ATTACHMENT A

Standard LSE Plan

Silicon Valley Clean Energy Authority

2018 INTEGRATED RESOURCE PLAN

August 1, 2018

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1. Executive Summary

This is the inaugural Integrated Resource Plan (IRP) of the Silicon Valley Clean Energy Authority (SVCE), filed in compliance with the requirements of SB 350 and R.16-02-007. SVCE presents two portfolios, Conforming and Preferred, which differ only by load forecast due to an expansion of SVCE's service territory since the release of the 2017 IEPR report. Both portfolios produce 2030 emissions estimates below SVCE's allotted 2030 benchmarks. As required, the IRP discusses both the methodology used to develop these portfolios and an action plan for implementing them, including measures to safeguard affordability and accommodate disadvantaged communities. Finally, SVCE presents suggestions for improving the IRP process in future cycles that SVCE believes will both improve the rigor of the results and make the process more efficient for both LSEs and CPUC staff.

2. Introduction to SVCE

The Silicon Valley Clean Energy Authority (SVCE) is a Community Choice Aggregator (CCA) that provides electricity to twelve communities and the unincorporated areas of Santa Clara County. Founded in 2016, SVCE was designed to strengthen local climate change mitigation efforts by reducing emissions associated with electricity production and promoting the distribution and adoption of low-carbon energy technologies. SVCE's member communities are:

Campbell	**Cupertino**	**Gilroy**	**Los Altos**
Los Altos Hills	**Los Gatos**	**Milpitas**	**Monte Sereno**
Morgan Hill	**Mountain View**	**Saratoga**	**Sunnyvale**
Unincorporated Santa Clara County			

Since day one, SVCE has been committed to providing customers with carbon-free electricity. When SVCE launched service in April 2017, customers had a choice between two electricity products:

- **GreenStart**: The default option, consisting of 50% RPS-eligible renewables and 50% large hydroelectric
- **GreenPrime**: An opt-in premium product consisting of 100% RPS-eligible renewables

These two product offerings remain in place, and are layered on top of a rate structure that mirrors PG&E's rate schedules and provides tailored options for residential, commercial, industrial, and net-metered customers.

SVCE is a Joint Powers Authority (JPA) governed by a Board of Directors of one local elected official from each member community. Board meetings are held on the second Wednesday of every month, at 7:00

pm at the Cupertino City Hall. As prescribed by the Brown Act and the CCA institutional model, all Board meetings are open to the public and all meeting materials are posted online.

3. Study Design

a. Objectives

SVCE approached the development of this IRP as a balancing act. On one hand, we support the idea of sector-wide decarbonization planning as embodied by the IRP process. SVCE was formed explicitly for the purpose of decarbonization, both in our member communities and as part of California's broader grid ecosystem.

On the other hand, we are wary of providing false certainty where it does not exist. The Baseline and New Resources templates mandated by the IRP process require very high temporal and resource granularity. However, the long time horizon of this modeling exercise means that many of these inputs are based on hypothetical future procurement decisions that will not be made for years. When they are made, these decisions will be influenced by future market conditions, policy outcomes, and other variables that we have little visibility into now but which would be irresponsible to write off. Thus, while it is possible to make hypothetical decisions now that provide highly granular inputs, doing so risks producing results that do not accurately reflect the level of uncertainty surrounding future procurement.

Greater detail on how we attempt to strike this balance is provided in later sections, but the development of this IRP was guided by the following objectives:

1) Describe SVCE's existing procurement commitments and goals clearly and comprehensively.

2) Build in enough procurement flexibility to allow SVCE to harness evolving market conditions and procure carbon-free energy as affordably as possible.

3) Document assumptions and methodologies clearly so that concrete procurement commitments can be separated from estimates and placeholders.

b. Methodology

i. Modeling Tool(s)

No modeling software was used in the production of this IRP. Microsoft Excel was used to complete the Commission-mandated templates and GHG calculator.

ii. Modeling Approach

The first step in our analysis was to translate the objectives above into a decision-making framework that could more concretely guide our completion of the templates and GHG calculator. In estimating how SVCE's energy demand would be met in each year, we considered a hierarchy of sources in order of decreasing certainty:

1. **Existing contract data**. Contracts that have already been signed provide procurement and therefore (relative) emissions and resource-type certainty for the timespan and portion of load they cover.
2. **Applicable procurement mandates**. Future procurement estimates should incorporate compliance with all mandates from state policymakers and SVCE's Board of Directors. These mandates make some decisions for us, such as the 65% RPS long-term contract requirement in SB 350 or the SVCE Board's direction to eliminate biomass and geothermal resources from SVCE's portfolio.
3. **Historical proxies**. In some instances, historical data can be used to approximate future procurement outcomes. For example, where contract terms are not changing between years, we use RECs documenting the previous year's actual energy deliveries from multi-facility, energy-only contracts to predict the resource mix of deliveries from those contracts in upcoming years.[1]
4. **Model structure**. <u>By themselves, the granularity needs of the model are not a sufficient justification for committing to one resource over another</u>. If multiple viable procurement options remain after complying with all Board and policy requirements and no historical proxy data are available, open questions should be represented in the templates and GHG calculator with neutral placeholder numbers. All such placeholders, such as a 50/50 split between two possible options, are clearly identified in this report.

This framework was then applied to three key contract characteristics that collectively defined SVCE's responses to the templates and GHG calculator.

Long-term vs Short-term Contracts: SB 350 requires that starting in 2021, at least 65% of procurement contracts used for compliance with the Renewable Portfolio Standard (RPS) be ten or more years in length.[2] Figure 1, below, shows SVCE's existing long-term RPS contracts and anticipated long-term RPS contracting needs between 2021 and 2030. A significant portion of SVCE's long-term obligation has already been fulfilled by the results of an RFO SVCE issued jointly with Monterey Bay Community Power

[1] There is no contract provision requiring or even suggesting that the split of REC deliveries between the eligible facilities in such a contract will remain the same year to year. However, given the inherent uncertainty in a contract of this structure, we see this proxy approach as the best available.

[2] Public Utilities Code Section 399.13 (b)

in fall 2017.[3] The light green wedge estimates SVCE's expected remaining long-term contract needs between now and 2030 in order to comply with the requirements of SB 350.

SVCE is open to signing long-term contracts in excess of this requirement, as well as for the non-RPS carbon-free portion of our portfolio. However, those decisions will be made on the basis of future market conditions and the quality of individual offers received in future RFOs. In this IRP, we assume only enough long-term RPS contracting to comply with SB 350 on the basis that a conservative approach better serves the purpose of identifying system-wide deficiencies than promising additional long-term contracting (and its indicator in the templates, new build) that is not guaranteed to happen.

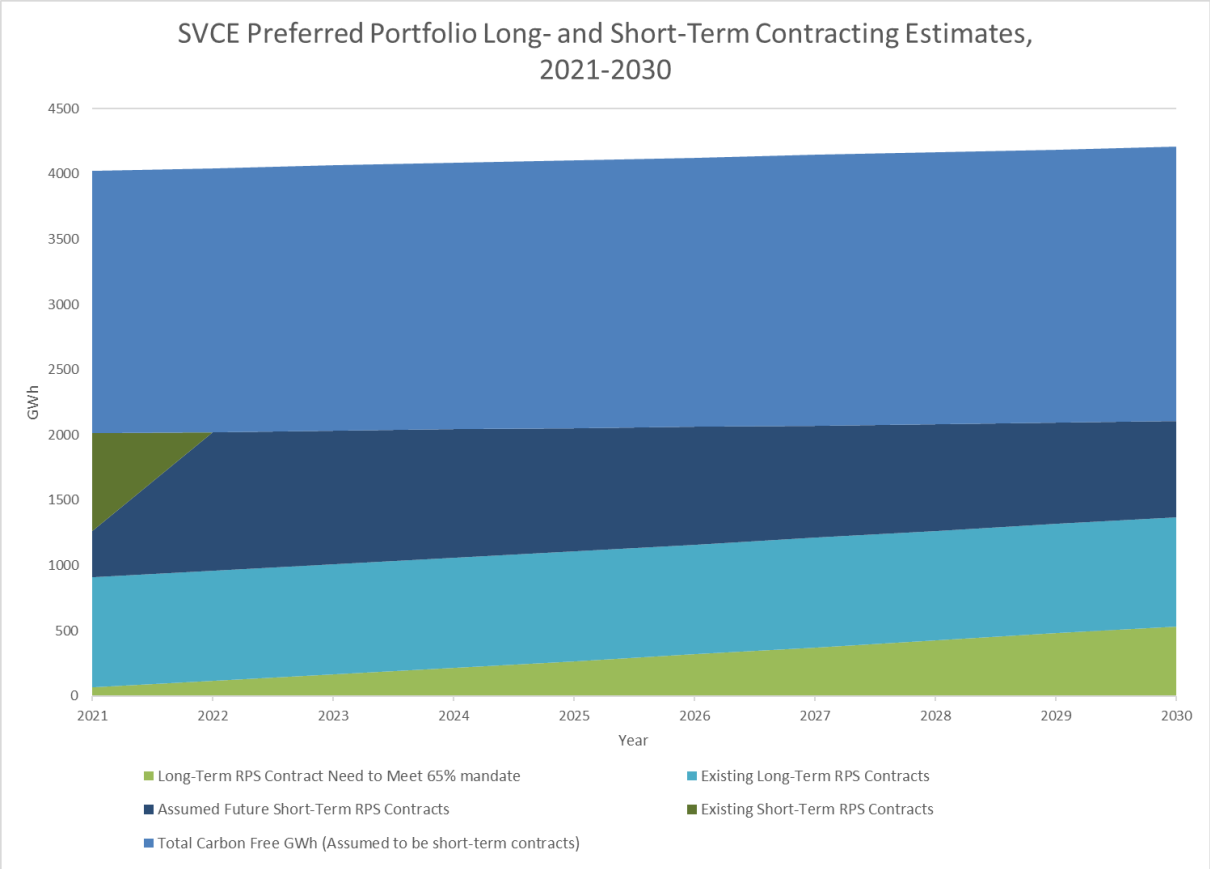


Figure 1. SVCE's existing RPS commitments and future contracting needs, 2021 – 2030.

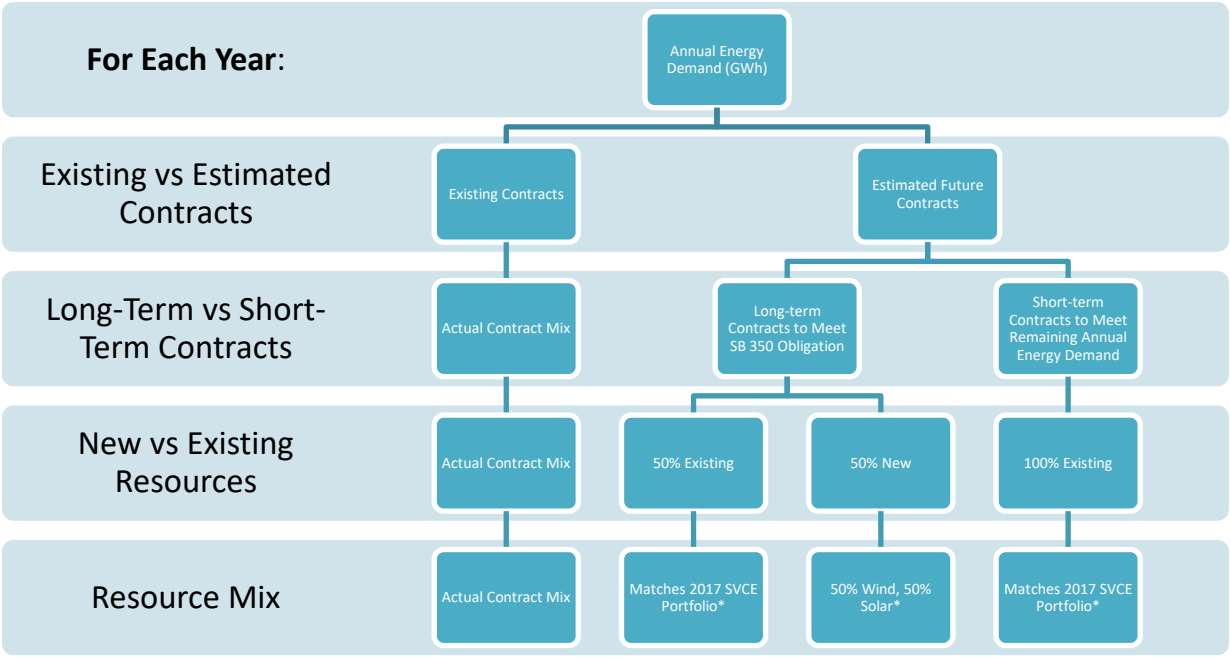
New vs Existing Resources: Our assumptions about building new resources hinge on our assumptions about long- vs short-term contracts. We assume all short-term contracts to be with existing resources (and thus represented in the Baseline Resources template), because a short-term contract is unlikely to provide the financial security needed to support construction of a new facility. Long-term contracts could be with either new or existing resources, and in the abstract SVCE does not prefer one over the

[3] RFO materials available at https://www.svcleanenergy.org/energy-procurement/

other. RFOs can bring in bids from both new and existing facilities, and our allocation of contracts between the two will depend on the quality and characteristics of the individual bids. Since these are impossible to foresee ahead of time, we use a placeholder split of 50/50 in the templates. Half of the annual energy demand allocated to long-term contracts is assumed to be met with new resources and represented in the New Resources template, and the other half is assigned to existing resources and represented in the Baseline Resources template.

Resource type: SVCE is not currently working towards any major resource-type portfolio transitions. Our assumptions about resource mix are thus based largely on maintaining SVCE's current resource portfolio into the future. All contracted and delivering CEC RPS-qualified resources are included in the 2018 supply plan, including the GHG calculator. For future years, annual energy demand allocated to anticipated future contracts with existing resources is split between resource types in proportions matching SVCE's 2017 portfolio.[4] While these percentages are likely to shift slightly year-to-year, this is the best approximation we have at this time. Demand allocated to new resources is assumed to be met with either wind or solar, and split 50/50 between the two as a placeholder.[5]

Figure 2 demonstrates the order in which the above three decisions were made.



[4] There are two minor caveats to this: elimination of biomass, biogas, and geothermal resources; and replacement of all non-PCC1 renewable resources with PCC1 renewables after existing contracts expire. These are discussed in Section 5.

[5] Since SVCE is young and has only conducted one RFO for new resources so far, the resource-type composition of our new resource contract portfolio is based on a very small sample size. We therefore deemed it an inappropriate proxy for the resource composition of future new resource contracts.

Figure 2. Decision tree of assumptions for allocation of future energy demand not met by existing SVCE contracts. **With caveats described in footnote four*.

In addition to the approach outline above, we use the GHG emissions benchmark as our key metric rather than the GHG planning price. For an institution that holds GHG mitigation as a core part of its mission, the mitigation guarantee of a mass-based target is more appropriate than one whose guarantee lies with cost. We also use energy in GWh as our main unit of analysis rather than capacity. This is due to the structure of SVCE's existing portfolio. Prior to SVCE's first RFO for long-term contracts that would contain both energy and capacity, SVCE's portfolio consisted solely of RA-only and energy-only contracts. Using energy as the unit of analysis thus made it easier to factor existing contracts into calculations of resource needs in future years. However, as discussed in Section 5, SVCE's early reliance on energy-only contracts required us to estimate associated capacity values as inputs for the GHG calculator.

iii. Assumptions

SVCE did not use any assumptions that differ from those used in the Reference System Plan and the GHG calculator default settings. SVCE is developing programs as quickly as possible (see Section 4), and upon implementation we anticipate that these will impact inputs such as electric vehicle charging profiles, building electrification, and energy efficiency. We therefore expect to use customized assumptions in future IRP cycles. However, for this cycle our only customized input is the load forecast, discussed below.

4. Study Results

a. Portfolio Results

This IRP contains two portfolios. The first, the Conforming Portfolio, uses the load forecast found in the "mid Baseline mid AAEE mid AAPV" version of Form 1.1c of the CEC's adopted 2017 IEPR forecast. This portfolio is required. The second, our Preferred Portfolio, is identical to the Conforming Portfolio with the exception of the load forecast.

On June 1, 2018, SVCE expanded its service territory into the City of Milpitas. This planned expansion was first documented in SVCE's updated Implementation Plan, submitted to the CPUC on December 20, 2017.[6] The expansion came too late to be included in the 2017 IEPR, so it is not included in SVCE's assigned load forecast or 2030 GHG benchmark. We therefore provide an updated forecast and the associated paperwork with this IRP, and designate the portfolio based on the updated forecast as our

[6] https://www.svcleanenergy.org/files/managed/Document/1059/SVCE%20Addendum%20No.%201%20Milpitas%20Expansion%20%28F%29.pdf

Preferred Portfolio. The addition of Milpitas grew SVCE's estimated 2030 load from 3,492 GWh/year to 4,209 GWh/year, an increase of about 21%.

Table 1 shows the 2030 load forecasts, GHG emissions benchmarks, and estimated 2030 CO_2 emissions from the GHG calculator for each of the portfolios. Both portfolios are well below their 2030 emissions benchmarks. For our Preferred Portfolio, the emissions benchmark is calculated from information provided in the May 25th Ruling in this proceeding.[7] The updated emissions benchmark is calculated by applying the updated percentage of total load in PG&E's delivery territory that is served by SVCE to the total allowable emissions in PG&E's delivery territory.

The Conforming and Preferred portfolios were assembled using the same set of procurement assumptions, discussed above and in Section 5. All narrative text in this report, including discussion of rate impacts, disadvantaged communities, and planned actions, applies equally to the Preferred and Conforming Portfolios.

Portfolio	2030 Estimated Load (GWh)	Proportion of Total 2030 Load within PG&E Delivery Territory	2030 GHG Emissions Benchmark (MMT CO_2)	2030 GHG Emissions from GHG Calculator (MMT CO_2)
Conforming	3,492	4.4%	0.62	0.16
Preferred	4,209	5.2%	0.75	0.20

Table 1. Estimated load, emissions benchmarks, and estimated emissions in 2030 by portfolio

b. Preferred and Conforming Portfolios

SVCE's Preferred Portfolio in this IRP cycle maintains our commitment to carbon-free power, meets all regulatory requirements, matches our projected load forecast to 2030 including the City of Milpitas, and retains enough procurement flexibility to help us minimize costs by taking advantage of market opportunities as they arise.

Our Preferred and Conforming Portfolios are documented in the GHG calculator and input templates that accompany this report. Table 2, below, shows the estimated annual emissions of each portfolio from the GHG calculator in 2018, 2022, 2026, and 2030.

Portfolio	Annual Emissions Estimated by the GHG Calculator ($MMtCO_2$/yr)

[7] "Administrative Law Judge's Ruling Finalizing Greenhouse Gas Emission Accounting Methods, Load Forecasts, and Greenhouse Gas Benchmarks for Individual Integrated Resource Plan Filings." CPUC, R.16-02-007. 25 May 2018. Table 1.

	2018	2022	2026	2030
Conforming	-0.05	0.12	0.13	0.16
Preferred	-0.04	0.13	0.15	0.20

Table 2. GHG calculator estimated emissions in benchmark years from the Conforming and Preferred Portfolios.

i. Local Air Pollutant Minimization

SVCE's portfolio minimizes localized air pollutants and GHG emissions across our service area, including disadvantaged communities. In order to identify disadvantaged communities (DACs) that are located within its service territory, SVCE used CalEnviroScreen 3.0 to identify the top 25% of impacted census tracts on a statewide basis and the top 5% of census tracts without an overall score but with highest pollution burden. This analysis indicates that SVCE serves customers residing in 5 census tracts identified as DACs: 6085504602, 6085505202, 6085512310, 6085512602, and 6085512603. The population of these DAC areas is listed as 18,753 per 2010 census figures, which is estimated to comprise approximately 2.5% of SVCE's customer base.

SVCE's primary strategy for reducing emissions and contributing to the economic development of DACs 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).

SVCE's outreach is also designed to be especially sensitive to the needs of DACs. SVCE is offering up to $75,000 in small grants (in amounts not-to-exceed $20,000) for local nonprofits to collaborate on outreach in the SVCE service area. The purpose of this small grant pilot program is to provide accurate information to SVCE customers about SVCE's mission and benefits, as well as build relationships in disadvantaged communities for future program development and deployment.

This collaboration will help SVCE promote social equity by ensuring that customers in target communities are aware of how they can benefit from SVCE programs and rates, which is a shared priority among state regulators. The outreach grants will also build trust, relationships, and new communication channels that can be leveraged as SVCE's program portfolio develops. The grants may also provide SVCE with valuable data to inform future programs and will provide additional channels to communicate upcoming changes on residential energy bills with the transition to Time-of-Use rates.

The grants will be offered to trusted, local nonprofits that serve underrepresented communities and harder to reach audiences in the SVCE territory, including 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 SVCE's newest community, Milpitas.

ii. Cost and Rate Analysis

Along with decarbonization, affordability is a key priority for SVCE. We are therefore taking a number of measures to ensure that we can procure the Preferred Portfolio at the lowest possible cost and insulate our ratepayers against any unforeseen price shocks.

Reserve Build-up: SVCE has placed a priority on building cash reserves. Reserves act as an insurance policy to enable SVCE to maintain financial solvency and mitigate risk. Reasons to fund the proper reserve level include:

- Facilitate financial self-sufficiency;
- Be prepared for market related risk;
- Avoid unplanned cost-reduction/rate-shock measures;
- Reduce the impact of regulatory or legislative risk.

SVCE has in place a Board-adopted reserve policy. The commitment to establish reserves is looked on favorably by power suppliers and will be vital in obtaining a credit rating. The reserves policy specifies a target of 180 expense coverage days with a minimum of 90 expense coverage days and a maximum of 270 expense coverage days. The policy requires staff to develop a financial plan to restore reserves within two (2) years if the balance falls below the minimum level.

Credit Rating: In June 2018, Moody's granted MCE an investment-grade credit rating of Baa2. This was the first credit rating received by a CCA, and a major vote of confidence in the CCA model by the financial community. SVCE is planning to follow suit as soon as possible. An investment-grade credit rating is a major asset in procurement negotiations, allowing access to less costly financing arrangements that in turn help keep rates low. It will be approximately three years before SVCE has enough institutional history to apply for a rating, but in the meantime we are concentrating on the other financial requirements so that SVCE can enter into long-term contracts that satisfy its portfolio objectives.

Access to Credit: Maintaining a strong liquidity profile is a key credit consideration when procuring power. SVCE will have established by September 2018 an additional line of credit. Having access to incremental external liquidity not only supplements SVCE's balance sheet but also will provide greater flexibility in negotiating credit terms for power supply and may result in more supplier options and better pricing. A line of credit is viewed positively by the credit rating agencies when evaluating SVCE's liquidity profile.

Another important issue in this area is the cost implications of the current Clean Net Short (CNS) methodology. As finalized in the May 25th Ruling, CNS does not recognize the GHG-free attributes of PCC2 renewable resources. Since SVCE is committed to providing carbon-free power, this severely devalues our existing PCC2 investments. Given that this same treatment of PCC2 resources is being considered in the AB 1110 proceeding at the California Energy Commission, SVCE is considering procuring only PCC1 renewables in the future. Our financial forecasts project an annual incremental cost to our ratepayers of approximately $5 million to replace existing PCC2 resources with PCC1 when the

contracts expire over the next year. In future years, the annual incremental cost of procuring only PCC1 for our renewable portfolio is approximately $10 million.

We do not agree with this treatment of PCC2 resources, and strongly recommend that the Commission revisit this issue in the next IRP cycle. The complete discounting of PCC2's GHG-free attributes due to location over a geographic boundary creates an increased cost to ratepayers but little to no marginal GHG mitigation. We recognize that the RPS is a separate policy program with different goals from the IRP process, but excluding PCC2 from the GHG-free category entirely is not an accurate reflection of the contribution these resources make to California's decarbonization effort.

c. Deviations from Current Resource Plans

This IRP does not deviate from any of SVCE's existing resource plans. It is consistent with SVCE's RPS Plan, Strategic Plan, and cumulative existing procurement guidance from SVCE's Board of Directors.

d. Local Needs Analysis

SVCE will continue to fulfill all of its system, local, and flexible Resource Adequacy obligations, including any new requirements that may come out of the current RA proceeding (R.17-09-020).

5. Action Plan

a. Proposed Activities

In order to implement our Preferred Portfolio, SVCE will seek carbon-free resources through a diverse array of procurement mechanisms both within and outside our service territory.

Joint RFOs: In September 2017, less than six months after launching, SVCE conducted our first RFO for long-term PPAs with new renewable resources.[8] We conducted the RFO jointly with Monterey Bay Community Power (MBCP), SVCE's neighbor CCA to the south. This allowed us to take bids for larger projects than SVCE alone would need or be able to support, maximizing economies of scale and the cost benefits that come with them. The RFO was a strong success, attracting 87 bids and resulting in long-term PPAs for an anticipated 478 MW of new wind and solar capacity and 85 MW of storage.

The joint RFO model is one that SVCE intends to return to in the future, including for collaboration with other CCAs besides MBCP. In addition to bilateral efforts among pairs or small groups of CCAs, the CCA community is in the process of building a formalized procurement entity, a "JPA of JPAs," that could negotiate procurement deals for larger segments of the CCA population. While this institution is still in

[8] https://www.svcleanenergy.org/energy-procurement/

the early stages of development, it illustrates the potential for innovation and collaboration across the increasingly diverse ecosystem of electricity suppliers in California.

Local RFOs: On the other end of the spectrum, SVCE is also looking into procurement within our own service territory. As shown in Figure 1, our long-term contracting short is, in its first few years, much smaller than a typical long-term PPA. One approach to this is to pursue a larger PPA even if it's not yet needed for compliance, fulfilling our SB 350 long-term contract obligations all the way through 2030 at once. However, another is to look for smaller resources within SVCE's territory that would have the double benefit of supporting local enterprises and providing a contract closer in size to our compliance requirement. This option can also function as a hedge against market and regulatory uncertainty while allowing us to stay on schedule with long-term procurement. SVCE anticipates issuing a new RFO within the next 12 months either on its own or jointly with one or more local CCAs.

In addition to the types of procurement mechanisms SVCE will use, schedule and frequency are also important. For the purposes of this IRP, SVCE has taken a conservative modeling approach and is planning for the minimum amount of long-term contracting required by SB 350. However, SVCE does not have a specific required portfolio split between short-term and long-term contracts, and we are open to signing more long-term contracts if market conditions are favorable for doing so. The same goes for increasing our percentage of RPS-eligible renewables above 50% if more affordable alternatives to the large hydro that currently constitutes the carbon-free half of the portfolio emerge. SVCE staff and the Board of Directors will continue to evaluate all options, and select a diverse portfolio that fulfills SVCE's commitment to carbon-free energy while maintaining reliability and affordability and leveraging community relationships.

Programs and Community Outreach: In addition to decarbonizing our electricity portfolio, a crucial part of SVCE's mission is furthering GHG mitigation in other sectors through programs targeted to the unique needs of our member communities. SVCE is young enough that we have not yet had time to roll out a full program portfolio, but we are moving forward with program development as quickly as possible.

In November 2017, the SVCE Board formed a Customer Program Advisory Group (CPAG) to include residential customers in the program development process. CPAG members were nominated by SVCE Board members and by the Board Chair, and they represent ten of the SVCE member communities and unincorporated Santa Clara County.

Upon formation the CPAG was chartered to:

1. Serve as a conduit for community input and review of prospective residential customer programs.
2. Prioritize and recommend candidate programs through quantitative analysis.
3. Consider residential customer program recommendations through qualitative analysis.
4. Communicate and promote board-adopted programs.

Members of the CPAG have also reached out into their communities to seek broader input from the various associations, neighborhood groups and organizations that they belong to. This helps us register an even broader segment of residential customer opinions. CPAG representatives presented an initial slate of program ideas to the SVCE Board in June 2018, and we anticipate finalizing the first round of program selections in fall 2018.

Another example of how SVCE is already moving forward in this area is the BAAQMD grant. In May 2018, the BAAQMD Board approved a $325,000 grant to SVCE for its Future Fit home grant application. SVCE plans to use the grant in combination with our own program funds to switch approximately 100 residences from natural gas water heaters to electric heat pump water heaters, using incentives for both the water heater and an electric service panel upgrade. Information from this two-year program will be shared via multiple public data sets on a) the impact of fuel switching cost drivers during installation and b) usage patterns post installation.

b. Barrier Analysis

The most significant potential barrier to implementing the Preferred Portfolio is the existence of significant regulatory and legislative risk. A number of open proceedings at the Commission right now could have a profound effect on CCA finances and procurement authority, especially those governing the PCIA (R.17-06-026) and Resource Adequacy (R.17-09-020) programs. SVCE is participating actively in these proceedings (often though contributions to CalCCA filings) in order to help develop solutions that fulfill public policy goals while protecting CCA rights. On the legislative side, the supplier diversification taking place in the electricity sector has attracted legislator attention that could lead to significant new energy laws being passed in the upcoming sessions.

There is also the possibility of procurement obstacles arising from scarcity of a particular type of resource or some other market-based condition. In the former scenario, some resource substitution is possible within each procurement category (PCC1, GHG-free, etc) while maintaining SVCE's commitment to GHG-free energy. We also employ the financial measures discussed in 4.b.ii to help us maximize our effectiveness as a procurement entity and protect our ratepayers from price shocks, be they regulatory or market-based in origin.

c. Proposed Commission Direction

SVCE does not require any new Commission action in order to implement the portfolios described in this IRP. However, preservation of SVCE's existing rights as a CCA, especially to procurement autonomy, will be crucial to upholding our procurement principles and our member communities' decarbonization goals.

6. Data

a. Baseline Resource Data Template

Existing Contracts with Existing Resources

SVCE's current resource portfolio consists of two contract categories: RA-only and energy-only. Both of these are included in the Baseline Resource Data Template, represented with capacity and energy values respectively. Treatment of the RA-only contracts, which are presented by year and month, is straightforward. However, the nature of the energy-only contracts makes them more difficult to fit into the template.

Most of SVCE's energy-only contracts are "blended" or "portfolio" contracts, meaning that they guarantee a specified amount of energy annually sourced from some combination of a list of eligible facilities. The types of facilities that are eligible depends on the overarching guarantee of the contract, which for SVCE is either "PCC1 eligible renewables," "PCC2 eligible renewables," or "carbon-free" (not necessarily RPS eligible). The exact contribution of each facility is not specified in the contract, and is not known until SVCE receives the RECs each spring from the previous year's delivered energy.

The difficulty with inputting these contracts into the template is that the template requires each row to have a specified resource type (Column H, "Resource_Type"). Since these contracts contain multiple resource types with unknown percentage contributions, representing a whole contract-month in a single row is impossible. Instead, we split the contracts out by resource, creating a separate row for each resource type in each contract. This spring SVCE received the 2017 RECs from these contracts, and we use these RECs to calculate the percent of total energy contributed by each resource type to each contract. Since the contract terms do not change year-to-year, we assume that each contract will exhibit an identical resource split in future years. There is no guarantee that these contributions from each resource type will hold constant year-to-year, but we do not see a better proxy available at this time.

The Baseline Template asks for contracts to be split out by year and month, the total number of rows per existing contract in the template is [number of years in the contract]x[12 months per year]x[number of resource types included in the contract]. Many of the contracts guarantee energy on an annual rather than a monthly schedule, so the annual energy total must split into estimated monthly contributions. We accomplish this using the month profiles from the one contract SVCE holds in which energy delivery is guaranteed by month, developed in accordance with SVCE's annual load shape.

Anticipated Future Contracts with Existing Resources

As SVCE's current contracts with existing resources gradually expire, we will need to sign new ones. After calculating the annual energy need that is not covered by existing contracts, we make assumptions about the resource composition of these new contracts. SVCE has maintained our preferred portfolio composition (50% RPS-eligible renewables, 50% carbon-free) from day one, so we are not trying to implement any major long-term transitions in portfolio composition. We thus assume that the total

resource composition of future contracts signed with existing resources will maintain our current resource mix, with two caveats.

First, we eliminate PCC2 renewable resources from the portfolio. Although we include our current PCC2 resources in the GHG calculator for 2018, we assume that when they expire they are replaced with PCC1 resources. As such, for the portion of future load allocated to RPS-eligible renewable contracts with existing resources, we use the resource mix of only our existing PCC1 contracts rather than all RPS-eligible renewable contracts combined.

Second, the Board of Directors has directed SVCE staff to eliminate biomass, biomethane, and geothermal resources from the portfolio as soon as possible. This was decided out of concern that these three resource types had small amounts of emissions associated with their energy production, and thus did not meet the SVCE standard of being carbon-free despite being eligible renewables under the RPS. We implement this in the template by distributing the portion of demand that would have been assigned to those resource types based on our current portfolio composition to the other eligible renewable resource types in proportion to their abundance, thus maintaining total percentage of eligible renewables in the portfolio.

b. New Resource Data Template

Existing Contracts for New Resources

The first entries into our new resources template are for SVCE's existing long-term contracts for new build. These are the result of SVCE's first RFO, held in fall 2017 and discussed in further detail in section 4. The contracts are still being finalized.

Anticipated Future Contracts for New Resources

Planning for additional new build in this IRP hinges on our assumptions about long-term vs. short-term contracting. As discussed in Sections 3 and 4, we took a conservative approach in this IRP and assumed only enough additional long-term contracting to comply with SB 350's requirements. SVCE is open to signing more long-term contracts if suitable opportunities arise. However, we assumed that from a system modeling perspective conservatism would be more useful than forecasting a larger quantity of new build that might never materialize.

We assume that all short-term contracts are with existing resources, because a short-term contract is unlikely to provide the security needed to finance a new generation facility. For long-term contracts, our distribution revolves around the fact that a single RFO can receive offers from both new and existing generation facilities. Since logistically we do not have to choose between new and existing resources before reviewing the individual bids, we see no value in restricting procurement options ahead of time. The potential benefits of building new carbon-free resources are obvious, but taking over an existing carbon-free facility that might otherwise have fallen out of production also has value.

We therefore use a placeholder 50/50 split to represent our willingness to consider both new and existing facilities for long-term contracts. Half the demand allocated to long-term contracts each year is assigned to existing facilities (and thus represented in the Baseline Resources template), and the other half is assigned to new facilities (represented in the New Resources template). The half that goes to the New Resources template is divided 50/50 between CAISO wind and CAISO solar, the two types of resources that we are most likely to be able to site and build. However, this 50/50 split is only a placeholder designed to represent the uncertainty of exactly which resources will produce the most competitive bids in future RFOs.

c. Other Data Reporting Guidelines

As previously mentioned, most of SVCE's portfolio consists of RA-only and energy-only contracts. However, the GHG calculator uses capacity values as the main generation input, and is not structured to handle energy-only contracts in raw form. We therefore needed to estimate capacity values for our energy-only contracts in order for them to be included in our GHG calculations. We did this by using the annual capacity factors from the "Renewable Profiles" tab of the GHG calculator to estimate the amount of capacity that would be needed to produce the total annual energy of each resource type guaranteed by our contracts. This was done for both existing energy-only contracts and estimated future contracts, the latter of which were originally calculated as a portion of annual energy need rather than capacity.

As mentioned above, we include all contracted and delivering CEC RPS-qualified resources in our 2018 supply plan, including our GHG calculator inputs. However, all of SVCE's non-PCC1 renewables contracts expire before 2022 (the next year used in the calculator) and are assumed to be replaced with PCC1 resources, so RPS-eligible calculator inputs in years after 2018 can be assumed to be PCC1.

7. Lessons Learned

Any planning effort this comprehensive requires time and iteration to perfect. SVCE staff would like to express our deep appreciation to the CPUC IRP staff team for their responsiveness to questions and efforts to address stakeholder concerns in advance of the filing deadline. We offer the following suggestions for improvement in future IRP cycles, which we hope will both improve the accuracy of the results and make the process more efficient for both LSEs and CPUC staff.

Improve harmonization between model input structure and actual contract structure. The primary analytical challenge we faced in developing this IRP was translating the information provided by our contracts into a form that the IRP templates and the GHG calculator would accept. These documents appear to have been designed for long-term PPAs with a single generation facility that include both energy and capacity. Such contracts provide both energy and capacity inputs and complete clarity regarding the type of resource involved. However, this does not reflect the reality of many LSEs' portfolios, especially young institutions like SVCE that have not yet had time to conduct multiple long-term RFOs. Energy-only contracts, blended contracts involving multiple resource types in unspecified

proportions, and other structures apart from a single-facility PPA are both common and an important first step for young LSEs. Even with time, risk management requires that some portion of an LSE's portfolio stay in short-term contracts, and these are more likely than long-term contracts to involve the above complications.

In this IRP cycle, the structure of the templates has taken precedence over the structure of LSEs' actual contracts, and individual LSEs have been responsible for modifying their contract information as necessary to produce acceptable model inputs. The approach suggested by CPUC staff has been for LSEs to make the modifications they must and document their methods in the narrative report. In many cases this is impossible to do without estimation, forcing LSEs to produce input templates that give an appearance of granularity and certainty where it does not actually exist.

Moreover, the treatment of the IRP materials after they are submitted to the CPUC opens up an opportunity for confusion. If SVCE staff understand the process correctly, the input templates are read into the statewide model using an automated script, separating the information they carry from the narrative reports and their documentation of assumptions. Warnings of uncertainty, differences in estimation methodologies across LSEs, and other nuances of the transformation from concrete contract data to preferred model inputs are all potentially lost unless CPUC staff manually check the inputs against their narrative reports and standardize them before feeding them into the statewide model. Even if this is done, it is presumably a time- and resource-intensive process for CPUC staff.

In future cycles, the IRP process could be improved by modifying the IRP models and templates to take inputs more similar to the information provided by actual procurement contracts. This allows CPUC staff to maximize their capture of accurate industry information, one of the primary benefits of having LSEs participate in the IRP process. If modifications are needed to make contract data align with the structure of the CPUC's chosen statewide model, these should be done internally at the CPUC in a standardized manner. That way, rather than requiring dozens of LSEs to come up with their own methodologies and CPUC staff to check all of them for consistency, there would be only one methodology per modification that would be known to both LSEs and CPUC staff. Trade-offs between certainty and granularity would be consistent across all LSEs, improving the rigor of the statewide model and allowing for a more informed interpretation of the results.

A simple example of this approach would be to modify the GHG calculator to take inputs in the form of energy *or* capacity rather than capacity only. In its current form the GHG calculator requires LSEs to estimate capacity values for energy-only contracts, creating a possibility of differing methodologies across LSEs. In this particular case the calculator provides capacity values that most LSEs are likely to use for their conversions. However, more complex tasks, such as splitting multi-resource contracts into contributions from single resource types, are more likely to see significant methodological variation across the LSE community.

Reform GHG accounting to correctly value PCC2 resources. SVCE generally supports the shift to an hourly GHG accounting methodology. Our commitment to carbon-free electricity was made when annual GHG accounting was the accepted norm, and we intend to continue procuring 100% carbon-free

power on an annual basis for our customers. We recognize, however, that moving to a higher time granularity is an important step towards decarbonizing the entire grid. Our future procurement and program development will reflect the growing importance of matching supply and demand curves on an hourly basis.

However, there is one piece of the Clean Net Short (CNS) GHG accounting methodology used for this IRP cycle that we consider indefensible. CNS in its current form strips all GHG reduction benefit from PCC2 RPS-eligible renewable resources. The justification given for this in the May 25th Ruling is that the firmed-and-shaped nature of these products is incompatible with the hourly nature of the CNS method, because it obscures the production profile of the renewable resource and may be delivering substitute, non-zero-emissions energy in any given hour.[9]

SVCE believes that this methodological challenge is not a sufficient reason to devalue all PCC2 resources. This policy disincentivizes regional coordination on climate mitigation despite the cost and integration benefits of tapping into renewable resources across geographic areas and time zones. Setting artificial boundaries at the state border makes efforts to decarbonize the grid more expensive with little additional mitigation benefit. We welcome a stakeholder process to determine how the hourly needs of IRP accounting might be reconciled with the structure of PCC2 contracts, but at least of portion of the energy from these contracts should be counted as the GHG-free resource that it is.

[9] "Administrative Law Judge's Ruling Finalizing Greenhouse Gas Emission Accounting Methods, Load Forecasts, and Greenhouse Gas Benchmarks for Individual Integrated Resource Plan Filings." CPUC, R.16-02-007. 25 May 2018, p. 13-14.