employed the following model constraints:

1. Reserve Margin – Requires portfolio to meet reserve margin requirements set by the IRP process
2. Energy Generation – Requires portfolio to supply at least 100% of SVCE load with SVCE resources
3. Emissions Target – Requires SVCE procure carbon-free energy to meet or exceed the 25 MMT target given the expected system emissions each hour from the Clean System Power (CSP) tool
4. RPS Constraint – Requires portfolio supply meet RPS targets

Outputs from ARS provide the timing and quantity of resources to procure through the study horizon which satisfy the above constraints at the lowest cost. The model considers full resource costs including fixed costs and variable costs. Market sales revenue is treated as a negative cost in the model. The next stage of the planning process is to evaluate ARS output portfolios in the CSP tool. Due to discrepancies between the Ascend modeling tools and the IRP compliance tools, cases were then post-processed to ensure a least cost fit which achieved the required RPS, RA and GHG metrics[2]. Finally, the portfolios were evaluated in production cost models to calculate total portfolio costs and gauge portfolio risk.

PowerSIMM captures and quantifies elements of risk through the simulation of meaningful uncertainty with weather as a fundamental driver. PowerSIMM is a "hybrid model," meaning it uses both market data and long-term fundamentals to simulate load, renewables, and California Independent System Operator (CAISO) spot market prices against which resources are dispatched and valued. To better capture the uncertainty in future conditions, a stochastic framework enabled simulation over a wide range of different future conditions, where market prices, weather patterns, renewable generation, and load significantly vary. To capture the risk associated with the distribution of portfolio costs (resulting from the stochastic simulation), a "risk premium" metric was used that indicates the cost at risk or the actuarial value of a portfolio's exposure to market price volatility, variation in generation and load, and changes in weather conditions.

[2] SVCE ensured that the RA, RPS and GHG metrics for compliance are achieved in all portfolios. In instances where the annual GHG-free percentage of energy from the CSP tool was less than 100%, SVCE relied on the modeling results of the Ascend tool. Due to the deliverability terms of SVCE's contracts, it expects to achieve 100% GHG-free energy with the portfolios presented, even in instances where the CSP tool does not achieve this target. SVCE monitors its contracted energy against its annual GHG-free target and intends to procure additional short-term GHG-free resources to maintain that target, if needed.

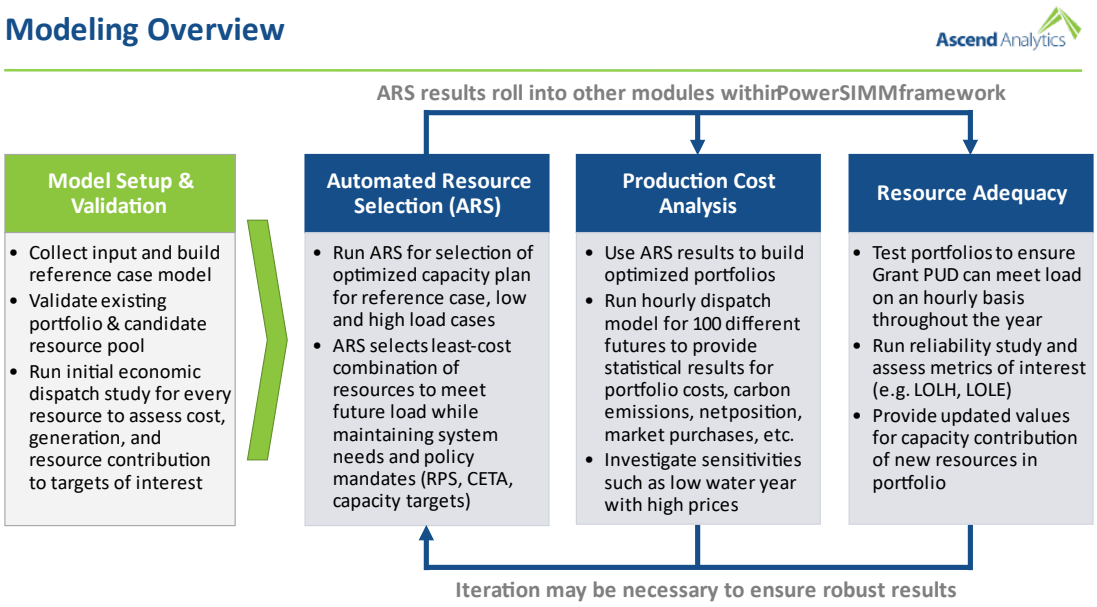

Figure 2. Modeling framework to develop compliant, reliable, and least cost portfolios in PowerSIMM.

Figure 3 shows PowerSIMM's modeling framework. PowerSIMM simulates hourly spot price conditions (i.e., "during delivery simulations") as a function of weather, system load, and renewables. The simulated spot prices are scaled so that the average of all spot prices equals the simulated on-peak/off-peak monthly forward price. Market forward data in the near term (next 5 years) is blended with Ascend's long-term fundamental forecasts of gas and power prices driven by supply fundamentals in the Western Electricity Coordinating Council (WECC).

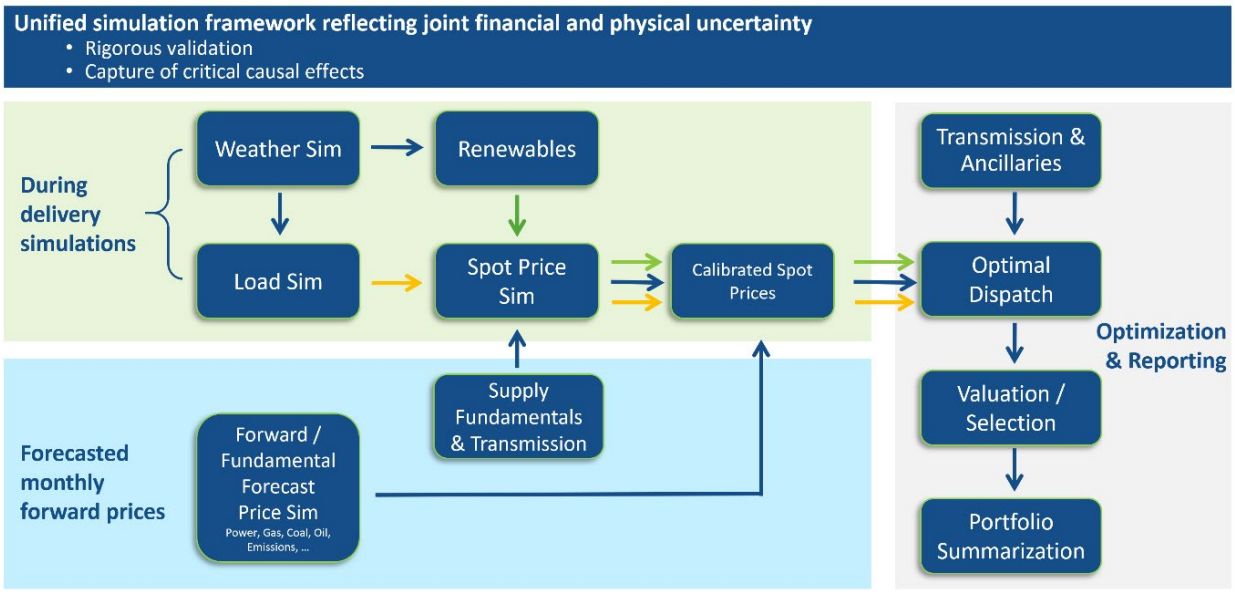

Figure 3. Schematic diagram of PowerSIMM modeling framework.

PowerSIMM captures a meaningful range of uncertainty driven by the factors that create price risk in power markets, including variability in weather, load, renewable output, congestion risk, and forward price volatility. PowerSIMM trains its econometric "sim engine" model with up to 30 years of historical weather to model the relationships between weather, load, and renewables. Ascend parameterizes its weather uncertainty using both time (month, day, hour) and autoregressive terms to create discrete chronological weather simulations. Weather serves as an input to load and renewable simulation for both SVCE load and CAISO system load. For this study, each portfolio was put through 50 "sim-reps," which are simulation processes of 8,760 hours across the planning time horizon. Results were summarized across the sim-reps to capture the full distribution of outcomes, including summarization of mean, median, fifth percentile probability (P5), and ninety-fifth percentile probability (P95) states.

SVCE selected PowerSIMM and the ARS module as the primary capacity expansion, production cost and valuation tool for this IRP because it provides deeper insight and precision in valuation relative to a sector-wide capacity expansion model like RESOLVE[3]. PowerSIMM does not explicitly check for system reliability as the SERVM model does. SVCE instead relied on enforcement of the IRP effective load-carrying capacity (ELCC) values as a PowerSIMM modeling constraint to ensure reliability metrics were accomplished. SVCE believes that while the PowerSIMM tool provides greater insight into portfolio performance than RESOLVE, combined with the ELCC constraint, it does not have any divergences from RESOLVE that would require the CPUC to evaluate the portfolios differently than if SVCE had used RESOLVE for capacity selection.

ii. Modeling Approach

In developing its models, SVCE first input historical generation data, cost projections, and other relevant data into the ARS module. SVCE utilized the CSP generation shapes for new generic resources and included all resource types selected in the RESOLVE LSE Filing Requirements results (RESOLVE Results) as candidate resources. After evaluation of RESOLVE cost assumptions, SVCE staff opted to utilize the cost curves developed by Ascend Analytics which more closely represent prices observed in recent Request for Offers (RFOs). This price forecast has similar cost decrease trajectories to RESOLVE over time. In some instances, such as for offshore wind, where staff did not have internal cost projections, the IRP cost assumptions were used.

To ensure that model results met the RA, RPS and GHG targets for each model run, Ascend Analytics built relevant constraints into the model. Though SVCE decided to exceed the 25 MMT ton target for each Conforming Portfolio, the results of the ELCC studies are not directionally consistent. To ensure that SVCE's Conforming Portfolios are compliant with both the 25 MMT and 30 MMT Resource Data Templates (RDTs) as required, staff used the lower ELCC for each resource in each year to ensure compliance. In initial model runs these were validated to ensure alignment with both the reliability output of the RDT and the CSP tool. In some instances, incremental post-processing was done by scaling resource selection to adjust the ARS portfolio results to the IRP compliance tools.

Once assumptions were input, staff verified that modeled systems behaved as anticipated under alternative weather and pricing conditions. An economic dispatch study for every resource to assess costs, generation, and contribution to targets of interest was then run. These inputs were fed to the ARS module, which selected new resources based on minimizing the cost of procuring and operating

[3] RESOLVE is a high-level capacity expansion optimization model that selects system level (i.e., WECC or California wide) resources to meet a set of load, emissions, and reliability constraints at minimum cost using a 37-day simplification.

new and existing resources while also meeting the constraints built into the model to ensure system requirements for RA, RPS and GHG constraints were met. After portfolios were selected, they were evaluated in PowerSIMM to understand their operational feasibility, cost, portfolio risk and the overall implications of the portfolio.

In addition to the conforming portfolio runs filed as part of this IRP, SVCE also completed several sensitivities intended to help inform this narrative. Namely, SVCE did an ARS run utilizing the Additional Transportation Electrification (ATE) IEPR inputs included in the LSE Filing Requirements RESOLVE package released June 29, 2022 to assess what additional resources may need to be built under the High Electrification scenario. Additionally, though ARS did not select any offshore wind in any conforming study, SVCE completed a model run which forced in SVCE's load share allocation of the RESOLVE model results to assess how a potential procurement order would impact its overall portfolio build. SVCE did not complete a full production cost model for these sensitivity runs but rather presents the results solely for the purpose of discussion in the relevant narrative sections below.

SVCE is actively considering pathways to develop a portfolio which achieves GHG-free energy on an hourly basis each day of the year. While the SVCE Board has not set a specific target to achieve such a "24x7" clean energy portfolio, in which its load is met by clean resources on an hourly basis, it is important to SVCE that procurement decisions made today help enable such a portfolio in the future should the Board provide such direction. Additionally, in 2022, SVCE announced a partnership with Google for a 24x7 Carbon-Free Energy Agreement. Under this agreement, SVCE will serve Google's Mountain View and Sunnyvale offices by matching carbon-free electricity to Google's local demand at least 92% of all hours of the year. This is measured using a Carbon-Free Energy (CFE) score which considers both the portfolio clean energy and emissions from reliance on system power in each hour[4]. To estimate the impact of each portfolio on SVCE's ability to achieve a future 24x7 clean portfolio, staff performed a modified version of the CFE calculation to assess hourly carbon-free energy for each Conforming Portfolio. These results are included in Section III below.

III. Study Results

a. Conforming and Alternative Portfolios

SVCE has chosen to submit three Conforming Portfolios for this IRP:

- **65% RPS Preferred Conforming Portfolio:** based on the 25 MMT target, this portfolio explores required resources to meet SVCE's current Board-adopted target of 60% RPS by 2030, with an additional 5% to meet the needs of its GreenPrime customers and select large customers, while maintaining 100% GHG-free power on an annual basis.
- **75% RPS Conforming Portfolio:** based on the 25 MMT target, this portfolio explores which resources would be required to meet a 75% RPS target starting in 2030 while maintaining 100% carbon free energy on an annual basis.

[4] The CFE calculation Is described In Google's " 24/7 Carbon-Free Energy: Methodologies and Metrics" report, available: https://www.gstatic.com/gumdrop/sustainability/24x7-carbon-free-energy-methodologies-metrics.pdf
For purposes of the IRP, staff utilized the 30 MMT CSP results to calculate the grid CFE score in each hour of the year. Unlike the CSP tool, the CFE calculation does not "credit" a portfolio for having excess clean energy in any one hour.

- **100% RPS Conforming Portfolio:** based on the 25 MMT target, this portfolio explores which resources would be required to meet a 100% RPS target by 2035. In this scenario SVCE removes its Pacific Gas & Electric (PG&E) hydro allocation starting in that year but utilizes it in other years to achieve 100% carbon-free energy on an annual basis.

SVCE's Board of Directors has selected the 65% RPS Conforming Portfolio as its preferred portfolio and the portfolio that most accurately reflects SVCE's intended procurement strategy going forward. This portfolio is fully consistent with SVCE's mandatory Board-adopted procurement requirements and provides a diverse and balanced portfolio that achieves results consistent with SB 350's reliability, GHG-reduction, RPS, disadvantaged communities (DACs), renewables integration, and other requirements. SVCE discusses its rationale for selecting this as its preferred portfolio in more detail in Section III.b below.

i. Contracted Resources Included in All Portfolios

Portfolios developed by SVCE as part of its 2022 IRP modeling exercise included all of the resources SVCE had under contract as of August 1, 2022 as described in the IRP filing requirements document[5]. In addition to the contracted resources, SVCE included its portion of the Cost Allocation Mechanism (CAM) and Central Procurement Entity (CPE) allocations per the filing requirement[6].

The following tables summarize the SVCE resources included in all portfolios:

Table 1: SVCE Contracts (Capacity, MW)

	2024	*2026*	*2030*	*2035*
Hybrid [generator, battery]	*[445.5, 151.125]*	*[445.5, 151.125]*	*[445.5, 151.125]*	*[445.5, 151.125]*
Geothermal	*59*	*59*	*59*	*52*
Wind	*154*	*154*	*154*	*111*
Long-Duration Storage	*0*	*29*	*29*	*29*

Table 2: SVCE Contracts (Energy, GWh)

	2024	*2026*	2030	*2035*
Hybrid	*1162*	*1293*	*1269*	*1237*
Geothermal	*472*	*596*	*476*	*406*
Wind	*492*	*492*	*492*	*324*
Solar	*102*	*106*	*104*	*83*
Other	*22*	*23*	*22*	*18*

[5] Aligned with SVCE's 2022 RPS Procurement Plan, SVCE has not included the Big Beau solar plus storage PPA that was executed following a 2018 RFO. This contract is currently under dispute with the developer, EDF.

[6] CAM and CPE allocations are not shown In Tables 1 and 2 given confidential nature of SVCE's peak share allocation.

ii. Generic Resources Included in All Portfolios

In addition to known contracted resources, SVCE assumed it would continue to receive its hydro allocations from PG&E through the IRP planning horizon. SVCE also included its allocation of the Diablo Canyon Nuclear Power Plant (DCPP) through the originally planned retirement date of each unit in 2024 and 2025[7]. SVCE also included sufficient energy to meet its remaining obligations under the Mid-Term Reliability (MTR) Decision (D.) 21-06-035 procurement order (MTR Order).

Each portfolio also assumed a portion of its procurement needs will continue to be met by short-term contracts from existing resources. SVCE assumed that approximately 10% of SVCE load can be met using short-term Index + RPS contracts over the planning horizon. Given SVCE has historically procured 50% of its loads utilizing such transactions, SVCE believes this represents a conservative view of market potential. SVCE also included a generic hydro contract capable of delivering both energy and capacity over the planning horizon based on its experience acquiring import RA from Washington met through hydro as the specified resource.

Finally, SVCE set an internal planning target for approximately 15% of its annual energy needs to be met with geothermal resources. SVCE's geothermal target is intended to ensure sufficient diversity in its RPS resource pool and to help support system reliability. To help meet this goal, SVCE assumed that 10 megawatts (MWs) of existing geothermal can be contracted by 2030. SVCE has seen such existing geothermal resources offered into previous RFOs and believes the capacity can reasonably be contracted. In all portfolios additional geothermal capacity is selected to help meet this goal.

Table 3: Additional Generic Existing Resources (Energy, MWh)

	2024	***2026***	**2030**	***2035[8]***
PG&E Hydro Allocation	*320*	*320*	*320*	*320*
PG&E Nuclear Allocation	*755*	*0*	*0*	*0*
Index + RPS	*368*	*372*	*383*	*404*
Additional Hydro	*110*	*250*	*110*	*0*
Geothermal	*0*	*0*	*78*	*78*

In addition to the resources above, SVCE allowed up to 500 MW of generic RA resources to be procured on a short-term basis each year to meet its RA needs. As a post-processing step, SVCE "right-sized" the total contract amount of these RA resources for each portfolio to ensure that the portfolio was not over-procuring such resources. This value was deemed reasonable by the SVCE modeling group based on experience in the market. Further, this amount represents less than SVCE's load share of the existing fossil fleet. Across all portfolios, SVCE needed significantly less than this amount of generic RA to fulfill its reliability obligations, averaging approximately 315 MW per year in the Preferred Conforming Plan.

[7] SVCE calculated its DCPP allocation utilizing the 2021 allocation values, assuming each unit had equal and constant production throughout the year. The 2024 allocation was calculated assuming Unit 1 would provide half of the total energy shown by PG&E in 2021 through November and Unit 2 would provide the same energy over the entire year. The 2025 allocation assumed Unit 2 would provide 75% of its assumed 2021 output.

[8] Hydro is not used in 2035 for the 100% RPS case. Values shown are minimum hydro numbers for each case. Both the 65% and 75% RPS cases utilize additional generic hydro, as described.

For the 65% RPS Preferred Conforming Case, SVCE included an additional 590 GWh of imported, energy only hydro, roughly doubling the hydro in the portfolio. The 75% RPS case utilized an additional 100 GWh of energy only hydro in 2035.

iii. Selected Conforming Portfolio Resources

Table 4 below shows the cumulative build for new resources in 2030 and 2035 for each portfolio. Across all scenarios, SVCE models did not select new resources prior to 2028.

Table 4: Cumulative Selected New Resources by Portfolio (Capacity, MW)

	2030			2035		
	65% RPS	75% RPS	100% RPS by 2035	65% RPS	75% RPS	100% RPS by 2035
Solar for Hybrid	0	70	83	70	105	120
Storage for Hybrid	0	35	41	35	53	60
Wind, Northern CA	0	0	150	100	150	305
Wind, Wyoming	0	0	0	30	110	110
Geothermal	7	7	27	7	7	27

Figures 4, 5 and 6 below show the cumulative incremental capacity needs for each Conforming Portfolio by year.

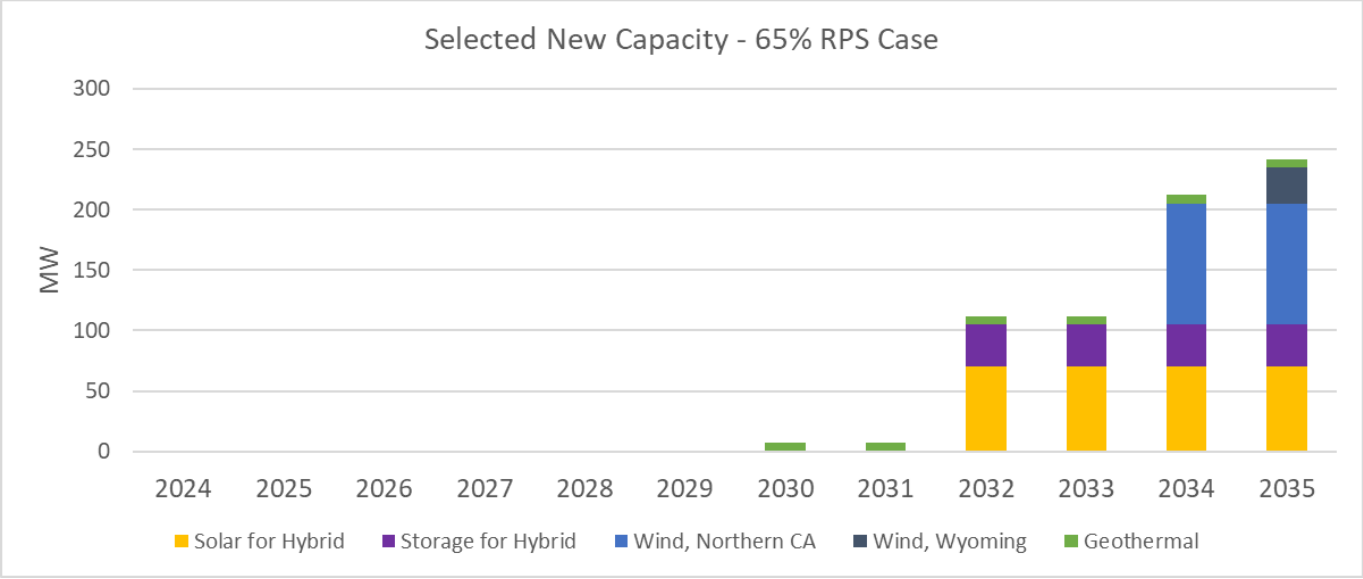

Figure 4. Incremental Capacity for 65% RPS Case.

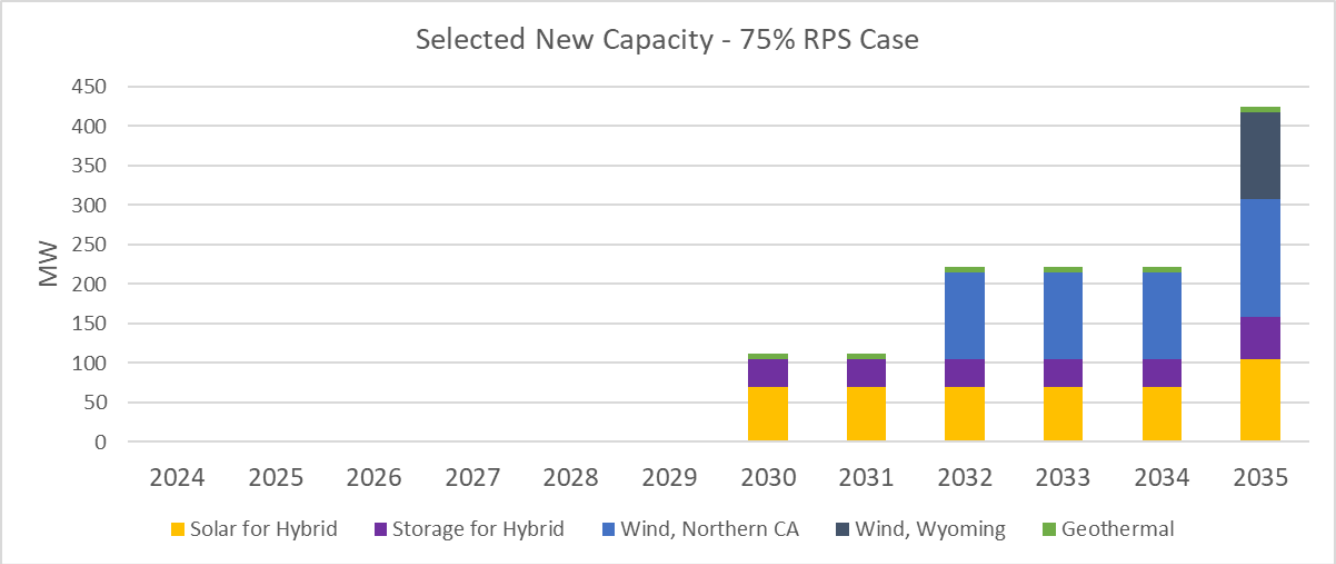

Figure 5. Incremental Capacity for 75% RPS Case.

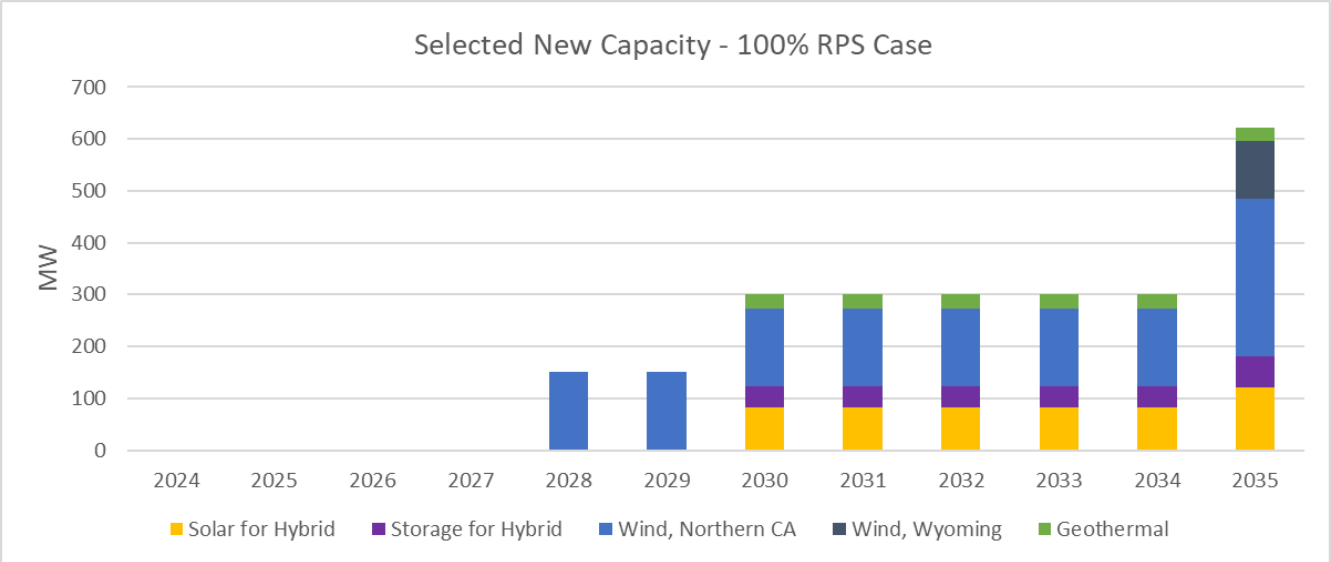

Figure 6. Incremental Capacity for 100% RPS Case.

Across all Portfolios, the model found a mix of wind and hybrid resources to be the most cost-effective way to meet its RPS, GHG emissions, and RA targets. The model did not by default select geothermal, however, to meet its 15% annual energy target from geothermal resources, new geothermal was added in all scenarios. Additional geothermal was added as a post-process step to the 100% RPS by 2035 case to ensure wind build did not exceed reasonable levels.

The primary cause of differences between the Preferred Conforming case and the other two submitted Conforming cases was the differing RPS targets in each scenario. As RPS targets increase, SVCE's reliance on hydro power falls as the energy is replaced by new RPS resources.

iv. Comparison to Preferred System Plan Portfolio

Table 5 below summarizes SVCE's Conforming Portfolio capacity selection results against its load share allocation of the 2021 Preferred System Plan (PSP) Portfolio.

Table 5: SVCE Portfolio Results Compared to Load Share Allocation of 2021 PSP Portfolio

	2030				2035			
	Load Share of PSP	65% RPS	75% RPS	100% RPS by 2035	Load Share of PSP	65% RPS	75% RPS	100% RPS by 2035
Hybrid	479	0	100	123	815	105	158	180
Wind, Northern CA	63	0	0	150	64	100	150	305
Wind, Wyoming	27	0	0	0	27	30	110	110
Geothermal	21	7	7	27	21	7	7	27

In all scenarios, SVCE procures significantly less hybrid resources than its load share allocation of the 2021 PSP. In all but the 100% RPS by 2035 case, it procured less than its load share allocation of geothermal. SVCE's existing portfolio has relatively high levels of each resource type. To ensure portfolio diversity, reduce curtailment risk and ensure SVCE's portfolio is achieving high CFE scores across all hours, wind resources add value to the portfolio while hybrids have increasingly diminishing value. Therefore, disproportionately more wind resources are selected to complement the existing hybrid and geothermal resources.

b. Preferred Conforming Portfolios

SVCE's preferred conforming portfolio is the 65% RPS Conforming Portfolio. This portfolio maintains SVCE's goal of being 100% carbon-free on an annual basis while balancing the costs and risks associated with long-term PPAs and continued hydro reliance. In addition to the rationale described below, SVCE selected this portfolio for the following reasons:

- It is consistent with the SVCE Board-approved RPS target.
- Reliability, RA, and grid integration requirements are still in flux and highly uncertain and may impact the value of additional RPS resources.
- Potential future expansion of Direct Access could result in load loss for SVCE and pose significant risk to SVCE if it procures large amounts of long-term resources beyond those necessary to meet existing mandates.
- Uncertainty around the IRP procurement track and on-going development risk impacts from the COVID-19 pandemic provide reason to be cautious about adoption of a portfolio which may be challenging to implement.

i. RPS and GHG Targets

Each of the portfolios assessed by SVCE met the selected RPS targets, which all meet or exceed the 60% RPS target by 2030, established in the RPS compliance guidelines. SVCE notes that for all cases, the stated RPS target used to identify the case is often exceeded due to the use of RPS resources to achieve

the GHG-targets set. In the Preferred Conforming Scenario, approximately 90% of the delivered RPS energy each year comes from long-term contracted resources, exceeding the 65% requirement.

All cases also exceeded SVCE's 25 MMT GHG target. While the 75% RPS achieves minimally lower GHG-emissions in 2035 than the Preferred Conforming Plan, system emissions are higher in 2030[9]. The 100% RPS plan achieves the lowest GHG-emissions in 2035, far exceeding SVCE's target, but as discussed later in this section raises concerns for viability and diversity. It also had only marginally lower emissions than the Preferred Conforming Plan did in 2030. The earlier reduction in GHG-emissions found in the Preferred Plan is considered a positive attribute of the Preferred Conforming Plan, especially due to the uncertainty of system emissions later in the planning horizon. SVCE provides detailed results of the GHG emissions for all portfolios in Section III.c.

As noted above, SVCE is exploring the viability of achieving a "24x7" clean portfolio, in which its hourly load is met by clean resources. In reviewing the results of each portfolio, SVCE assessed the hourly CFE score of the portfolio. The methodology for this calculation is noted in Section II.b.ii above.

Of the three Portfolios, the Preferred Conforming Plan provided the best hourly distribution of carbon-free energy due to the reliance on hydro power resources while simultaneously achieving the highest CFE score in 2030. Given virtually all of SVCE's emissions come from use of system power, reducing its CFE score is one of the best ways SVCE can limit impact to DACs throughout the state. The Preferred Conforming Plan achieves a 95% CFE score compared to 93% and 94% for the 75% RPS Conforming Case and 100% RPS Conforming Case, respectively. Figure 7 below provides a summary of the CFE results for each case and illustrates the benefit of hydro on reducing reliance on system power in the late evening and early morning hours.

Preferred Conforming Plan

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	91%	92%	91%	88%	87%	90%	92%	96%	98%	97%	98%	98%	98%	98%	97%	97%	94%	89%	88%	88%	88%	89%	90%	91%
2	93%	93%	93%	92%	90%	90%	93%	96%	98%	98%	98%	98%	99%	99%	98%	99%	98%	90%	89%	88%	89%	90%	91%	92%
3	98%	98%	98%	98%	96%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%	94%	94%	96%	98%	99%	99%
4	99%	99%	99%	99%	98%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	96%	97%	99%	99%	99%	99%
5	99%	99%	99%	99%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	98%	99%	99%	99%	99%
6	97%	98%	98%	98%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	99%	99%	99%	98%	98%
7	90%	90%	91%	90%	90%	93%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	95%	96%	96%	93%	91%	91%
8	84%	85%	85%	85%	84%	89%	95%	97%	98%	99%	99%	100%	100%	99%	99%	98%	97%	94%	94%	94%	93%	89%	86%	86%
9	81%	82%	82%	80%	79%	84%	92%	96%	99%	99%	100%	100%	100%	100%	99%	98%	94%	93%	94%	93%	91%	87%	85%	85%
10	94%	94%	94%	94%	91%	92%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%	94%	91%	91%	90%	91%	91%	92%	93%
11	89%	90%	90%	89%	89%	90%	94%	98%	99%	100%	100%	100%	100%	100%	100%	97%	87%	88%	88%	88%	87%	88%	88%	90%
12	84%	84%	84%	83%	84%	85%	88%	93%	92%	95%	96%	97%	97%	97%	96%	92%	86%	85%	85%	84%	84%	84%	84%	85%

75% RPS Conforming Plan

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	88%	88%	87%	84%	82%	85%	89%	94%	97%	97%	98%	98%	98%	98%	97%	97%	92%	86%	85%	85%	85%	86%	87%	88%
2	89%	89%	89%	87%	85%	85%	90%	95%	97%	98%	98%	98%	99%	99%	99%	99%	97%	87%	86%	85%	85%	87%	88%	89%
3	97%	96%	96%	96%	93%	91%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	93%	92%	92%	95%	97%	98%	98%
4	97%	97%	98%	97%	97%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%	94%	96%	98%	98%	98%	98%
5	97%	97%	97%	97%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	96%	97%	98%	99%	98%	98%
6	94%	95%	95%	95%	96%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	96%	98%	99%	98%	96%	96%
7	87%	86%	86%	86%	87%	91%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	96%	94%	95%	95%	92%	88%	88%
8	81%	81%	81%	81%	80%	87%	94%	97%	99%	99%	99%	100%	100%	99%	99%	99%	97%	93%	93%	94%	92%	87%	83%	83%
9	77%	77%	77%	75%	74%	81%	91%	97%	99%	100%	100%	100%	100%	100%	100%	99%	95%	92%	93%	92%	90%	85%	83%	82%
10	91%	91%	91%	90%	88%	90%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	94%	89%	89%	88%	89%	89%	90%	91%
11	86%	86%	86%	84%	84%	86%	92%	98%	99%	100%	100%	100%	100%	100%	100%	98%	86%	86%	85%	85%	85%	85%	85%	88%
12	80%	80%	79%	77%	78%	80%	84%	91%	93%	96%	97%	97%	97%	97%	97%	93%	83%	82%	82%	81%	81%	81%	81%	82%

100% RPS by 2035 Conforming Plan

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	89%	89%	88%	85%	83%	86%	90%	95%	98%	98%	98%	98%	99%	99%	98%	97%	92%	87%	86%	86%	86%	87%	88%	88%
2	91%	91%	90%	89%	86%	86%	91%	96%	97%	99%	99%	99%	100%	99%	99%	99%	97%	88%	88%	86%	87%	88%	89%	90%
3	97%	97%	97%	96%	94%	92%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	94%	93%	93%	96%	97%	98%	98%
4	98%	98%	98%	98%	97%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	95%	97%	98%	98%	98%	99%
5	98%	98%	98%	98%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	97%	99%	99%	99%	99%
6	95%	95%	96%	95%	96%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	98%	99%	98%	97%	97%
7	88%	87%	87%	86%	87%	91%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%	95%	96%	96%	93%	89%	89%
8	82%	82%	82%	82%	81%	88%	95%	98%	99%	99%	100%	100%	100%	100%	100%	99%	98%	95%	95%	95%	94%	88%	85%	85%
9	79%	79%	79%	76%	75%	82%	92%	98%	100%	100%	100%	100%	100%	100%	100%	100%	97%	94%	95%	94%	91%	86%	84%	84%
10	92%	92%	92%	91%	89%	91%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%	91%	90%	90%	91%	91%	91%	92%
11	87%	88%	87%	86%	87%	88%	94%	99%	100%	100%	100%	100%	100%	100%	100%	99%	87%	87%	86%	86%	85%	86%	86%	89%
12	81%	80%	79%	78%	78%	81%	85%	92%	94%	97%	97%	98%	98%	98%	98%	94%	84%	83%	82%	82%	81%	82%	81%	82%

Figure 7. Heat Map of SVCE Preferred and Conforming Portfolios CFE Scores

[9] In 2030, the 65% case emissions are approximately 40% lower due to assumed hydro power usage to achieve 100% carbon-free energy on an annual basis. In 2035, the Preferred Conforming Scenario's emissions are less than 2.5% higher than in the 75% Conforming Scenario.

ii. Ratepayer Impact

As an LSE operating in an environment where customers have choice, SVCE is focused on ensuring affordability for its customers. Each conforming plan was evaluated using the PowerSIMM dispatch module, as described in Section II.b.i above, to evaluate both portfolio cost and risk metrics. As described in Section III.e below, SVCE found relatively similar cost trajectories for all three Conforming Portfolios. While the Preferred Conforming Portfolio was not the least cost portfolio, the relative regulatory and development risk, which can have significant ratepayer impact, are expected to be the lowest in this portfolio.

A key metric in evaluation of the portfolios is the assumed "cost at risk": a measurement of the probabilistic deviation from the mean which represents a tail probability. SVCE found the expected cost at risk to be acceptable for all portfolios with the cost differential between the expected value and P95 cost to be between 10-12% for all portfolios. SVCE maintains significant reserves to help cover unexpected cost fluctuations to minimize the impact of such events on ratepayer bills.

Additionally, SVCE believes that diversifying procurement with short- and long-term contracts allows the LSE to "right-size" the portfolio and better manage risks, whether from the market, load departure or regulatory uncertainty. The higher volume of short-term energy contracts in the Preferred Conforming portfolio will help manage price and load forecast risks. SVCE expects the Preferred Conforming Portfolio will help ensure the organization can dynamically adjust to changing conditions and minimize impact to ratepayer bills over time.

iii. Reliability, Diversity and Grid Management

In considering the Conforming Portfolios evaluated, SVCE examined the potential risks each portfolio poses to both SVCE and the grid at large, including reliability, development, and supply risks. In all Conforming Portfolios, SVCE meets its reliability obligations through the use of both long-term and short-term contracts. As described in Section III.f below, SVCE relies on less than its load share allocation of the existing fossil fleet to meet its RA requirements in any year. Additionally, the reliance on existing resources to meet RA needs is relatively consistent across Conforming Portfolios. SVCE analyzed the Preferred Conforming Portfolio using both the 30 MMT and 25 MMT ELCC assumptions and found that the 25 MMT ELCC assumptions required slightly less system capacity to meet its reliability needs. The average difference in effective MW capacity of the two scenarios was 10 MW per year. SVCE therefore does not expect this portfolio to have meaningfully different reliability regardless of if other LSEs procure in a manner consistent with the 25 or 30 MMT scenarios. Though SVCE uses short-term existing fossil resources as a proxy for meeting its RA requirements for simplicity, in practice, these RA only contracts will likely come from a variety of resources.

A key component of the evaluation of the Conforming Portfolios was ensuring a reasonable balance of development risk for new resources and supply risk for existing resources such as hydro power. Relative to its prior IRP, SVCE's Preferred Conforming Portfolio relies on less existing resources to meet its energy needs and as described in Section II of this narrative worked to ensure that all reliance on existing resources was reasonable given both what SVCE has historically contracted and expected future market conditions. The COVID-19 pandemic and resulting supply chain issues has highlighted that over-reliance on new resources brings its own set of risks, including delays. In addition to balancing short- and long-term contracts, over-reliance on specific resource types can also provide challenges. As an example, recent increases in lithium-ion prices have triggered requests for repricing of contracts. SVCE chose its

Preferred Conforming Plan in large part because it appears to most reasonably balance the portfolio's reliance on new resources while providing energy from a diverse mix of resource types.

As a CCA, SVCE has limited ability to support the resiliency of the bulk transmission system, but through the efforts of its programs has and will continue to work to enhance both grid resiliency and demand-side energy management. SVCE used the same demand-side modifiers in all scenarios and while demand response was a candidate resource it was not selected in any portfolio. Therefore, these resources did not factor into selection of SVCE's preferred portfolio selection. SVCE is actively developing internal load forecasts for load modifiers specific to its service territory which it hopes to utilize in the next IRP cycle and may include sensitivities to assess the impact of various load modifier penetrations on the supply side portfolio and distribution grid. Regardless of what resources the supply-side portfolio ultimately adopts, SVCE will remain committed to supporting the resiliency and affordability of the electricity grid as it advocates for electrification. SVCE describes these efforts in more detail in Section IV.a below.

c. GHG Emissions Results

All of SVCE's conforming portfolios exceed its assigned GHG-benchmarks under the 25 MMT version of the CSP. SVCE did not use a custom hourly load shape or user-specified production profiles in the CSP calculator but did adjust the portion of Commercial & Industrial (C&I) load to reflect its actual customer class shares. Below, SVCE provides the GHG emissions results for its portfolios using both the 25 MMT and 30 MMT versions of the CSP tool.

Table 6: Preferred Conforming Portfolio GHG Emissions, 25 MMT Scenario

	Unit	**2024**	**2026**	**2030**	**2035**
SVCE Target	***MMt/yr***			**0.412**	**0.334**
CO_2	*MMt/yr*	0.10	0.22	0.285	0.315
PM2.5	*tonnes/yr*	3	7	11	12
SO_2	*tonnes/yr*	1	2	2	2
NOx	*tonnes/yr*	27	31	34	25

Table 7: 75% RPS Conforming Portfolio GHG Emissions, 25 MMT Scenario

	Unit	**2024**	**2026**	**2030**	**2035**
SVCE Target	***MMt/yr***			**0.412**	**0.334**
CO_2	*MMt/yr*	0.10	0.22	0.364	0.316
PM2.5	*tonnes/yr*	3	7	13	11
SO_2	*tonnes/yr*	1	2	2	2
NOx	*tonnes/yr*	27	31	37	25

Table 8: 100% RPS by 2035 Conforming Portfolio GHG Emissions, 25 MMT Scenario

	Unit	2024	2026	2030	2035
SVCE Target	***MMt/yr***			**0.412**	**0.334**
CO_2	*MMt/yr*	0.10	0.22	0.269	0.281
PM2.5	*tonnes/yr*	3	7	9	9
SO_2	*tonnes/yr*	1	2	2	1
NOx	*tonnes/yr*	27	31	32	22

Table 9: Preferred Conforming Portfolio GHG Emissions, 30 MMT Scenario

	Unit	2024	2026	2030	2035
SVCE Target	***MMt/yr***			**0.546**	**0.418**
CO_2	*MMt/yr*	0.11	0.21	0.250	0.287
PM2.5	*tonnes/yr*	4	8	11	13
SO_2	*tonnes/yr*	1	2	2	2
NOx	*tonnes/yr*	28	32	34	28

Table 10: 75% RPS Conforming Portfolio GHG Emissions, 30 MMT Scenario

	Unit	2024	2026	2030	2035
SVCE Target	***MMt/yr***			**0.546**	**0.418**
CO_2	*MMt/yr*	0.11	0.21	0.319	0.285
PM2.5	*tonnes/yr*	4	8	13	13
SO_2	*tonnes/yr*	1	2	2	2
NOx	*tonnes/yr*	28	32	37	27

Table 11: 100% RPS by 2035 Conforming Portfolio GHG Emissions, 30 MMT Scenario

	Unit	2024	2026	2030	2035
SVCE Target	***MMt/yr***			**0.546**	**0.418**
CO_2	*MMt/yr*	0.11	0.21	0.218	0.242
PM2.5	*tonnes/yr*	4	8	9	11
SO_2	*tonnes/yr*	1	2	2	2
NOx	*tonnes/yr*	28	32	32	25

d. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

SVCE provides the results of the air pollutants for each of its Conforming Portfolios as calculated in both the 25 MMT and 30 MMT versions of the CSP in Tables 12 and 13 below. The majority of SVCE pollutants come from system power, including the CHP attributable emissions from the LSE share of

CAISO-wide system emissions in the calculator. SVCE's portfolio also includes small shares of biogas and biomass emissions which come solely from SVCE's Voluntary Allocation, which the organization is using to help meet its RPS goals in a cost-effective manner. As noted in Section III.b above, SVCE selected its Preferred Conforming Portfolio in part because it best fits SVCE's load to its clean energy supply, thereby reducing reliance on system power.

Table 12: Local Air Pollutant Results, 25 MMT Scenario

		Preferred Conforming Case 65% RPS by 2030				Conforming Case 75% RPS by 2030				Conforming Case 100% RPS by 2035			
Pollutant	**Unit**	**2024**	**2026**	**2030**	**2035**	**2024**	**2026**	**2030**	**2035**	**2024**	**2026**	**2030**	**2035**
PM 2.5	**Tonnes/yr**	3	7	11	12	3	7	13	11	3	7	9	9
SO2	**Tonnes/yr**	1	2	2	2	1	2	2	2	1	2	2	1
NOx	**Tonnes/yr**	27	31	34	25	27	31	37	25	27	31	32	22

Table 13: Local Air Pollutant Results, 30 MMT Scenario

		Preferred Conforming Case 65% RPS by 2030				Conforming Case 75% RPS by 2030				Conforming Case 100% RPS by 2035			
Pollutant	**Unit**	**2024**	**2026**	**2030**	**2035**	**2024**	**2026**	**2030**	**2035**	**2024**	**2026**	**2030**	**2035**
PM 2.5	**Tonnes/yr**	4	8	11	13	4	8	13	13	4	8	9	11
SO2	**Tonnes/yr**	1	2	2	2	1	2	2	2	1	2	2	2
NOx	**Tonnes/yr**	28	32	34	28	28	32	37	27	28	32	32	25

ii. Focus on Disadvantaged Communities

In order to identify state-defined DACs that are located within its service territory, SVCE used CalEnviroScreen 4.0 to identify the top 25% of impacted census tracts on a statewide basis. This analysis indicates that SVCE serves 4,260 customers residing in 3 census tracts identified as DACs: 6085512604, 6085512603, and 6085512602. The map below shows each of these census tracts in red. The population of these DAC areas is listed as 11,924 per 2019 American Community Survey (ACS) population estimates, which is estimated to comprise approximately 2% of the population of SVCE service territory.

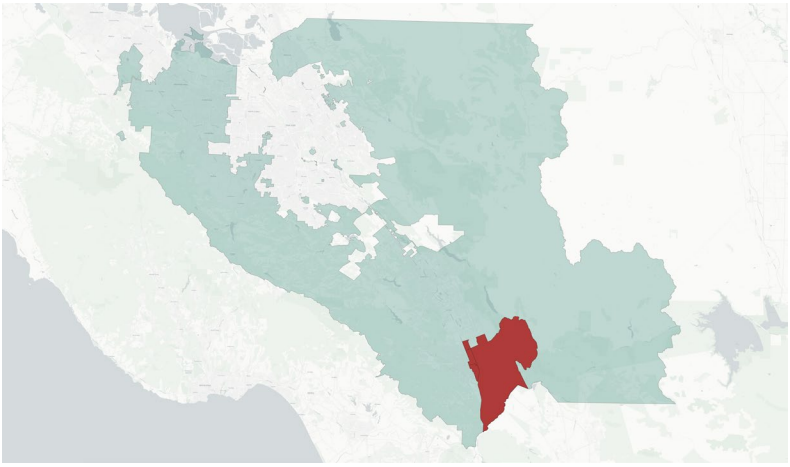

Figure 8. Map of SVCE DAC Census Tracts[10]

[10] CalEnviroScreen 4.0 Mapping Tool, https://oehha.ca.gov/calenviroscreen/maps-data.

SVCE's primary strategy for reducing emissions and contributing to the economic development of DACs in its procurement practices is the aggressive procurement of zero-emissions renewable resources. When selecting green power projects, SVCE considers whether proposed facilities are located within DACs or otherwise contribute to DAC economic development (for instance, by increasing employment opportunities for DAC residents). Currently, SVCE has signed one PPA for a solar plus storage facility within a DAC census tract: RE Slate in Kings County.

SVCE does not have any energy contracts with gas generators located in or next to DACs. SVCE does not have any energy contracts with renewable generation that may have local emissions impacts (such as biogas or biomass) located within or next to DACs[11]. Portfolios submitted as part of this 2022 IRP filing all ensure that SVCE meets 100% of its annual energy obligation on an annual basis. As discussed in Section II.b.ii above, SVCE has also calculated its CFE score which shows SVCE will rely less on system power over time. SVCE adopted the PSP in part due to its favorable CFE scores relative to other Conforming Portfolios, which it believes will help minimize local air pollutants in DACs state-wide.

SVCE's existing RA contracts are primarily from natural gas units which may be located in or near a DAC area. To the extent compatible with RA program requirements and cost-effectiveness, SVCE prefers capacity contracts from generators that do not have emissions impacts on DACs such as those from Distributed Energy Resources (DERs), renewable and carbon-free resources. To this end, SVCE has been aggressively signing new PPAs which provide both energy and capacity to SVCE to help meet its RA requirements.

As discussed more fully in Section IV.b below, SVCE's Board of Directors is made up of elected officials representing each of the thirteen member agencies in the SVCE service area. Decisions related to SVCE's procurement and strategic planning are made by these elected officials in the interest of their constituents, including those in DACs. Throughout the development of this IRP, SVCE staff met with the Board to discuss matters related to long-term planning for both SVCE and the system at large. SVCE staff utilized feedback from the Board in development of this IRP, which was ultimately reviewed and approved by the Board of Directors on October 12, 2022.

e. Cost and Rate Analysis

As a California CCA operating in an environment where customers have choice, whether itis returning to the incumbent utility, participating in Direct Access or bypassing SVCE with behind-the-meter solar, SVCE is acutely aware of the need to manage cost and maintain competitive rates. SVCE's rates are currently indexed to PG&E's rates for each respective rate offering approved by the CPUC. SVCE's governing board establishes a discount and/or premium to PG&E's rate based on the adopted fiscal year operating budget, assumed commodity cost uncertainty and financial reserve targets. Operating budget and rates may be adjusted at mid-year. Reserves are used to cover costs above budget to maintain rate stability.

SVCE's value proposition since its inception has been to provide affordable and annually carbon-free product offerings to its customers. GreenStart is SVCE's default product offering, comprised of a mix of RPS and other carbon-free resources, which since inception has been offered at a discount to PG&E's

[11] In 2022, SVCE opted to take a portion of its Voluntary Allocation per the rules in Rulemaking (R.) 18-07-003. SVCE is not aware of the location of all biofueled resources in that portfolio.

bundled generation rates of three percent on average. GreenPrime is SVCE's opt-up product which is made up of 100% RPS eligible resources and is offered at a small premium to GreenStart.

Starting in 2020 and again in 2022, SVCE has offered bill credits to California Alternate Rates for Energy Program/Family Electric Rate Assistance Program (CARE/FERA) (income qualified) customers. Ten percent of SVCE's residential customers are CARE/FERA, and these bill credit amounts from SVCE represent an additional generation rate discount of approximately 10%. SVCE describes its CARE/FERA program in more detail in Section IV.b below. SVCE will continue to pursue affordability to end users along with building a robust green portfolio aligned with SVCE's mission.

Fundamental to achieving SVCE's product and rate objectives is SVCE's ability to procure cost-effective electric supply resources and manage the cost and risk associated with its load and supply portfolio. This starts with the proper evaluation and selection of resources acquired to meet SVCE's long-term renewable needs, which make up a large portion of the supply portfolio. In evaluating the addition of new or existing resources to the SVCE generation portfolio, SVCE utilizes both quantitative and qualitative metrics. SVCE evaluates the resource value as determined by its net energy (including congestion), ancillary service (A/S), RA and RPS/REC value and compares it to the contract cost. In addition, SVCE assigns qualitative metrics including a resource's generation profile, location, workforce development and technology type. SVCE then measures the resource's benefits against its costs to determine whether it is cost-effective and to assess an implied REC cost.

After a resource has been analyzed to be cost-effective, it is then incorporated and modeled with SVCE's existing portfolio to determine the overall portfolio's return/risk ratio. The return/risk ratio analysis will account for portfolio dynamics including:

- Resource performance against SVCE's hourly load obligation;
- Basis locational price differential between the resource and SVCE Default Load Aggregation Point (DLAP); and
- Variability in production from resources and forward and spot price uncertainty.

Resources that increase the portfolio's gross margin net present value (NPV) while decreasing the gross margin at risk (as measured by the mean gross margin NPV minus the P5 gross margin NPV) are considered resources for further consideration.

In addition to the process described above, SVCE also assesses the compliance and strategic value a resource may provide. Resources are evaluated on their ability to:

- Meet California mandated procurement requirements;
- Meet SVCE's vision of a true carbon-free portfolio where the resource can provide clean energy on a 24x7 basis or in the hours where carbon emissions are the highest;
- Provide local benefits to its member communities;
- Mitigate portfolio concentration risk (price, technology, counterparty and/or location); and
- Provide for overall grid reliability.

SVCE is subject to significant cost volatility and uncertainty in meeting its energy load obligations within the CAISO. To manage this cost, SVCE's governing board has adopted an Energy Risk Management Policy. Included in the Policy are tolerance bands for minimum and maximum amount of load to be met through forward purchases of fixed-price energy. These transactions are carried out with Board-

approved counterparties and for the most part, are sourced through generic resources priced at the PG&E EZ-Gen Hub or NP15 delivery point.

Table 14. SVCE Board Approved Energy Risk Management Tolerance Bands (Fixed Price Supply as a % of Load)

Period	Minimum	Maximum
Current Balance of Year	80%	110%
Year 2	70%	90%
Year 3	55%	80%
Year 4	50%	80%
Year 5	50%	80%

Taking a portfolio approach of varying new and existing projects, technology, location, contract tenor, counterparties and contract pricing structures in its pursuit of long-term RPS resources along with having a rigorous energy risk management program to manage load obligations and supply portfolio cost and risk ensures that SVCE can meet its near- and long-term cost, rate, and financial objectives.

In development of this 2022 IRP, the SVCE team, in collaboration with Ascend Analytics, completed cost analysis for all three Conforming Portfolios. The results of this evaluation are included in Figure 9 below. The Preferred Conforming Portfolio is expected to result in marginally more expensive power supply costs than the other two conforming portfolios. This is largely driven by additional spot market purchases and short-term RA. Cost assumptions for each of these categories are subject to uncertainty. However, the costs are broadly the same across portfolios and subject to variance dependent on actual market prices. SVCE finds the 65% RPS preferrable regardless due to its relatively lower exposure to regulatory and development risk, both of which can ultimately have large impacts on affordability.

Given the potential differential between model assumptions and actual market conditions, SVCE will continue to evaluate offers as solicitations occur in the future. In signing actual contracts, SVCE will balance both clean energy attributes with affordability measures to ensure cost effectiveness for the portfolio in order to maintain affordability for its customer base.

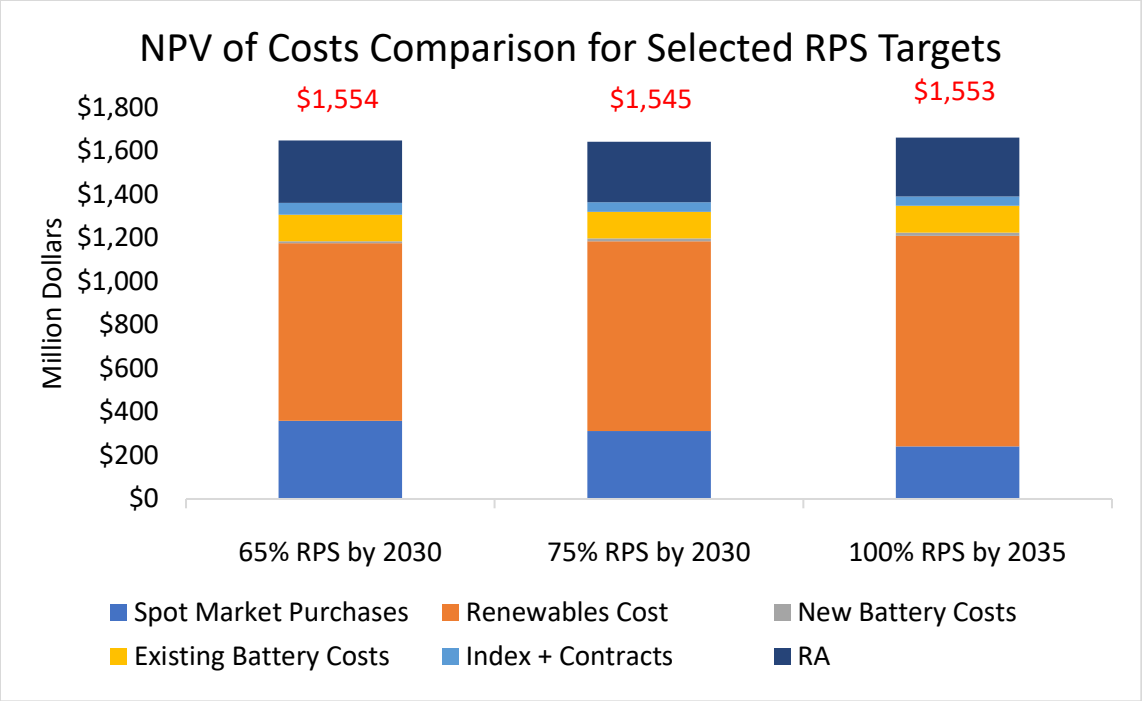

Figure 9. SVCE Expected NPV Cost for Conforming Portfolios

f. System Reliability Analysis

As part of its capacity expansion and modeling exercise, SVCE enforced a RA constraint aligned with the IRP ELCC assumptions in the RDT to ensure that all portfolios contribute fairly to total system reliability. As noted in Section III.a.ii above, SVCE "right sized" short-term RA contracts to meet the RA needs of the portfolio each year. For this reason, SVCE achieves a net zero position in all Conforming Plans. The results of each Conforming Portfolio's Load and Resource Table by Contract Status are below[12].

Table 15: 65% RPS RA Results

	2024	2026	2030	2035
SVCE Marginal Reliability Need (MW)				
Online				
Development				
Under Review				
Planned, Existing				
Planned, New				
BTM PV				
Total RA Supply				
Net Position				

[12] Results for Tables 15, 16 and 17 are reflective of the 30 MMT ELCCs which are the more conservative estimate of ELCCs. SVCE shows a small net positive position for RA supply under the 25 MMT ELCC scenario.

Table 16: 75% RPS RA results

	2024	2026	2030	2035
SVCE Marginal Reliability Need (MW)				
Online				
Development				
Under Review				
Planned, Existing				
Planned, New				
BTM PV				
Total RA Supply				
Net Position				

Table 17: 100% RPS by 2035 Case

	2024	2026	2030	2035
SVCE Marginal Reliability Need (MW)				
Online				
In Development				
Under Review				
Planned, Existing				
Planned, New				
BTM PV				
Total RA Supply				
Net Position				

Figure 10 below compares what share of SVCE's total RA needs are met by each contract category. Due to the timing of the build, there are no differences between the Portfolios for years 2024 and 2026. While SVCE's RA requirements are met by proportionally more existing resources in later years, SVCE never relies on more than its load share allocation of the existing fossil fleet to meet its RA requirements. Given the recent procurement orders and heightened attention on reliability from both regulators and the legislature, SVCE expects the RA market to have sufficient excess capacity to allow for this level of short-term market purchases.

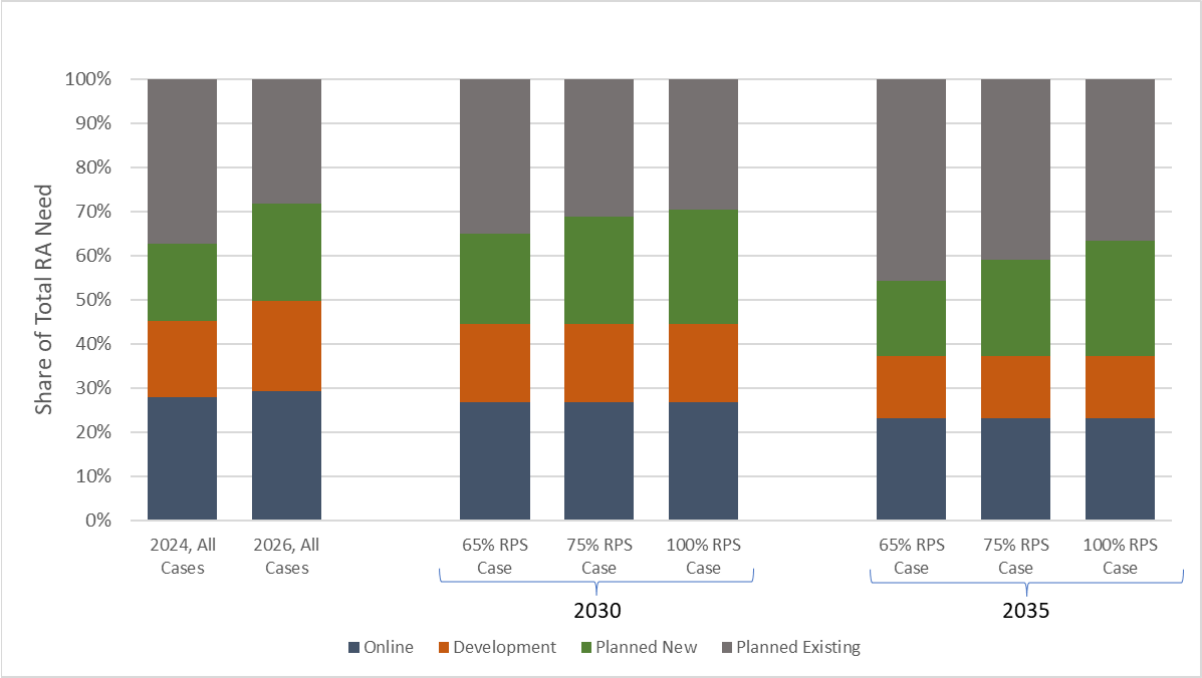

Figure 10: Comparison of RA Portfolios by Contract Category

g. High Electrification Planning

To assess the impact of a higher electrification load, SVCE re-ran its preferred portfolio assumptions utilizing its load share allocation of the 2021 CEC Additional Transportation Electrification forecast as provided in the LSE Filing Requirements RESOLVE package posted on the CPUC's 2022 IRP Events and Materials page on June 29, 2022. As a proxy to determine SVCE's share of the higher load, staff first determined its load share of the baseline assumptions by calculating the share of its assigned retail sales as part of the RESOLVE total retail sales. This value was then multiplied by the high electrification retail sales to find SVCE's share for this sensitivity. SVCE then calculated its peak obligation by multiplying its assigned peak load share by the CAISO peak in the RESOLVE Inputs. Effectively, SVCE found that to meet the GHG-target of the high electrification scenario for its Preferred Conforming Plan, it would need the 2035 resource mix utilized in the 75% RPS Conforming plan plus an additional 10 MW of geothermal to hit the 15% annual energy target. The results of the below scenario exceed the 25 MMT target and provide a 2035 RPS portfolio of 76%.

Table 18: SVCE High Electrification Results Build

Resource Type	MWs	Annual GWh	2035 GHG target	Transmission Zone[13]	Substation/Bus	Alternative location	Note
Hybrid [solar, battery]	[105, 53]	302	Both	N/A	N/A	N/A	N/A
Wind, N. CA	150	219	Both	N/A	N/A	N/A	N/A
Wind, Wyoming	110	491	Both	N/A	N/A	N/A	N/A
Geothermal	17	133	Both	N/A	N/A	N/A	N/A

In this scenario, SVCE may rely more heavily on existing system resources to meet RA. However, as described in Section IV of this document, SVCE's Programs team actively pursues electrification as a means to achieve economy-wide emissions reductions in its service area. Many of SVCE's programs aim to ensure that the timing of this demand will minimize the impact of infrastructure needs and peak demand increases. While SVCE sees the value in engaging LSEs in development of a high electrification portfolio for TPP needs, it does not necessarily believe this load and peak demand scenario will come to fruition by 2035.

h. Existing Resource Planning

In developing its inputs and assumptions, SVCE worked to create a defendable balance of resources utilizing existing and new resources based on its experience transacting in the market and in procuring new resources. In all portfolios, the majority of SVCE's energy and capacity needs were met by resources already under contract or added into the portfolio as planned new resources. However, it is an important part of SVCE's risk management strategy to balance its portfolio with a mix of new and existing resources as well as short- and long-term contracts.

While the majority of each portfolio was comprised of either new planned resources or those already under contract by SVCE, several existing resources were included either as candidate resources or forced into the portfolio as an input assumption. Specifically, SVCE included generic existing RA contracts, Index + contracts assumed to rely on existing RPS and GHG-free resources, and allocations for hydro, nuclear and CAM/CPE resources from its incumbent IOU, PG&E.

Relative to its 2020 IRP, SVCE assumes lower reliance on existing thermal and hydro for RA purposes. In both its 2020 and 2022 IRP plans, SVCE assumes a portion of its energy and capacity needs will be met with hydro imports from the Pacific Northwest (PNW) meeting the CPUC's contracting and scheduling requirements for import RA in addition to seeking in-state existing hydro resources with energy and RA qualifying capacity. In 2022, SVCE decreased the size of this type of resource by 40% relative to its 2020 IRP assumptions. As noted in Section III.a.i above, SVCE does assume short-term RA can be purchased to fill RA needs. In its 2020 IRP, SVCE expected to need up to 565 MW of generic RA capacity to meet its RA obligations. In this IRP, SVCE never relies on more than 360 MW of generic RA capacity in a given

[13] SVCE did not model resources to explicit transmission zones. See transmission planning Section III.n, for further discussion.

year, which is more than 100 MW less than SVCE's load share of the existing fossil fleet. The Preferred Conforming Plan averages a need of approximately 315 MW across the planning horizon.

In this IRP, SVCE meets approximately 10% of its load each year with index + RPS short-term contracts across all portfolios. This strategy of procuring short-term resources is consistent with SVCE's Board directive to diversify procurement tenor to manage the risk of losing load to Direct Access and/or bypass. SVCE believes the resources to meet this procurement objective may be sourced from other LSEs portfolios and/or merchant renewable resources. In the 65% RPS case, SVCE meets an additional 15% of its needs with index + GHG-free hydro resources after 2030. This is consistent with existing contracts SVCE has secured since its inception and will likely be sourced from in-state resources either as firm or non-firm resources. Relative to its 2020 IRP, SVCE's 2022 Preferred Plan relies on roughly 50% lower index + transaction volumes to meet its energy and GHG-free targets in 2030.

To estimate hydro and nuclear allocations, SVCE relied heavily on historic allocation data. The nuclear allocation from the Diablo Canyon Power Plant took recent historical allocations and scaled them down based on the originally expected retirement dates for each unit, assuming consistent output over the year.

As described in the RDTv3 User Guide, SVCE determined its CAM allocations using the CAM year-ahead list for both DR and non-DR resources. Per guidance, SVCE assumed this volume would stay static over the entire planning horizon.

i. Hydro Generation Risk Management

SVCE currently relies on a significant amount of purchases of GHG-free energy from hydro generators to maintain its Board-approved goal of being carbon-free on an annual basis. SVCE manages its hydrological risk by contracting with both PNW and California suppliers. In addition, SVCE attempts to execute firm contracts to provide certainty on hydro deliveries from suppliers who will only sell excess resources versus a unit contingent contract that is subject to the vagaries of hydrological conditions. SVCE is able to mitigate its hydrological delivery risk by diversifying the regions from which it procures large hydro. In addition, SVCE is inserting language in contracts that specify that the supplier provide hydrological statistics (storage levels and acre/ft conversions) at certain times of the year in order for SVCE to better forecast future deliveries. For the portion of hydro supply provided from non-firm resources, SVCE will assess the variability of the resources under various precipitation and hydrological conditions and will rebalance its portfolio with firm carbon-free and/or RPS resources to meet its 100% carbon-free annual goal.

SVCE contracts for hydro resources through a mix of counterparties and for varying terms to manage risk associated with counterparty default on hydro resources. SVCE's goal is to secure a large portion of its large hydro needs under contract of three- to five-year tenures; however, it continues to explore longer-term contracting for small hydro facilities.

Since its 2020 IRP, SVCE has actively worked to reduce its reliance on short-term purchases of GHG-free energy through its growing portfolio of long-term contracts for renewable resources. This portfolio includes both geothermal resources that can deliver baseload generation and long-duration storage which can effectively utilize renewable energy during peak hours. Further, SVCE is exploring long-term contracts for hydro resources. In 2018, SVCE was awarded a small allocation of large hydro from the Central Valley Project (CVP) as provided for under Western Area Power Administration's (WAPA's) 2025

Power Marketing Plan. The SVCE Board approved participation in the Western Base Resource (WBR) contract in late 2020. The contract is 30 years in term with deliveries starting in 2025, structured as a run-of-river for which SVCE will be responsible for its share of project cost and receive its share of all energy and capacity benefits. As a WBR contract customer, SVCE will have the ability to increase its participation share through long and short-term lay-offs from other WBR participants. The WBR contract has an option to terminate in July 2024 before taking delivery.

Figure 11 below compares the amount of hydro generation in each Conforming Portfolio against SVCE's load share allocation of the 2021 PSP.

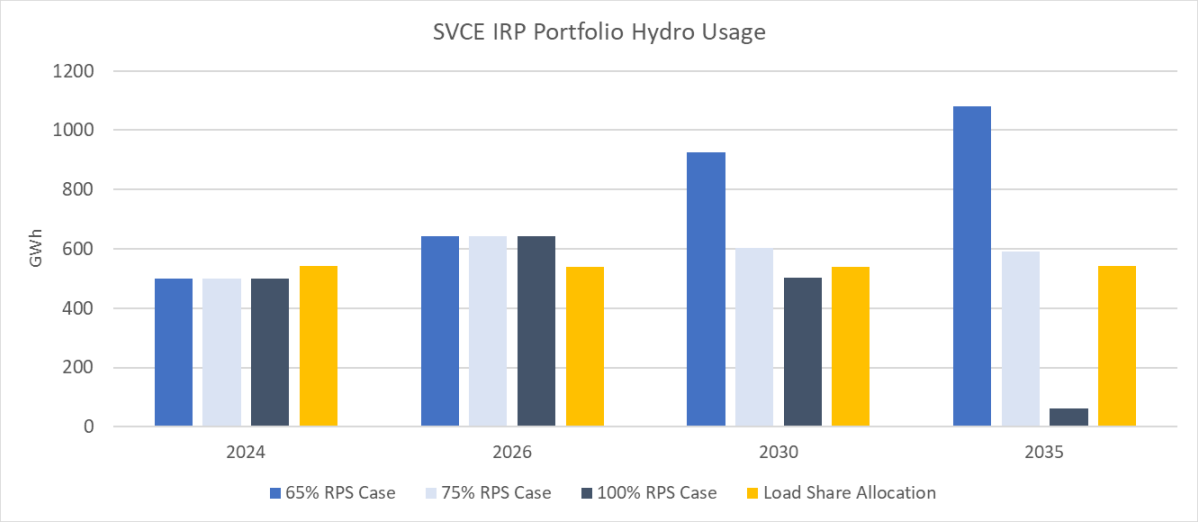

Figure 11. Comparison of hydro generation for each portfolio and SVCE's load share allocation of the 2021 PSP

As the figure shows, SVCE would rely on less than its load share allocation in 2024 and approximately 20% more than its allocation in 2026 across all cases. SVCE notes that the 2026 hydro utilization may be lower should the Commission allocate GHG-free attributes from the extended Diablo Canyon Nuclear Power Plant across LSEs[14]. In the 65% RPS case, SVCE would need roughly twice its load share allocation by 2035. Exploring the trade-offs between reliance on hydro and RPS resources was a fundamental driver of why SVCE selected the RPS scenarios it did. As described in Section III.b, SVCE found the 65% RPS case to be the Preferred Conforming Portfolio in part because it provides a reasonable balance of reliance on new resources and existing hydro power to meet its annual carbon-free energy goals.

j. Long-Duration Storage Planning

SVCE included long-duration storage (LDS) as a candidate resource in the modeling exercise to develop conforming portfolios this cycle. Across all scenarios, long-duration storage was not selected. As noted in Section IV.a.ii below, SVCE has contracted long-duration storage to meet its requirements under D.21-06-035.

[14] SB 864 (Melendez, 2022) amended Public Utilities Code Section 9.712.8(q) to allow the Commission to decide how to allocate the attributes from extended operations of the Diablo Canyon plant.

SVCE continues to assess the value of long-duration storage as part of its portfolio planning process and included it as a candidate resource in its capacity expansion modeling. While no LDS resources were selected as part of the planning process, SVCE will nonetheless continue to evaluate LDS resources including non-lithium-ion technologies and emerging technologies in its all-source solicitations.

k. Clean Firm Power Planning

SVCE currently satisfies approximately 12% of its energy needs with geothermal resources. Recognizing the benefits of diversification and the need for clean, firm resources SVCE has set a target of meeting approximately 15% of its energy needs with geothermal over the IRP planning horizon. These geothermal resources will help SVCE meet its decarbonization and electrification goals by providing a 24x7 source of carbon-free energy. SVCE finds geothermal to be a good substitute to capacity from natural gas resources and Diablo Canyon. It is a proven technology and is not susceptible to grid integration issues such as those with intermittent resources.

SVCE first executed geothermal contracts in 2019 which were selected through a competitive solicitation process which evaluated offers to assess an expected levelized net benefit value under various market and regulatory conditions. While the geothermal resources were offered in at significantly higher PPA cost on a per-MWh basis versus the solar plus storage and wind projects, the expected value and therefore net benefit was deemed competitive and cost-effective.

As part of its 2022 IRP planning efforts, SVCE included both geothermal and biomass as candidate resources. By default, the ARS capacity expansion model did not select either resource. However, due to SVCE's 15% geothermal target, additional geothermal appears in each Conforming plan. Based on market surveys and previous offers, SVCE believes it can sign additional geothermal using a mix of both new and existing geothermal resources.

SVCE continues to view clean firm resources as a necessary component of a clean, reliable electricity system, but cautions the Commission for including similar resource carve-outs in future procurement orders due to the impact on affordability for customers. These concerns are discussed in more detail in Section IV.c below. SVCE also discusses impact of Maximum Import Capability (MIC) constraints in more detail in Section IV.a.ii.a below.

l. Out-of-State Wind Planning

As with other resources selected in the 2021 PSP, SVCE modeled out-of-state wind (OOS wind) as a candidate resource for its 2022 IRP portfolios. Across all Conforming Plans, out of state wind was selected. To ensure alignment with the IRP modeling assumptions, SVCE created candidate resources for Wyoming, New Mexico and Pacific Northwest wind. In all instances, Wyoming wind was found to be the preferred resource, however, SVCE notes that resources with similar profiles and valuation may be found in other states. This resource is likely found valuable due to its high capacity factor, relative to in-state wind, and ability to complement SVCE's extensive solar and storage portfolio.

SVCE has had bilateral discussions with developers for OOS wind resources, however transmission and cost continue to be a major barrier. Such opportunities are evaluated alongside others and are not penalized for being out-of-state as long as they can deliver to the CAISO. The viability of the project given the development stage of the transmission project and the ability to acquire import capacity rights is factored into the evaluation especially if the project is needed to meet specific procurement targets

such as SB 350. Due to the long lead time needed to build out transmission for OOS wind and the uncertainty around transmission development in California, OOS wind is not being considered to meet any of SVCE's MTR procurement requirements. SVCE discusses its evaluation of transmission availability more thoroughly in Section III.n below.

Despite potential barriers, given the potential cost effectiveness and diversity benefit of OOS wind to the CAISO system, SVCE supports the inclusion of OOS wind in the 2022-2023 IRP PSP as a means to help assess the pathway toward building sufficient transmission to allow these resources in the CAISO's Transmission Planning Process (TPP).

m. Offshore Wind Planning

In its 2022 modeling for the IRP, SVCE included offshore wind as a candidate resource, utilizing the cost and wind profiles provided by the CPUC in the RESOLVE and CSP tools. The ARS capacity expansion tool did not select this resource in any of the scenarios modeled, likely due to its cost relative to out of state wind resources which provide many of the same attributes. In addition to modeling results, SVCE staff also considers offshore wind in California to have significant development risk which makes it an unfavorable resource for the portfolio.

In anticipation of a potential procurement order for offshore wind, in part to meet the planning goals of AB 525, SVCE did a scenario analysis of the Conforming Preferred Portfolio which included SVCE's load share allocation of the IRP offshore wind build starting in 2032. This is equivalent to approximately 81 MW. SVCE does not endorse the use of load share allocation for procurement orders, as discussed in Section IV.c below, but used this as a proxy given LSEs' open positions are unknown and it is unclear what basis an offshore wind order would be justified (i.e., GHG or RA compliance) should it be ordered by the Commission.

In this scenario, the energy and capacity from the offshore wind would replace the need for all incremental new capacity, other than geothermal which would be maintained to achieve SVCE's internal target of having 15% of annual energy met by geothermal. Even with the removal of all other new resources, SVCE would expect to be "long" RPS and GHG-free attributes in this scenario.

SVCE did not explicitly test the other Conforming Portfolios with the above offshore wind allocation. However, given the earlier build in both other Conforming Portfolios, it is likely that those resources would be at least partially stranded in the event SVCE was forced to procure its load share allocation of such an offshore wind order. This regulatory uncertainty played a role in the decision to not adopt these portfolios as preferred this cycle.

Should the Commission order offshore wind, it would likely have significant impact on LSEs actual procurement activities going forward. Given the risk of delay or failure of emerging technologies such as offshore wind, SVCE encourages the Commission to carefully consider how to ensure LSEs collectively balance ongoing procurement of both proven and emerging technologies to manage risks and help ensure affordability for California ratepayers.

n. Transmission Planning

SVCE summarizes known transmission upgrades for its resources under contract in Table 19 below.

Table 19. New SVCE Resource Location Information. SVCE has executed contracts with these resources.

Project Name	Resource Type	Location	Queue Position	Station or Transmission Line	Interconnection Agreement?	Known Transmission Upgrades
Big Beau	Solar + Storage	Kern County, CA	602 (18MWs solar) 1329 (110MWs solar, 40 MWs storage)	Whirlwind Substation 230kV	Yes	Completed
RE Slate	Solar + Storage	Kings County, CA	1158	Mustang Switching Station 230kV	Yes	Completed
Casa Diablo IV	Geothermal	Mono County, CA	WDAT-315	Casa Diablo Substation	Yes	Completed
Rabbitbrush	Solar + Storage	Kern County, CA	1215	Whirlwind Substation 230kV	Yes	Completed
Yellow Pine	Solar + Storage	Clark County, NV	1341	GridLiance Trout Canyon 230 kV substation on the Pahrump Sloan Canyon 230 kV line	Yes	Network Upgrades expected to be completed by the end of 2022.
Aratina	Solar + Storage	Kern County, CA	1604	Kramer Substation 230 kV	Yes	Unknown
Angela	Solar + Storage	Tulare County, CA	1443	Olive Switching Station	Yes	Network upgrade expected by Q2, 2023.
Atlas	Solar	La Paz County, AZ	1402	Cielo Azul 500 kV Switch Station	Yes	Ten West Link Transmission Project is expected to be in service by Q4, 2023.
Victory Pass	Solar + Storage	Riverside County, CA	1200	Red Bluff Substation	Yes	Network upgrade expected by 9/30/2023.
San Luis West	Solar + Storage	Fresno County, CA	1389	Gates Substation	Yes	Network upgrade and interconnection facilities expected by 12/31/2023 and 12/31/2024 respectively.
AES MountainView	Wind	Riverside County, CA		Mountwind Substation	Yes	It is a repower project. No new transmission facilities are required.
Coso	Geothermal	Inyo County, CA		Southern California Edison via 115kV Inyokern and 230kV Kramer Junction	Yes	Existing generating facilities. No new transmission or interconnection facilities are required.
Cameron Crest	Wind	Kern County, CA		Windhub Substation	Yes	Existing generating facilities. No new transmission or interconnection facilities are required.
Calpine	Thermal	Yuba County, CA			Yes	None
Fish Lake Geothermal	Geothermal	Esmerelda County, NV		[redacted]	Yes	None
Golden Hills	Wind	Alameda County, CA	709	Tesla Sub 115 KV	Yes	Unknown
Ormat Nevada	Geothermal	Various (CA & NV)		[redacted]	Yes	None

Tumbleweed	Storage	Kern County, CA	1076, 1217	Whirlwind Substation 230 kV	Yes	None
Goal Line	Storage	San Diego County, CA	1832	Esco Substation 69 kV	Yes	Network Upgrades possible, but full extent unknown at this time. Project is included in the Queue Cluster 14 study process which is currently ongoing at the CAISO.

Each Conforming Portfolio includes new solar and storage hybrid, Northern California wind, Wyoming wind, and geothermal resources modeled as planned backfill PPAs but not yet under contract. SVCE's only location requirement for these resources is that they must qualify as PCC1 resources for RPS compliance purposes, meaning they have the first point of interconnection with a California balancing authority. Ultimately, SVCE's procurement activities will be driven by the results of RFOs which may or may not include resources for any specific location SVCE could have modelled in this IRP. As such, SVCE believes it is false precision to provide specific locations for its resources. Nonetheless, SVCE did assess the reasonableness of its Conforming Portfolios. To do this, it followed the PSP distribution of solar/storage hybrid, Northern California wind, Wyoming wind, and geothermal resources. This spreads the resources in many transmission zones throughout California and CAISO border.

For generic new resources, SVCE used multiple sources of information on transmission upgrades, interconnection, and resource planning to assess their viability. For instance, the Northern California wind is a proxy for generic wind resources in Northern California, Solano, and the Carrizo area. In its 2021-2022 Transmission Plan, the CAISO approved a new 500/230 kV substation (Collinsville) in Solano County creating access to wind resources[15]. The Collinsville project is expected to be highly effective in addressing several deliverability constraints[16] to facilitate full capacity deliverability of the Solano area wind generation. The Commission's Modeling Assumptions also confirm this for the CAISO 2022-2023 Transmission Planning Process (TPP)[17]. Therefore, the base portfolio provided by the Commission for the CAISO 2022-2023 TPP assumes 305 MW, 272 MW, and 287 MW of wind resources in the Northern California, Solano, and Carrizo resource zones, respectively, as they can likely be accommodated on the existing and approved CAISO transmission[18]. The High Electrification Sensitivity Portfolio for the 2022-2023 TPP includes an even higher amount of wind resources in the Northern California and Solano zones. Given this information, SVCE assumes that its procurement of Northern California wind resources in 2030-2035 as outlined in the Preferred Portfolio would not be expected to trigger any transmission delivery network upgrades (DNU).

[15] CAISO 2021-2022 Transmission Plan, March 17, 2022, p. iv.

[16] Cayetano-North Dublin 230 kV line, Lone Tree-USWP-JRW-Cayetano 230 kV line, and Las Positas-Newark 230 kV line, as included in CAISO 2021-2022 Transmission Plan, March 17, 2022, p.193.

[17] CPUC staff assumed two upgrades identified in the draft report could alleviate the exceedance on the Northern California – Cortina – Vaca-Dixon Line Constraint. These upgrades are the CAISO-approved Delevan-Cortina 230 kV line reconducting costing $18 - $35 million and the proposed new Collinsville 500 kV substation costing $475 -675 million and taking an estimated 6 years to complete.

[18] See Preferred System Plan and Portfolios for 2022-23 Transmission Planning Process (https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2019-20-irp-events-and-materials), Busbar Mapping Dashboard workbook - 38 MMT with 2020 IEPR high EV base case portfolio, Updated Mapped Resources by Substation Summary, 9/20/2022, ResClassification_byArea tab.

Wyoming wind is essentially a proxy for out-of-state wind resources that would be delivered to the CAISO border. SVCE has not assumed any additional transmission upgrades within the CAISO grid that would be triggered by the out-of-state resources to deliver them to the load centers.

The base portfolio provided by the Commission for the CAISO 2022-2023 TPP assumes 79 MW, 440 MW, and 600 MW of geothermal resources in the Solano, Southern Nevada, and Greater Imperial resource zones, respectively[19]. The High Electrification Sensitivity Portfolio for the 2022-2023 TPP includes the identical amount of geothermal resources in Solano and Southern Nevada, and a higher amount in the Greater Imperial resource zones[20]. Although the full buildout of this geothermal portfolio may trigger additional policy-driven transmission in the 2022-2023 TPP, the CAISO Transmission capability estimates for CPUC's resource planning process indicate that the existing CAISO transmission has adequate buffer to accommodate a significant portion of this geothermal portfolio. For instance, Southern Nevada can accommodate 300 MW of Full Capacity Deliverability Status (FCDS) resources on the existing transmission[21]. Therefore, SVCE has assumed the 7 MW of geothermal procurement by 2030, which is significantly lower than its load ratio of the system-wide geothermal buildout, can be accommodated on the existing and CAISO-approved transmission and would not trigger any additional DNUs or related transmission costs.

Ultimately, SVCE will select resources with the best overall characteristics for cost and reliability, including the cost of any new transmission for interconnection. The risk of interconnection delays due to the need for new transmission construction is also considered in reviewing all offers in SVCE's procurement process.

In summary, SVCE believes that its portfolio in terms of resource type and locations is consistent with the PSP Portfolio and the High Electrification Sensitivity Portfolio for the 2022-2023 TPP.

IV. Action Plan

a. Proposed Procurement Activities and Potential Barriers

As a community-driven LSE, SVCE works with its governing board to set policy, strategies, and directives. At a high level, in 2018 SVCE's Board approved a Decarbonization Roadmap[22] which set a path for achieving deep decarbonization goals. SVCE's decarbonization approach consists of four central tenets that are all necessary to achieving deep decarbonization: procure and maintain a sustainable, affordable and carbon-free power supply; electrify the built environment; electrify mobility; and promote energy

[19] *Ibid*.
[20] See Dashboard for the Busbar Mapping of the 30 MMT High Electrification Sensitivity Portfolio for 2035, dated 7-1-2022, located at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2019-2020-irp-events-and-materials/busbarmapping_30_mmt_hesensitivity_dashboard_07_01_22.xlsx.
[21] See *Table 3-1: Updated transmission capability estimates* in *Transmission Capability Estimates for use in the CPUC's Resource Planning Process* available here: https://www.caiso.com/Documents/RevisedWhitePaper-2021TransmissionCapabilityEstimates-CPUCResourcePlanningProcess.pdf.
[22] Available at https://www.svcleanenergy.org/wp-content/uploads/2019/03/Decarbonization-Strategy-Programs-Roadmap_Dec-2018.pdf.

efficiency and successful grid integration. The following subsections summarize key activities by focus area, but do not include all of SVCE's ongoing or planned activities.

In each of SVCE's Conforming Portfolios, the organization does not require new resources until at least 2028. This is due in large part to SVCE's recent procurement efforts, including eleven contracted projects which the organization is currently working to bring online. Due to current market disruptions stemming from supply chain issues and interconnection delays, and the status of SVCE's current procurement activities, the organization does not expect to procure any additional resources in the near term. While supply chain issues may resolve over the coming years as the impacts of the COVID-19 pandemic lessen, and global manufacturing issues resolve and/or domestic production increases, SVCE remains very concerned about on-going interconnection issues in the CAISO. Recent experience has shown that it may be difficult to sustain the necessary build and interconnection rate to meet the State's reliability and GHG targets. SVCE encourages the CAISO and CPUC to continue to evaluate improvements to the interconnection process to ensure the state can meet its aggressive goals.

In addition to existing market conditions, SVCE must consider regulatory uncertainty as part of its procurement and planning efforts. Regulatory uncertainty in both the IRP and RA proceedings are of particular importance to SVCE's current procurement strategy. The ongoing RA Reform work represents meaningful uncertainty for resource valuation going forward. In addition to awaiting final rules for resource counting and reliability requirements, SVCE also intends to monitor the impact of the reform on the marketplace and valuation of specific resource types. Within the IRP proceeding, uncertainty regarding future procurement directives and orders creates significant stranded asset risk for new projects. SVCE discusses these concerns in more detail in Section IV.c below.

Additionally, SVCE is closely monitoring R.17-06-026, including the recent Staff Proposal to eliminate GHG-free allocations and replace them with a Market Price Benchmark (MPB) compensation mechanism in the Power Charge Indifference Adjustment (PCIA) charge[23]. Should the Commission adopt staff's proposal, SVCE would need to procure additional GHG-free resources in the marketplace. This may result in SVCE procuring additional short or long-term RPS resources to fill this need, depending on market offers.

As SVCE's efforts to help the local community decarbonize continue to expand and scale, it hopes to drive non-linear increases in DERs, electric vehicles (EVs), all-electric buildings, and customer literacy on Time of Use (TOU) rates. These changes will significantly impact not only the load, but also the load shape over time, resulting in changes to both the RA needs and hourly emissions. SVCE's decarbonization approach prioritizes innovation and experimentation. This approach, and the continuously evolving nature of the regulatory and planning space, necessarily results in some degree of uncertainty of the impact and timing of its efforts. SVCE will continue to monitor and forecast the impacts of its decarbonization approach and its impact on SVCE's supply side needs, but views flexibility in planning going forward as necessary to best serve its customers.

SVCE will continue to monitor its procurement needs and the marketplace to assess when to time new solicitations. SVCE discusses financial and viability considerations for specific resource types in the sections below.

[23] R.17-06-026. Administrative Law Judge's Ruling Requesting Comments on GHG-free Resources Staff Proposal and Other Issues. Filed 9/12/2022. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M496/K874/496874129.PDF.

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

SVCE has met its obligations under D.19-11-016 and currently has all required capacity online to meet the requirements of that order.

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

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

As part of the MTR order, SVCE was required to procure 20.5 MW NQC of Clean, Firm resources[24]. SVCE participated in a California Community Power (CC Power) RFO issued in October 2021 to procure clean firm resources. CC Power was formed in February 2021 by ten CCAs, including SVCE, to share resources and risk related to the procurement of difficult-to-acquire resources.

In October 2021, CC Power began seeking offers for the sale of firm clean resources (FCR) as defined in more detail in CPUC D.21-06-035, Ordering Paragraph (OP) 2(b), as well as existing resources that otherwise meet the requirements of OP 2(b).1. CC Power sought to acquire up to 200 MWs of FCR through one or more projects, with deliveries beginning no later than June 1, 2026.

The FCR procurement effort from CC Power resulted in two PPAs from Open Mountain Energy – Fish Lake Geothermal (OME) and Ormat Nevada LLC's geothermal portfolio (Ormat Geo Portfolio). The projects were selected from a pool of 16 proposals. The projects are located in California and Nevada.

The Ormat Geo Portfolio for CC Power will provide between a minimum of 64 MW and a maximum of 125 MW with an expected commercial operation date (COD) starting in June 2024 for a term of 20 years. OME's project size will be 13 MW with an expected COD of April 2024 for a term of 20 years. SVCE will receive an entitlement share of each project.

SVCE's FCR MTR NQC requirement is 20.5 MW; this requirement will be met by:

[redacted]

OME and Ormat Geo Portfolio are located outside of the CAISO. Projects not in the CAISO need MIC to count as RA, a requirement for the FCR procurement mandate. Participating CCAs filed jointly a MIC expansion request with the CAISO, which was due on June 1, 2022 in order to take part in the current expansion process. SVCE received adequate MIC for calendar year 2023, but there are no guarantees of sufficient MIC availability throughout the term of the PPAs.

For the Ormat Geo Portfolio, CC Power has the ability to elect to add specific facilities into the PPA depending on availability of MIC and/or the collective CCAs need for the resources to meet other portfolio obligations including RPS. Should SVCE and/or other participating CCAs not acquire sufficient MIC, then it is likely that the CCAs will be unable to meet their respective MTR obligations for FCR

[24] The order permitted SVCE to utilize an already contracted resource under development at the time of the order, toward this obligation so long as the LSE could show that other resources were developed to meet the total obligations of both D.19-11-016 and D.21-06-035.

through the contracted resources. SVCE will be required to seek out other sources of new geothermal capacity and expects the availability of such resources to be scarce and prices for such resources to be cost prohibitive especially if located within the CAISO[25].

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

In October 2020, seven joint CCAs issued an RFO seeking acquisition of up to 500 MWs of capacity through the Long Duration Energy Storage (LDS) RFO to cost effectively enhance the integration of their respective renewable energy portfolios into the CAISO grid and to aid in meeting California's aggressive GHG reduction targets by 2030 as outlined in the CPUC 2021-2030 IRP Reference System Plan.

The RFO objectives and requirements included the following:

- Procuring cost-effective LDS to integrate renewables & support grid reliability
- Joint procurement to reduce overall project risk
- Grid-charged with minimum 8-hour discharge duration
- Meet RA requirements
- COD no later than 6/1/2026
- Minimum delivery term of 10 years
- 50 MW minimum

Through the Joint LDS RFO a total of 51 entities submitted offers (over 9,000 MW), representing 18 distinct technologies including many emerging technologies. Offers were evaluated, ranked and selected for shortlisting with the objective of meeting the RFO's cost effectiveness goals and requirements under the MTR Order.

Two lithium-ion LDS projects were selected including LS Power's Tumbleweed LLC for 69 MW and Onward Energy's Goal Line BESS 1, LLC for 50 MW. CC Power executed Energy Service Storage Agreements with the two counterparties and Project Participation Share Agreements with the participating CCAs including SVCE.

SVCE's MTR LDS obligation is 20.5 MW NQC, which will be met with:

- [redacted]

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

SVCE discusses the procurement efforts for both the zero-emissions generation resources and the generic requirements in Section IV.d below. Given the nature of the resources applicable to both the zero-emissions generation and the generic resources categories for the MTR order, SVCE's RFOs have been intended to cover both categories and SVCE has found similar barriers to procurement.

[25] In recent RFOs, SVCE found the cost of geothermal resources located in the CAISO to be nearly twice the cost of similar resources located outside the balancing authority.

d. All other procurement requirements

SVCE has issued two RFOs intended to help satisfy the remaining MTR order requirements, both the generic RA requirements as well as the zero-emitting (DCPP replacement) capacity. The first RFO was issued in January 2022 in partnership with Central Coast Community Energy (CCCE) and Sonoma Clean Power (SCP). Sufficient capacity was offered into the RFO to meet the collective group of CCAs' MTR requirements. However, several global events materialized while the CCAs were in the process of evaluating offers including a significant run up in the cost of lithium bicarbonate, a key component in the production of lithium-ion batteries, and the U.S. Department of Commerce investigation into potential tariff circumvention on solar cells from China. These combined events resulted in several proposals to the RFO being repriced and/or withdrawn. Ultimately, SVCE successfully negotiated an agreement with AES for 75 MW of RA-only from their Baldy Mesa solar plus storage project[26]. The resource will meet a portion of SVCE's generic MTR requirement. The project has begun construction and has an expected on-line date of June 2023.

Following the initial RFO for MTR resources, SVCE issued a second RFO in August 2022, this time in partnership with CCCE, SCP and Peninsula Clean Energy (PCE) with a focus on standalone storage. Several projects were offered into the RFO; however, given the prices, project viability and ability to meet MTR requirements, including on-line date, SVCE passed on all offers.

SVCE plans to issue a new RFO in the coming months to meet its MTR need.

iii. Offshore wind

As discussed in Section III.m above, SVCE's Preferred Portfolio did not select any offshore wind. In addition to the cost of the resource, the development risk associated with bringing on an emerging technology is a significant barrier for adoption.

SVCE recognizes that the State sees potential value for offshore wind and urges a thorough stakeholder process to vet its value to the system. Should an offshore wind order occur, SVCE believes it is worth exploring opportunities for a central entity to procure such resources to manage the cost, risk, and potential economies of scale for development of such resources.

iv. Out-of-state wind

All three of SVCE's conforming portfolios selected some out-of-state wind by 2035. Out-of-state wind can provide meaningful diversity and benefits to SVCE's portfolio. In its modeling, SVCE assumed out of state resources would provide both RA and energy value. If SVCE cannot secure out of state resources which provide FCDS and value for RA purposes, they may have significantly diminished value to the portfolio and require the organization to consider alternative resource options. Further efforts with the CAISO are required to evaluate deliverability at intertie points and to allow for long-term allocations of these rights for RA certainty. Refinement within CAISO's TPP process could alleviate this uncertainty.

There is also an issue of import capability scarcity and how these rights will be treated under the 24-Hour Slice RA Reform. SVCE requested through the RA Reform process for the CAISO and Energy Division work to resolve the current transitional issues inherent in the process of allocating import rights

[26] This contract was executed after the August 1st cutoff date used for this IRP. It is not listed in the RDT, but rather should be considered a subset of the generic MTR procurement listed in the RDT.

and whether resources will need to have enough transmission to match their 24-Slice capacity profile. SVCE encourages the CPUC to include out of state wind as part of its TPP portfolios and to work with the CAISO to help ensure sufficient transmission is available to bring these valuable resources into the state.

v. Other renewable energy not described above

Across all Conforming Portfolios, the SVCE modeling exercise resulted in selection of both hybrid and in-state wind resources. Both technologies are ones which SVCE has experience contracting and operating and expects to find cost effective on an on-going basis. SVCE has contracted for seven new solar battery hybrids since its inception in 2016. All of these projects are expected to contribute to both SVCE's RA requirements and RPS goals. The organization also has approximately 150 MW of wind under long-term contract, all of which is comprised of existing or repowered sources.

SVCE expects some additional hybrid resources to provide a cost-effective means to achieve its RPS and RA needs on a forward-looking basis. However, SVCE has concerns about continued cost pressures facing the development of PV and battery energy storage system (BESS) in the near-term and the ability to cost effectively develop the resources in time to meet several portfolio needs and procurement obligations including MTR. While SVCE has effectively executed agreements for several new hybrid resources, these projects face continued uncertainty and development challenges due to both supply chain issues and interconnection delays.

Despite the value of hybrid resources, SVCE also prioritizes diversification in its portfolio. While the ARS capacity model found wind resources cost effective, SVCE also supported its inclusion in the portfolio for diversification purposes. Based on past solicitations, SVCE does recognize that development of new in-state wind may be a challenge due to lack of available sites and permitting issues. However, SVCE has been able to contract two existing or repowered wind resources into its portfolio and will continue to consider such offers in future solicitations which may replace some of the new wind shown in the Preferred Conforming Plan.

In developing its portfolios, SVCE limited its candidate resources to those selected by the CPUC's RESOLVE model and CSP tools. However, SVCE reiterates that actual procurement decisions are subject to change based on the results of RFOs and actual and forecasted portfolio need at the time of evaluation. SVCE supports the exploration of other renewable energy and renewable integration resources, including emerging technologies such as hydrogen and carbon capture and storage (CCS), as part of the on-going CAISO system planning process. SVCE appreciates Energy Division staff's efforts to integrate these resources more fully in future IRP cycles as outlined in the September 22, 2022 Modeling Advisory Group webinar[27]. Consideration of these technologies in future LSE and system plan processes may have meaningful impact on SVCE's projected portfolio needs.

vi. Other energy storage not described above

As noted in the response to Section IV.a.v above, SVCE did not allow any candidate resources beyond those in the IRP modeling tools. SVCE's procurement team continues to assess offers and opportunities as they are presented. In particular, SVCE sees potential diversification value from procuring nonlithium-based batteries in the future and will continue to explore the potential of such technologies.

[27] Recording and presentation slides available: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials.

vii. Other demand response not described above

SVCE staff continues to evaluate the value proposition of Virtual Power Plants (VPPs) and explore options for their deployment going forward. The attributes, load shape, and technical and economic potential of these resources are still being investigated. As an innovative, new market product, staff determined it was premature to force any VPP capacity in its 2022 IRP portfolios and due to uncertainty of the resources' attributes did not explicitly model it as a candidate resource[28]. As described below SVCE will continue to explore market opportunities for VPP and expects that ultimately VPP capacity may replace some portion of the capacity shown in its 2022 Preferred Conforming Plan.

SVCE has spent significant time and effort over the past several years exploring options for establishing a successful VPP. SVCE defines VPPs to be aggregations of DERs that can permit a shifting of energy demand or injections to the grid (i.e., can be used to increase or decrease load, as desired). Demand response is one use case that falls into SVCE's thinking on VPPs. Enrolling smart DERs into VPPs to provide value to the grid and return that value to customers is a critical part of SVCE's vision for spurring a widespread increase in DER adoption. An initial whitepaper[29] outlining opportunities was created with Gridworks and a group of industry stakeholders and identified demand response contracts and non-market-integrated load shift as promising concepts for the near term.

In response to the 2019 Public Safety Power Shutoff (PSPS) events, and in keeping with the results of the Gridworks whitepaper, SVCE executed a contract for load modification with Sunrun. This program[30] aggregates customer-sited solar and storage systems that provide islanding backup to the customer in the case of power outages as well as discharging energy during the 4-9 PM window daily to reduce SVCE load. The systems will begin delivering energy in 2023 for ten years. The RA value of these resources is dependent in part on the outcome of the RA Reform work currently in process at the CPUC. SVCE will observe actual dispatch in 2023 and present additional data to CEC next year to adjust SVCE's peak load based on this contract's actual dispatch. Rules that reduce the countable capacity of BTM solar and storage resources make pursuit of these types of contracts less attractive and the uncertainty in the market has negatively affected the scale of this program. SVCE would like to sign more of these kinds of contracts as they provide both customer and grid benefits.

SVCE views the impact of new load from modifiers, such as EVs and BTM resources, to be a significant driver of its future load increase. Managing the timing of this load to ensure system-wide affordability in the future is of particular importance to SVCE. To that end, in 2020 SVCE hired consultants E3 and Ascend Analytics to understand the magnitude of value available from different assets and through different value streams[31]. Figure 12 below shows how EV charging was identified as providing the most value. As customers switch to TOU rates, the value available from RA decreases, presuming consumers are rationally responding to the TOU rate structure, but the value from energy value streams remains.

[28] Shed Demand Response, which likely has many similar attributes to VPP, was modeled but ultimately not selected by the capacity expansion tool.
[29] Available at https://gridworks.org/wp-content/uploads/2019/08/GW_Silicon-Valley-Clean-Energy-report.pdf.
[30] Program webpage at https://www.svcleanenergy.org/lights-on-sv/.
[31] Slide deck summarizing key findings available at https://www.svcleanenergy.org/wp-content/uploads/20201020_AscendAnalysis_digital.pdf.

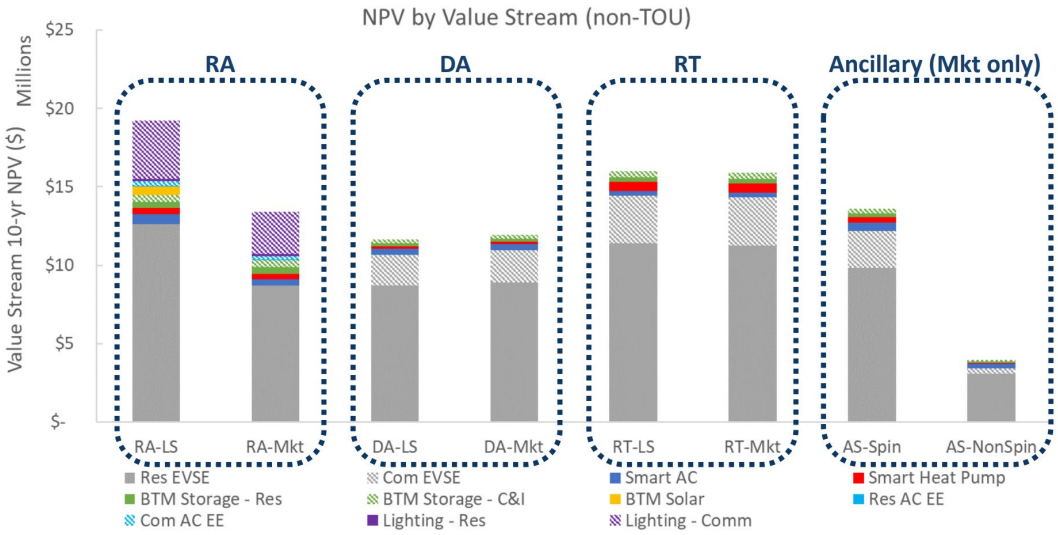

Figure 12: Value streams available by technology

In the interest of capturing these value streams and helping customers reduce their ongoing EV charging costs, SVCE launched its GridShift: EV Charging program[32]. This app is now actively being used by nearly 600 EV owners to simplify the charging experience and better follow TOU rates and the carbon intensity of the grid. This app is not integrated into the energy markets, but instead shifts charging daily to avoid the worst times of day (worst emissions or highest cost). SVCE has also layered on demand response events to minimize charging during Flex Alerts and has run "clean charging events" to promote an increase in EV charging during particularly clean hours of the day[33].

In December of 2022, in parallel with PG&E, SVCE is planning to launch a new electrification rate, E-ELEC. To encourage and reward electrification, the rate would include a flat monthly fee, reduced $/kWh time-of-use charges, and higher peak vs. off-peak rate differentials. Customers with an EV, heat pump water heater or HVAC system will be eligible. SVCE is incorporating this new rate into its online customer education platform (SVCE eHub) and exploring the potential for additional rate discounting to further encourage adoption.

In response to the launch of the Emergency Load Reduction Program (ELRP) in 2021, SVCE supported outreach to large, tech-savvy commercial and industrial customers in its service territory – including customers with significant back-up generation capacity. SVCE took the lead in creating a webinar with PG&E, Olivine, and other local CCAs to push more of these customers to enroll in the new ELRP. SVCE also chose to allow its eligible residential customers to be automatically enrolled in the A.6 residential ELRP program, leading to approximately 60,000 local accounts to be included in the program. SVCE would like to do more to promote ELRP to residential and non-residential customers but needs information on which of its customers are already enrolled and the resultant level of impact so SVCE can target its marketing appropriately. To date, PG&E has not shared data on customer participation in ELRP, so more targeted outreach by SVCE has not been possible.

[32] Program webpage at https://www.svcleanenergy.org/gridshift-ev/.
[33] An initial report by the app provider, ev.energy, can be found at https://www.svcleanenergy.org/wp-content/uploads/GridShift-pilot-report_2021.pdf, and SVCE will soon be releasing a third-party evaluation report analyzing impacts of the app at https://www.svcleanenergy.org/research-analysis/#1639688703076-c88f0dce-ef3b.

Moving forward, SVCE is looking into next steps that can be taken to use VPPs for near-term procurement and long-term impact. In October 2021, SVCE completed an analysis with Electron to scope out what a local DER market might look like and how to integrate it into SVCE operations[34]. In the coming months, SVCE will be reviewing findings from its efforts so far on VPPs, considering the Electron work, and identifying actions that can be taken to provide a meaningfully sized VPP in the near-term to help better control its load in the coming years. SVCE will also take steps to support its longer-term vision of how to include VPPs in grid operations, but the potential there will depend on support from state agencies as there are significant barriers to overcome[35].

Outside of SVCE, several proceedings at the CPUC may also impact the value proposition and deployment of DERs and VPP. Among these are R.18-12-006, R-21-06-017 and R.22-07-005. SVCE's regulatory team, in coordination with CalCCA, plans to continue to monitor and participate in such proceedings. The outcomes and decisions from these Rulemakings are likely to impact VPP adoption and therefore the actual supply side resource needs of SVCE during the current planning horizon of this IRP cycle.

VPPs have the potential to dramatically reshape SVCE's load in the next decades. Not only will they play a key role in reducing peak loads and costs, but they will also help utilize clean resources available to the grid mid-day, reducing system curtailment projected in the 2030s, and shifting load away from hours where the grid is relying on fossil generation. They will also support the deployment of more DERs by passing value back to customers. The key question is how quickly SVCE will be able to scale its approaches and leverage them to make substantial changes to the load forecast.

viii. Other energy efficiency not described above

Energy efficiency is an essential part of SVCE's four tenets to decarbonization. Having customers improve their efficiency before electrifying technology allows for smaller equipment, lower costs, and more bill savings. SVCE considers efficiency during program design and will often include requirements which support greater efficiency. For example, all heat pump water heaters incentivized need to have a Uniform Energy Factor of 2.9 or greater.

On SVCE's eHub website for customer education, the Appliances Assistant[36] tool helps customers search for new EV chargers, thermostats, dryers, cooktops and more. This tool is provided by Enervee and includes a score calculated on the products' energy efficiency to help customers find the most efficient options. SVCE customers can also leverage PG&E energy efficiency programs.

SVCE does not expect its standalone energy efficiency efforts to have a major impact on its load beyond what is included in the IEPR forecast but will continue to include efficiency in its electrification and decarbonization program design.

[34] Electron pilot analysis was based on SVCE data and stakeholder interviews but are not necessarily representative of SVCE's views. Documents can be found at https://www.svcleanenergy.org/innovation-electron/.
[35] For example, see SVCE's comments filed on R.21-06-017 (modernizing the grid for a high DER future): https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M400/K593/400593850.PDF.
[36] Appliances Assistant tool available at https://appliances.svcleanenergy.org/.

ix. Other distributed generation not described above

In terms of aggregating distributed generation at customer sites, SVCE considers this within the VPP framework and can be combined with comments in the demand response Section IV.a.vii above.

Relative to solar, approximately 10% of SVCE's residential customers are on a Net Energy Metering (NEM) tariff. SVCE's NEM rates currently mirror the IOU, though SVCE offers a more attractive net surplus compensation rate (2X) for customers who generate an annual surplus, and 2.5X for CARE/FERA customers. While solar adoption in SVCE's service area has been strong historically, it is difficult to predict how the new NEM 3.0 tariff will impact solar uptake in the future, and implications for the IEPR forecast. SVCE will continue to actively promote pairing of battery storage with solar, and to the extent possible, solutions that enable alignment of building electrification loads with solar production.

In response to COVID-19 and the corresponding economic impact on customers, the SVCE board approved $10M in funds to provide relief to the community[37]. A portion went to providing bill credits for customers on CARE/FERA rates, and $5M was reserved for SVCE's thirteen member agencies to evaluate and install resiliency infrastructure in their communities. While the projects are varied, the inclusion of on-site generation to support resilience means they may also be able to provide SVCE with value as local, distributed generation. SVCE is working to identify if and how to integrate these forthcoming projects into its portfolio[38].

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

Emissions from transportation comprise the largest source of GHG emissions in SVCE's territory, and SVCE has created programs to tackle some of the hardest challenges in this sector. SVCE's transportation electrification focus has historically been on EV charging infrastructure as a way to support rapid and widespread adoption of EVs. Silicon Valley already has some of the highest EV penetration in the state, and SVCE expects to see this trend to continue and even increase as more of its programs start to create an impact. SVCE's future forecasts should take into account these localized trends. While SVCE did not submit an alternate forecast this IRP cycle, due to timing issues with its internal forecast, it does expect that its customers are further along on the EV adoption curve than the state at large, and therefore the load share allocation of EV load in the CSP is likely inappropriate. SVCE does not have extensive insight to what extent the IEPR forecast accounts for its electrification programs or how the CEC views the impact of such programs on load growth.

Some key efforts to scale up EV charging include the California Electric Vehicle Infrastructure Project (CALeVIP)[39], which is a regional deployment of a statewide program funded by the CEC. SVCE partnered with four other LSEs across San Mateo and Santa Clara Counties to attract CALeVIP to the region, and the CEC and SVCE each contributed $6M, for a total of $12M to incentivize new EV charging to be installed in SVCE territory in the 2020-2024 timeframe.

SVCE has also launched several of its own incentive programs to target adoption by multifamily property tenants, who locally own EVs at much lower rates than single-family property tenants. One program

[37] More details on SVCE COVID-19 response at https://www.svcleanenergy.org/covid-19/.
[38] Press release for one of the completed resilience projects in Milpitas at https://www.svcleanenergy.org/news/milpitas-community-center-powers-up-with-resiliency-grant-from-silicon-valley-clean-energy/.
[39] CALeVIP homepage for the local region at https://calevip.org/incentive-project/peninsula-silicon-valley.

provides free concierge support to multifamily property managers to learn about EV charging options, have a site visit from an expert, and generate engineering estimates to make getting bids from contractors easy[40]. They are also eligible for incentives from SVCE when installing the equipment. Another program is exploring the potential for nearby DC fast chargers to meet the needs of these tenants (as some multifamily properties do not have electrical capacity for on-site charging without costly upgrades) by providing incentives for installations near clusters of older multifamily housing[41].

In early 2019, SVCE and its member agencies embarked on an ambitious project to adopt local building codes that would exceed the state code in promoting decarbonization benefits. These Reach Codes can include requirements for installing EV chargers or running EV-ready wiring to parking spaces in new construction. Of SVCE's thirteen communities, nine adopted some form of EV Reach Code that was more supportive of EV charger deployment than CalGREEN[42]. SVCE is working with its member agencies once again in 2022, as part of the triennial cycle, to adopt new Reach Codes and ensure that new construction in SVCE territory continues to promote EV charging.

The forthcoming investments from the Inflation Reduction Act and state funding will further support an increased rate of EV charger deployment and EV adoption. However, SVCE has noted in its programs so far that interconnection timelines, permitting processes, and supply chain issues are dramatically pushing out EV charger installations and are limiting the ability of the state to meet its GHG goals. SVCE is working on reducing the friction in the permitting processes with its member agencies but will look to CEC and CPUC action to accelerate the interconnection process with PG&E and ameliorate supply chain delays.

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

The Decarbonization Roadmap promotes electrification in the built environment and transportation sectors, grid integration, and a carbon-free electricity grid. This was followed by the EV Infrastructure Joint Action Plan[43] in 2019 and the Building Decarbonization Joint Action Plan[44] in 2020 to further scope key SVCE initiatives in those sectors. As of September 2022, SVCE's Board had set aside approximately $52M to be used for decarbonization programs.

As mentioned above, SVCE and its member agencies worked in 2019 to help reduce GHG emissions from new buildings by developing and adopting local Reach Codes that surpassed the state code in promoting decarbonization[45]. Of SVCE's thirteen communities, twelve approved some form of building Reach Code. As such, SVCE suspects its share of state building electrification exceeds its load share allocation, as given in the assigned IRP forecasts. As with transportation electrification, SVCE is not aware of the extent to which the IEPR forecast accounts for its building electrification efforts and programs.

[40] Multifamily technical assistance and rebate webpage at https://www.svcleanenergy.org/ev-charging-assist/.
[41] DC Fast Charger incentive program webpage at https://www.svcleanenergy.org/dcfastchargers/.
[42] SVCE webpage for Reach Codes, including a table tracking EV charger codes adopted for the 2020 code cycle at https://www.svcleanenergy.org/reach-codes/.
[43] Available at https://www.svcleanenergy.org/decarbonization/#evi-joint-action-plan_sept-2019/1/.
[44] Available at https://www.svcleanenergy.org/decarbonization/#building-decarbonization-joint-action-plan_011821-web/1/.
[45] SVCE webpage for Reach Codes, including a table tracking building codes adopted for the 2020 code cycle at https://www.svcleanenergy.org/reach-codes/.

The exact Reach Codes implemented varied by jurisdiction, ranging from encouraging all-electric construction to banning methane gas altogether. SVCE served as a facilitator and technical advisor, while also bringing in an expert consultant to run the analysis and development of draft language. In 2022, SVCE is helping its member agencies once again consider Reach Codes to maintain reach standards previously approved, improve language and scope, and further advance all-electric new construction in SVCE territory where possible. After 2022, SVCE will turn towards existing buildings and begin working with interested member agencies to explore how best to adopt policies targeting this critical sector. These existing building policies have the potential to accelerate electrification at a scale and speed not otherwise possible and would significantly affect SVCE load in the future if adopted.

In addition to supporting Reach Codes, SVCE has several specific programs targeted at building electrification. SVCE has been offering incentives for heat pump water heaters and panel upgrades to its customers for several years to increase local adoption[46]. In Q4 2022, SVCE expanded its incentives to include heat pump space conditioning, pre-wiring, and promoting all-electric retrofits. These incentives will continue to support the growth of the local all-electric market and contractor network, in addition to the equipment directly incentivized by SVCE. There is uncertainty in what uptake will look like for these new offerings from SVCE, although the initial funding is sufficient for hundreds of homes. SVCE's Board may increase funding if the program is successful in reaching a broad audience.

To help reduce the upfront costs associated with retrofit building electrification and allow more customers to be able to participate in the benefits of decarbonization, SVCE has been exploring financing options to augment its other programs. A key effort is the Tariffed On-Bill Financing pilot that SVCE is pursuing with TECH and submitted to the Clean Energy Finance proceeding[47]. The draft scope includes heat pump water and space heating, along with efficiency improvements, and may ultimately include electrification of all devices in the home. If this pilot advances, SVCE will be able to test out the attractiveness of this offer and the impact on customers, along with the necessary programmatic elements to make it work. If successful, SVCE and PG&E will likely continue to scale financing offerings through this mechanism, drive customer upfront costs down, and allow for accelerated scaling of electrification. The ability of SVCE to test this depends on approval of the pilot by the CPUC and the direction given to PG&E on how and when to make adjustments to their billing system to accommodate the necessary features for Tariffed On-Bill Financing. This pilot will also require that the equipment be controlled to best follow TOU rates and maximize bill savings, so this approach will inherently optimize these new loads to the benefit of SVCE's load shape.

[46] Webpage for SVCE's heat pump water heater program at https://www.svcleanenergy.org/water-heating/.
[47] Presentation available from the May 12, 2022 workshop link found at https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/clean-energy-financing.

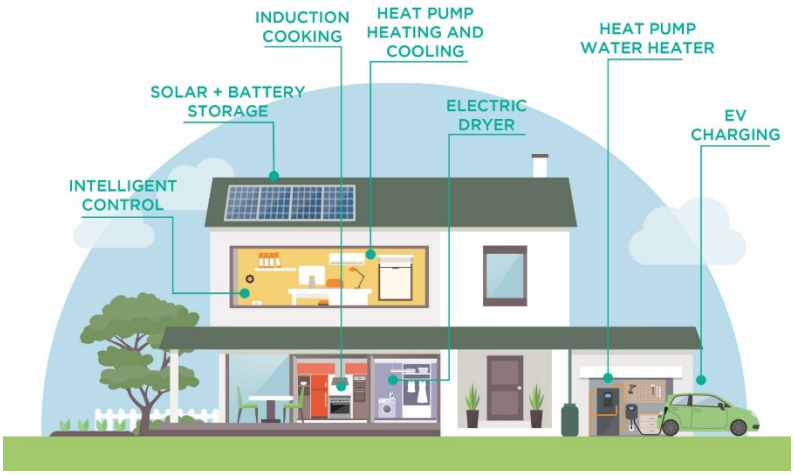

Figure 13: SVCE's presentation of a "FutureFit" home that embraces intelligent decarbonization

Multiple SVCE initiatives have been developed with the intention of catalyzing impacts across the other subsections and create stepwise increases in electrification. While modeling the future impacts of some of these efforts is challenging, they may lead to some of the largest changes in SVCE's load over the current IRP planning horizon.

One initiative which will impact deployment of a variety of electrification technologies across resource categories is the FutureFit Fundamentals program for workforce development[48]. Eligible contractors receive $500 for completing the online course and may also be able to receive up to $5,000 to install a qualifying electric technology in their home or business. The approximately five hours of training cover a variety of electric technologies, and SVCE hopes this will increase the size of the local contractor pool that is available, to help educate customers, and expand awareness of the benefits of all-electric equipment. The online training and stipend are available to contractors throughout Santa Clara County and is offered in both English and Spanish languages.

As referenced in the transportation electrification Section IV.a.x, SVCE is also working with its member agencies to modernize and simplify permitting processes to pave the way for the immense number of permits that will be required for electrification retrofits. Removing any bottlenecks here will be critical to widespread and rapid adoption of all types of DERs. SVCE has initially committed $3.2M to provide tools and resources to its member agencies to support this needed work.

xii. Other

SVCE's location in the Silicon Valley gives it a unique opportunity to engage with top innovators and startups. As deep decarbonization will require overcoming major hurdles in cost-effective ways, SVCE created its Innovation Onramp program to attract novel pilots that demonstrate scalable solutions[49]. SVCE has funded 12 pilots over the last few years[50]. While not all end up achieving their goals, these pilots can unlock paradigm-shifting approaches to intractable problems. This innovation lens also

[48] Webpage for SVCE's FutureFit Fundamentals workforce development program: https://www.svcleanenergy.org/futurefit-fundamentals/.
[49] Impact report summarizing some Innovation Onramp goals and impacts at https://www.svcleanenergy.org/innovation/#innovation-impact-report_web/1/.
[50] List of SVCE's Innovation Onramp pilot by cohort at https://www.svcleanenergy.org/innovation-pilots/.

extends to technologies that can reduce need for grid infrastructure upgrades and help manage SVCE's load. Some of SVCE's pilots have progressed into longer-term SVCE programs (like the Data Hive[51] for access to customer energy data to enable improved DER adoption or the GridShift: EV Charging app) and some go on to attract significant outside funding (like the CEC grants for both the EVmatch[52] and Ecology Action[53] approaches to multifamily EV charging). SVCE will continue to fund innovation pilots to try to unearth these major advances in thinking that will accelerate the transition to deep decarbonization and help SVCE best manage its load in a future with accelerating DER adoption.

b. Disadvantaged Communities

As a community-based LSE, SVCE's Board of Directors is made up of thirteen elected officials representing each of the thirteen member agencies that comprise SVCE's service territory. Decisions on procurement, programs and investments are made by these elected officials in the interest of all their constituents, including specific underserved communities that they and their agency staff are closest to. SVCE is taking specific steps to address underserved communities. These include lower rates for income-qualified customers, development of a Programs Equity Framework and use of SEVI (Socioeconomic Vulnerability Index) metrics to guide program planning and design, and ongoing community engagement and outreach efforts.

Income-qualified CARE/FERA customers comprise approximately 10% of SVCE's residential customer base. Beginning in April of 2022, SVCE is providing monthly on-bill rebates to CARE/FERA customers equivalent to an average discount of approximately 10% to SVCE's electric generation rate. This discount will be continued in 2023.

At the direction of SVCE's Board, SVCE's decarbonization programs and community outreach are customer-focused and designed to be inclusive of the needs of underserved communities. SVCE is utilizing an internally developed Programs Equity Framework to guide a systematic process for learning and considering needs of underserved communities, defining these groups, understanding their current state of DER adoption and barriers, and tracking ongoing impacts of SVCE programs.

SVCE defines an underserved community as one that is underrepresented in decision-making and whose access to key information and resources is limited when it comes to energy issues and receiving the benefits of decarbonization. Underserved communities can face barriers associated with lower socioeconomic status (affordable housing tenants, CARE/FERA customers), type and ownership of housing (renters, tenants of older multifamily properties), geographic isolation, language barriers or cultural isolation, or limited access to digital platforms.

The primary indicator used by SVCE to identify underserved communities and develop program approaches is the Socioeconomic Vulnerability Index (SEVI), originally developed as part of the CPUC's Affordability Report. SVCE has taken the statewide SEVI data by census tract and grouped the tracts that are in SVCE territory into four quartiles, as shown in Figure 14 below. Importantly, SEVI identifies

[51] Main webpage for the Data Hive, with a link to see the directory of companies registered to use the Data Hive to receive instant, authorized, and secure access to customer usage data at https://data.svcleanenergy.org/.
[52] Final report from EVmatch on their multifamily EV charging pilot at https://www.svcleanenergy.org/wp-content/uploads/SVCE-Innovation-Onramp-Summary_EVMatch.pdf.
[53] Final report from Ecology Action on their multifamily EV charging pilot at https://www.svcleanenergy.org/wp-content/uploads/IN-Ecology-Action-Innovation-Onramp-Final-Report_11.5.21_digital.pdf.

relative socioeconomic vulnerability across SVCE's entire service territory. DACs within SVCE's service territory, as defined by CalEPA, are exclusively in the SEVI 4 quartile.

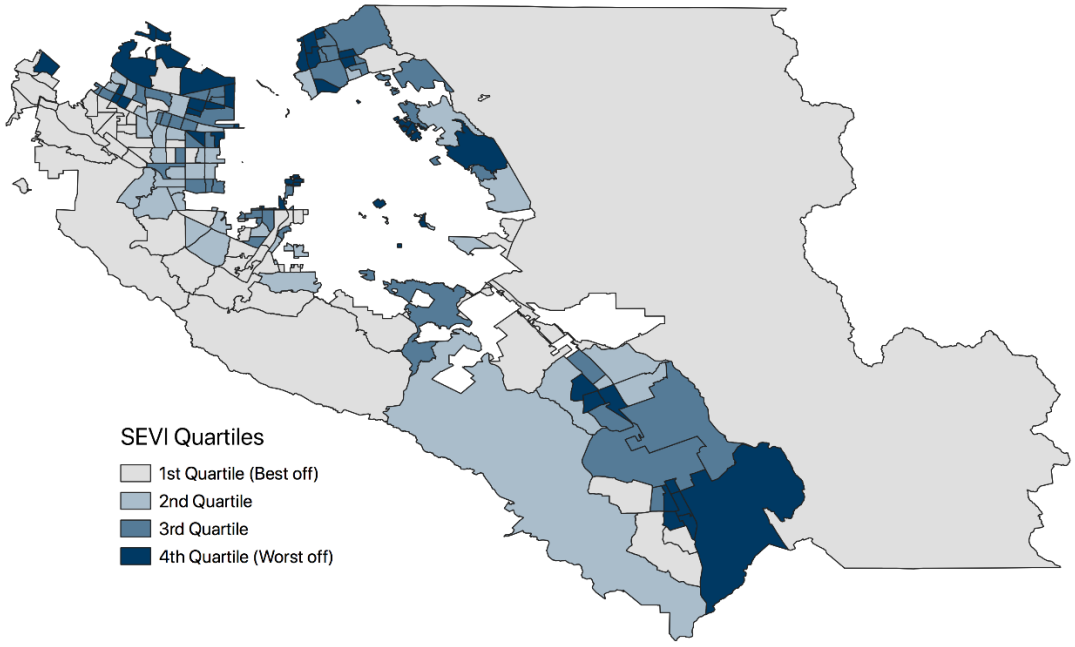

Figure 14: Map of SVCE census tracts by SEVI quartile

SVCE has performed analysis to understand the different demographics in these SEVI quartiles using utility and tax assessor data. See Table 20 below for a high-level overview of some example statistics by SEVI quartile that SVCE uses to inform program design.

Table 20: SEVI quartiles and key demographic information

	SEVI 1	SEVI 2	SEVI 3	SEVI 4
Residential Accounts	53k (23%)	62k (27%)	64k (28%)	44k (19%)
Population	177k (19%)	251k (27%)	245k (26%)	242k (26%)
CARE/FERA Accounts	2.8k (10%)	4.6k (17%)	8.2k (30%)	10.5k (39%)
Median Income	$166,000	$145,000	$117,000	$79,000

The goal of using SEVI as a primary indicator is to provide a first pass at identifying varying community and customer demographics, associated decarbonization needs, and to support and track how those needs are being met. SEVI quartiles help SVCE staff think about program design and outreach. As an example, Figure 15 shows how housing composition varies among SVCE customers in SEVI 1 (best-off) and SEVI 4 (worst-off) quartiles. Considering that the population in SEVI 4 tends to have lower electrification rates overall is important but understanding the differences in housing composition is critical to decide how best to formulate a program for this underserved community.

This analysis, in part, led to SVCE's decision to offer both a building electrification incentive program (simpler for single-family homeowners) and a direct installation program (designed for multifamily). SVCE is still considering how best to reach single-family renters, another underserved subgroup, and has been pursuing the Tariffed On-Bill Financing pilot as a possible path.

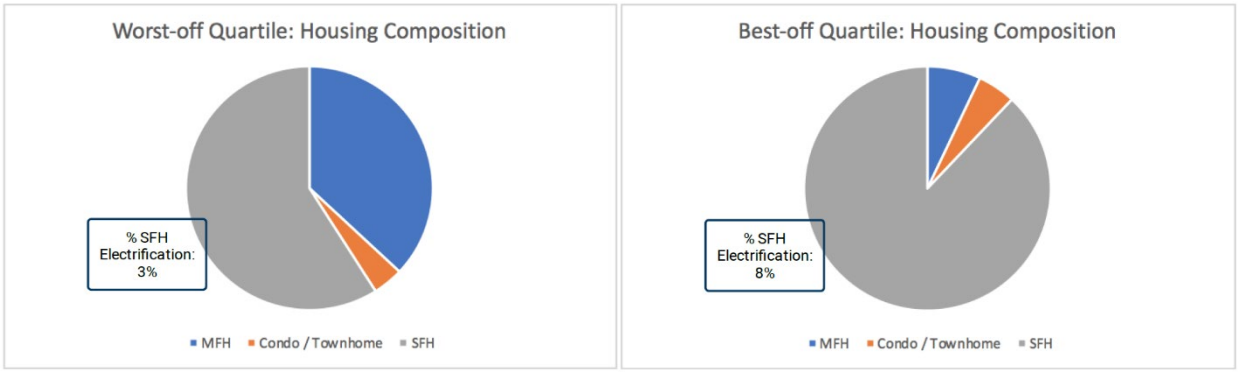

Figure 15: housing comparison of SEVI 4 (worst-off) and SEVI 1 (best-off) quartiles

SVCE is in the process of integrating its Programs Equity Framework into day-to-day program and marketing operations. Figure 16 below shows steps that SVCE follows during every program design to promote equity and reach underserved communities. By adding these steps into its program design checklist, SVCE has incorporated consideration of the needs of underserved communities.

A fundamental component identified to support the implementation of the Programs Equity Framework is strengthening ties with local community-based organizations representing underserved communities that SVCE is trying to reach. These organizations are best suited to help SVCE act on the steps from the Programs Equity Framework, receive useful input on program design and market effectively to their communities.

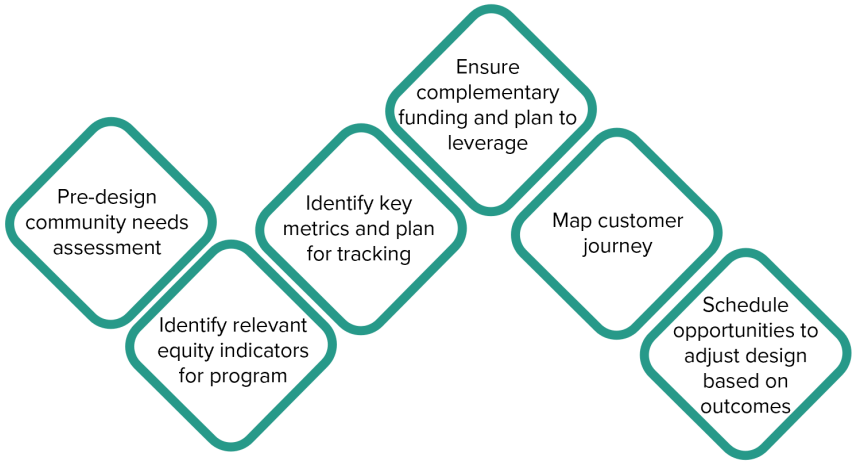

Figure 16: key steps to considering underserved communities in program design and implementation

Historically, SVCE has awarded grant funds to local nonprofits to collaborate on outreach to traditionally hard-to-reach and underserved residential customers. The purpose of these grants has been to provide accurate information to SVCE customers about SVCE's mission and benefits, as well as build relationships in underserved communities for future program development and deployment. The grants were offered to trusted, local nonprofits that serve underrepresented communities and harder-to-reach audiences in the SVCE service territory. These communities and audiences include low-income residents; seniors; customers eligible for Medical Baseline discounts; customers with low English language proficiency; and customers living in the south county, unincorporated Santa Clara County, and Milpitas.

Such collaboration has helped SVCE promote social equity by ensuring that customers in target communities are aware of how they can benefit from SVCE programs and rates. In 2023, SVCE will continue to strengthen ties with the community through focused outreach plans that include in-person outreach at community facilities, schools, retail and neighborhood associations as well as launching a native language awareness campaign to support the implementation of the Programs Equity Framework.

There are several examples of SVCE programs launched specifically to support underserved customers through their design. SVCE provided grant funding to launch two innovative pilots to provide reliable and affordable charging access to multifamily residents. The pilot with EVmatch tested their reservation-based software platform for shared charging for multi-unit dwelling tenants[54]. The pilot with Ecology Action demonstrated lower power charging technology and a business model designed for affordable housing communities[55]. SVCE further supported successful applications for CEC grant funds by both companies to greatly expand their efforts locally.

In addition, per SVCE's EV Infrastructure Joint Action Plan, SVCE is currently offering two programs focused on deployment of EV charging to serve multi-family properties. The "Priority Zone DC Fast Charging" program offers financial incentives for new fast charging stations located near concentrations of older and therefore typically lower-income multifamily properties. The map below shows representative "Priority Zones." SVCE's FutureFit Assist: EV Charging program offers a full suite of free technical assistance to multifamily properties for design and deployment of onsite charging. In addition to incentives, the program helps multifamily property managers identify current and future EV charging needs, design charging installations, and obtain funding from relevant incentive programs.

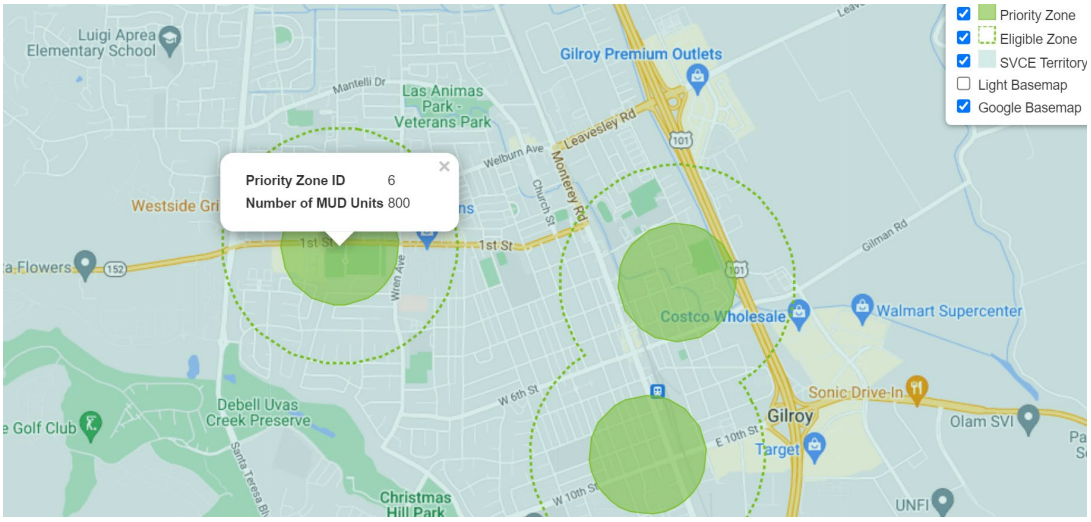

Figure 17: map of some SVCE "Priority Zones" around clusters of multifamily properties (MUDs) in Gilroy

To help serve its most vulnerable customers, SVCE is working with a local non-profit agency to provide free portable batteries for medical baseline customers located in fire-prone areas, and those most likely to be impacted by PSPS events.

On an ongoing basis, SVCE is conducting outreach and engaging with its 270,000+ customers, through both direct and electronic channels. Quarterly, SVCE hosts a meeting with its community partners to gain feedback on SVCE's energy services, program results, and upcoming plans. Community partners include local advocacy groups, citizens serving on local governmental commissions, and community non-profit organizations. And as a public community choice energy agency, SVCE Board and Committee meetings are publicly noticed and open to the public for input and comment.

[54] Pilot available at https://www.svcleanenergy.org/innovation-evmatch/.
[55] Pilot available at https://www.svcleanenergy.org/innovation-ecologyaction/.

SVCE's website includes the eHub customer resource center, designed to inspire, educate, and enable action related to clean energy and electrification. It is highly accessible and free of charge. eHub provides educational content, tools and third-party services for a broad range of topics, including solar + battery storage, EV costs, savings, and available incentives and heat pump water heater models and ratings. SVCE conducts several major outbound email campaigns each year focused on education related to electrification, and resources available to customers via eHub.

SVCE's website and compliance notifications are available in four languages – English, Spanish, Standard Chinese, and Vietnamese.

c. Commission Direction of Actions

While SVCE has attempted to put forward reasonable and actionable portfolios as part of this IRP, there is significant uncertainty in regulatory and market conditions which were considered in selecting a preferred portfolio. Part of SVCE's qualitative evaluation of the Conforming Portfolios included assessing regulatory risk. Generally, such risks provide incentive for an LSE to maintain optionality on a forward-looking basis to adapt to changing conditions. More specifically, the suggestion of "resource specific" enforcement of the 2022 IRPs in Energy Division's recent Staff Options paper was a barrier to pursuing a more aggressive IRP Preferred Portfolio this cycle. Combined with current market conditions for development and interconnections of new projects, SVCE opted to select a more conservative portfolio as its preferred case in the event the Commission penalizes LSEs who do not or cannot implement the Preferred Portfolios presented in the 2022 LSE IRP filings.

Previous IRP procurement orders have effectively penalized SVCE for proactively procuring resources to meet its long-term obligations to its customers and the state by not allowing these contracted resources to count toward procurement orders. These orders also unfairly shift costs to LSEs who may be made "long" by a load share-based allocation. SVCE has also witnessed the impact of such orders, especially resource-specific carve outs, on the market and believes they contribute to market power issues. SVCE appreciates the Commission's acknowledgement of such issues in D.22-02-004 and the recent ALJ ruling on Near-term Actions to Encourage Additional Procurement[56]. While SVCE recognizes the Commission is considering alternate IRP program designs, there remains risk to LSEs for pro-actively contracting new resources.

While SVCE was cautious this cycle in its Preferred Conforming Plan election, it does appreciate the Commission's efforts to design an improved structure for procurement which balances the needs of LSE autonomy and assurances for regulatory bodies that the system can meet its objectives. SVCE is still evaluating options and appropriate design for the programmatic approach. It generally supports the notion that procurement should not be driven by procurement orders. SVCE believes that requiring LSEs to contribute fairly to the system needs is, in principle, a commendable goal. Details for how to assess and enforce portfolios require careful evaluation. Core to any future procurement methodology is ensuring reasonable consistency in regulatory and IRP planning assumptions as discussed in Section V below. SVCE looks forward to engaging in stakeholder processes to further elaborate on a programmatic approach to the IRP. SVCE encourages the Commission to act expeditiously to design and

[56] See Administrative Law Judge's Ruling Seeking Comments on Staff Paper on Procurement Program and Potential Near-term Action to Encourage Additional Procurement. R-20-05-003. September 8, 2022. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M496/K688/496688637.PDF.

implement such a program prior to the 2024 IRP cycle to provide LSEs with more regulatory certainty as they develop their next IRP portfolios.

V. Lessons Learned

SVCE applauds the Commission for the continued evolution of the Integrated Resource Planning process, which has had meaningful improvements over the past three cycles. Many of the suggested changes proposed by SVCE in its 2020 IRP have since been adopted. In particular, the changes to the RDT and CSP tools and requirements this cycle represented meaningful improvement over prior cycles by both increasing usability and allowing a greater degree of flexibility for LSEs. Additionally, SVCE appreciates the Commission and staff for allowing LSEs to exceed the minimum GHG-targets and provide the opportunity to submit their own load forecasts for consideration. These changes enable LSEs to provide portfolios more representative of their intended actions.

As the IRP process continues to evolve, SVCE provides the following suggestions for further improvements to the proceeding.

First, SVCE notes that the current timing of the planning process creates challenges for LSEs trying to develop actionable portfolios. Staff did not release several key documents until mid-July. Given SVCE utilized many of the inputs from the CSP and RDT tools in its modeling effort to ensure alignment between its portfolio optimization and the compliance tools, the majority of the work on this IRP could not begin until after materials were released. Further, staff continued to change requirements as late as September 30, 2022. Any changes or clarifications to requirements near the filing deadline can be challenging to implement and take time that could otherwise be used to refine the narrative or add additional analytical insights which would provide value to the larger stakeholder process. CCAs such as SVCE are governed by a board of directors who must review and approve the IRP filing during regularly scheduled board meetings which do not align with regulatory filing dates. This means that CCAs must have largely complete IRPs weeks in advance of the filing deadline. In practice, SVCE had less than three months to review compliance tools, calibrate models, develop portfolios and complete the required deliverables.

Should the Commission adopt a compliance-based approach to the IRP in which LSEs are held to their IRP portfolios as described in the September 2022 Staff Options Paper, providing additional time to LSEs to more fully explore pathways to hitting their targets will be necessary to ensure the success of the program[57]. It is not reasonable to ask LSEs to be held to a ten or more-year plan which they had less than one quarter to develop.

Second, the IRP process as it stands today lacks cohesion due to radical shifts in planning assumptions between cycles. This is made worse by procurement orders which effectively negate the plans LSEs file. These dramatic shifts in expected resources and requirements, planning reserve margins and resource counting methodologies produce IRP results disconnected from previous cycles, making implementation of plans difficult or impossible. If a sustainable IRP implementation track is to be developed, planning assumptions must be stabilized to ensure that LSEs can iteratively develop a reasonable path toward meeting their long-term planning goals.

[57] "Reliable and Clean Power Procurement Program Staff Options Paper". CPUC Energy Division. September 2022.

Third, SVCE encourages the Commission to engage with the CAISO and other relevant stakeholders to improve grid planning and development. The immense level of new build required to ensure the State meets its reliability and decarbonization goals is currently subject to many barriers and risks. Improvements to interconnection processes, CAISO queue management, permitting and import allocation rights all need to be addressed to ensure resources can come online and are available as needed. As noted above, both supply side projects and demand side programs rely on the timely development of transmission and distribution assets. Some programs, such as ELRP, would also benefit from improved data accessibility to ensure CCAs such as SVCE can improve outreach to customers. These non-wire alternatives may also play an important role in ensuring reliability in the near and long-term.

Finally, SVCE once again encourages the CPUC to undertake further integration and complementarity between the IRP and RPS Procurement Plan processes and timelines. Many of the same fundamental questions addressed in the RPS Procurement Plan are of interest in the IRP exercise, including future resource selection and impacts of resource selection on grid reliability. Developing internal CPUC infrastructure that would allow LSEs to avoid duplicating this information would reduce administrative burden and allow for more focus on substantive consideration of key policy issues.

Glossary of Terms

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

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

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

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

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

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

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

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

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

Conforming Portfolio*: the LSE portfolio that conforms to IRP Planning Standards, the 2030 LSE-specific GHG Emissions Benchmark, use of the LSE's assigned load forecast, use of inputs and assumptions matching those used in developing the Reference System Portfolio, as well as other IRP requirements including the filing of a complete Narrative Template, a Resource Data Template and Clean System Power Calculator*.

Effective Load Carrying Capacity*: a percentage that expresses how well a resource is able avoid loss-of-load events (considering availability and use limitations). The percentage is relative to a reference resource, for example a resource that is always available with no use limitations. It is calculated via probabilistic reliability modeling, and yields a single percentage value for a given resource or grouping of resources.*

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

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

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

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

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

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

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

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

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

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

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

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

Loss of Load Expectation (LOLE): *a metric that quantifies the expected frequency of loss-of-load events per year. Loss-of-load is any instance where available generating capacity is insufficient to serve electric demand. If one or more instances of loss-of-load occurring within the same day regardless of duration are counted as one loss-of-load event, then the LOLE metric can be compared to a reference point such as the industry probabilistic reliability standard of "one expected day in 10 years," i.e., a LOLE of 0.1.*

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

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

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

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

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

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

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

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

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

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

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

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

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

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