Standard LSE Plan

SAN JOSE CLEAN ENERGY

2020 INTEGRATED RESOURCE PLAN

SEPTEMBER 1, 2020

PUBLIC VERSION

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I. Executive Summary

About SJCE and this Integrated Resource Plan (IRP)

San José Clean Energy (SJCE) is San José's new electricity supplier, having launched service in February 2019. Operated by the City of San José's Community Energy Department, SJCE was created to implement the City's ambitious clean energy goals and provide choice to residents and businesses for electric supply. SJCE is governed by the San José City Council. SJCE has committed to achieving the goals of the Paris Agreement on climate change and developed a comprehensive plan, Climate Smart San José, to achieve that objective.

While SJCE only began serving residents and businesses in February of 2019, SJCE has engaged in aggressive procurement of a balanced portfolio of long-term contracts. SJCE's portfolio already includes the following new resources to be added no later than 12-31-2022: a 225 MW out-of-state wind project, a 62 MW solar project paired with storage to produce fixed delivery in hours ending 07-22 every day of the year, and two 100 MW solar projects, one of these with a 10 MW co-located battery.

On August 25, 2020, the San José City Council approved two portfolios to be submitted as part of SJCE's 2020 IRP:

- A conforming portfolio that results in SJCE emissions equal to its proportional share of a statewide electric system case that emits 46 million metric tons (MMT) of greenhouse gas (GHG) emissions by 2030 (the "Conforming 46MMT Portfolio"); and
- A conforming portfolio that results in SJCE emissions equal to its proportional share of a statewide electric system case that emits 38 MMT of GHG emissions by 2030 (the "Conforming 38 MMT Portfolio").

In addition, San José City Council approved 2020 IRP Criteria and authorized the Director of the Community Energy Department to finalize and file with the California Public Utilities Commission ("Commission") this IRP.

This report was prepared in accordance with the Commission's Decision D.18-02-018 and subsequent decisions under proceeding R.16-02-007. In accordance with the requirements of Senate Bill 350 and the Commission Decision (D.)20-03-028, SJCE respectfully submits its 2020 IRP. The IRP is comprised of this written narrative as well as the following attachments:

i. Completed CPUC Resource Data Template – 46 MMT Conforming;
ii. Completed CPUC Resource Data Template – 38 MMT Conforming;
iii. Completed CPUC Clean System Power ("CSP") Calculator – 46 MMT Conforming; and
iv. Completed CPUC Clean System Power Calculator – 38 MMT Conforming.

The San José City Council approved SJCE's recommendation that the Conforming 38 MMT Portfolio be SJCE's preferred portfolio. SJCE is not submitting any Alternative Portfolios or additional Conforming

Portfolios beyond its two Conforming Portfolios (which are therefore its Preferred Conforming Portfolios) as part of its IRP.[1]

Process for Creating This IRP

SJCE worked jointly with two other Community Choice Aggregators ("CCAs"), Peninsula Clean Energy and Clean Power Alliance (together, the "Joint CCAs"), as well as actively collaborated with several other CCAs throughout the IRP process, to develop its 2020 IRP. The Joint CCAs represent approximately eight percent of California's load and 40 percent of CCA load.

In this coordinated process, the load, resources, power needs, and expansion plans of all participating CCAs were developed and assessed together to understand interactions between the plans and ensure that the CCAs do not all plan to use or build the same resources. The Joint CCAs also developed disaggregated plans to accommodate local requirements and provide for submission of individual plans as required by the Commission.

The Joint CCAs hired Siemens Energy Business Advisory ("Siemens") to assist in the preparation of their 2020 IRPs. The analysis undertaken by Siemens, which includes production cost modeling and stochastic analysis, complements the Commission's work developing the Reference System Plan and Reference System Portfolio ("RSP") and provides a strong analytical underpinning for SJCE's 2020 IRP. The modeling software used to develop the IRP was Energy Exemplar's Aurora Forecasting Software (AURORA).

In addition to the Conforming 46 MMT and Conforming 38 MMT Portfolios, SJCE also commissioned Siemens to model two additional scenarios to inform policy decisions: a case that met a 30 MMT target in 2030, and a carbon-neutral by 2021 case. These two scenarios, while not submitted as additional portfolios in this plan, are intended to help guide SJCE's procurement in conjunction with the Conforming 38 MMT Portfolio.

The San José City Council has authorized SJCE to undertake additional renewable energy and energy storage procurement that would position SJCE to achieve a portfolio based on a 30 MMT scenario if existing regulatory and market barriers are resolved. SJCE has undertaken aggressive procurement since its inception, and is currently on track to meet the needed resources to achieve a portfolio consistent with either a 46MMT, a 38MMT or a 30 MMT scenario. SJCE plans to continue to add some additional resources and intends to conduct additional analysis, monitor regulatory and market risks and outcomes, and further consider the possibility of adopting a more ambitious portfolio in its 2022 IRP.

Results of the 2020 IRP

SJCE presents in this IRP two Conforming Portfolios that are consistent with the Siemen's modeling and analysis.

[1] The San José City Council eliminated the requirement for SJCE to develop a portfolio that achieves carbon neutrality starting in 2021.

SJCE's Conforming 38MMT Portfolio, which is its preferred portfolio between the two portfolios presented, selected the following resource additions by 2030 in addition to new resources already under contract with SJCE:

- 100 megawatts ("MW") of wind;
- 320 MW of solar; and
- 200 MW of battery storage.

SJCE's Conforming 46MMT Portfolio selected the following resource additions by 2030 in addition to new resources already under contract with SJCE:

- 90 MW of wind;
- 100 MW of solar; and
- 150 MW of battery storage.

For purposes of this assessment only, SJCE accepted the CEC assumptions about demand-response, energy efficiency and behind the meter solar, and SJCE's load forecast includes its proportional share of the CEC assumptions about these important resources. Nonetheless, SJCE is assessing opportunities to increase these important resources, particularly as it seeks to add resiliency in the face of Power Safety Shut-offs and distribution outages. The 2020 IRP Criteria adopted by the San José City Council, continue to reflect the goal that by 2040 San José will be the world's first one gigawatt solar city.

Differences between SJCE's portfolios and the RSP

The analysis conducted by Siemens and SJCE produced results that differ from the RSP based on a 46 MMT 2030 GHG target, as well as the CPUC's 38 MMT 2030 GHG target scenario, in the following important respects:

- More renewables were selected with a generally corresponding level of battery storage (not considering long duration battery storage ("LDS")) resulting in a difference in the renewables to battery ratio of new resources, but a generally consistent ratio of renewables to batteries when all resources in the RSP and the 38 MMT scenario were taken into account;
- LDS was not selected until 2037; and
- Geothermal power was not selected.

Initial review of these results with Siemens suggests that since SJCE is a new power provider and has invested in battery storage paired with solar investments since its inception, SJCE's proportional share of new battery storage investments is lower than its share in the RSP as there is less of a need to ensure prior solar investments are paired with sufficient battery storage. Notwithstanding these results, SJCE is continuing to explore long-duration storage and continues to welcome bids from all kinds of renewable resources in its solicitations.

SJCE looks forward to exploring the source of the differences between the Siemen's results and the Commission's results, and the further information that will result from combining the IRPs from all Load Serving Entities ("LSEs"). If appropriate based on further information, SJCE can make adjustments to its IRP (subject to the approval of its Risk Oversight Committee and the San José City Council). In any event, SJCE will meet any proportional share requirements adopted by the Commission.

Reliability

SJCE is deeply concerned about reliability and understands the importance of a responsible transition from the current portfolio to an electric system with significantly reduced GHG emissions. While SJCE only began serving residents and businesses in February of 2019, as described above, SJCE already has a diverse portfolio of long-term contracts including out of state wind, and an innovative fixed delivery solar agreement.

In addition, SJCE has entered into a seven- year 150 MW agreement with Calpine for Resource Adequacy ("RA") from its existing natural gas fleet, and several other three-year RA agreements with natural gas plants. SJCE was in negotiations with battery storage providers over the summer; however deferred procurement because of regulatory uncertainty, and is actively exploring LDS with other CCAs.

Because reliability is a particularly critical factor in developing a robust resource procurement plan, SJCE reviewed the relationship of its Conforming Portfolios and system reliability from several perspectives. First, SJCE conducted a stochastic analysis to assess the performance of its Conforming Portfolios under a range of market conditions. In addition, SJCE considered the extent to which it has already procured the RA to meet its expected RA obligation. Finally, SJCE reviewed how its portfolio of resources meets its load on a number of key representative days during 2026 and 2030.

The results of the stochastic analysis suggest that there is not a high risk of a supply/demand imbalance. SJCE is encouraged by these results but understands that they merit further exploration especially given recent events and the impacts of climate change. To the extent the CPUC's modeling indicates a different outcome, any such divergences should be investigated further to obtain more definitive insights and results and to identify the most cost-effective solutions.

The assessments of SJCE's RA procurement to date and how SJCE's portfolio of resources match its load illustrate that SJCE has undertaken reasonable RA procurement through 2029, and that continued attention to meeting non-solar hours is merited. SJCE will continue to work with our partners to contract for renewable generation, energy and battery storage in a manner that complements market and portfolio needs.

Action Plan

In the last year, SJCE contracted for 487 MW of new renewable generation, which will supply 44 percent of SJCE's load in 2023, the first full year when all these resources are anticipated to be operational. SJCE will also continue to add short-term renewable and GHG-free resources to meet San José City Council-approved portfolio content goals. SJCE plans to continue to add new renewable energy and storage at a measured pace over the next decade to ensure SJCE's portfolio is cost-effective and does not result in excess supply while still meeting our ambitious local and state de-carbonization goals.

SJCE will continue to monitor key regulatory issues that affect RA and to explore alternatives to provide for stronger reliability to address local, statewide, and regional resource adequacy and resiliency needs. Modeling suggests that in the more aggressive Conforming 38 MMT Portfolio, an additional 100 MW of battery storage is required to be in service before 2024, with renewable energy additions selected for later years. SJCE has obtained approval from the San José City Council to procure an additional 100 MW of renewables, and has authorization to procure 70 MW of additional energy storage. San José's City

Council has been very supportive of SJCE's procurement recommendations and meeting state regulatory requirements.

Despite the fact that the IRP model did not select any LDS as a cost-effective resource to meet SJCE's load, SJCE understands the importance of continuing to explore and seek actual offers for LDS, both system-wide and for SJCE's portfolio. SJCE recently participated in a joint CCA Request for Information ("RFI") for LDS to better understand the types of projects and associated technology and pricing that are available in the market today. SJCE also plans to participate in the upcoming joint CCA Request for Offers ("RFO") for LDS projects in the winter. The same CCAs are exploring the formation of a new joint-powers authority to enable the procurement of LDS resulting from the RFO. SJCE remains concerned about the relative costs of LDS, but understands the reliability advantages and will evaluate responses to the RFO and determine future procurement.

Disadvantaged Communities

SJCE believes that the most important and influential way it can benefit San José's disadvantaged communities is by keeping the cost of electricity affordable in order to provide equitable access to an essential service. SJCE's procurement is guided by this objective, and by seeking to reduce harmful environmental impacts that disproportionately affect disadvantaged communities. SJCE has recently entered into four long-term PPAs for renewable projects that will serve 44 percent of SJCE's load when they are all operational, beginning on December 31, 2022.

Equity is a core focus of the City of San José. While focusing on achieving the financial reserves that will permit SJCE to provide affordable service over the long term, in its initial years of operation, working closely and directly with its community including disadvantaged communities, SJCE developed a comprehensive community programs roadmap. This roadmap will guide the development of programs to benefit communities throughout SJCE service territory, including disadvantaged communities. The programs roadmap has a set of five program guiding principles, with one of those principles focused on equity. In addition, the roadmap includes a set of metrics focused on measuring equity and each program's impact on disadvantaged communities.

SJCE is also partnering with the California Energy Commission ("CEC") to improve access to affordable EV charging options, with at least 25 percent being installed in disadvantaged and low-income communities. Improving access to affordable EV charging options in disadvantaged and low-income communities is critical for overcoming one of the key barriers to widespread EV adoption, as well as reducing pollution that disadvantaged and low-income communities often are exposed to at higher levels than other communities. Additional SJCE programs include EV workshops for low-income San José residents, promotion of backup power options to the medically vulnerable and low-income residents in San José, and a community solar program offering a 20 percent discount to CARE/FERA customers through the CPUC's DAC-Green Tariff program.

Risks Identified and Lessons Learned

A handful of important regulatory and market risks are affecting SJCE's ability to pursue its aggressive environmental goals and to provide for the RA resources that are a necessary complement.

- **Power Charge Indifference Adjustment ("PCIA"):** Pacific Gas & Electric's ("PG&E") PCIA rate has increased by over 600 percent in seven years. This increase suggests that the approach for

calculating the PCIA is deeply flawed, particularly given that during the same period, energy markets, and thus the value of PG&E's resources, have been relatively stable. The SJCE revenue lost to pay for this ever-increasing fee directly affects SJCE rates, how clean SJCE's power mix can be, and the cost impacts related to entering into long-term contracts.

- **Allocation of Investor-owned Utility ("IOU") Resources included in the PCIA**: As load has migrated to CCAs, the IOUs have been left with significant excess of resources. To prevent over procurement and unnecessary excess cost to California consumers, it is necessary for the Commission to ensure the IOUs make excess resources available for sale to the market in a timely and fair manner. For example, in 2020, the PG&E GHG-free allocation saved SJCE customers $5 million even though it was only put into place in June. However, the untimely information about whether and when PG&E would allocate GHG-free power to SJCE in 2020 resulted in SJCE having a higher than approved carbon content that results in unnecessary additional costs to customers.

  The allocations of GHG-free and renewables portfolio standard ("RPS") resources from PG&E's portfolio to SJCE can change the proportion of GHG-free power in SJCE's portfolio from 80 and 140 percent before Diablo Canyon closes (depending on SJCE's load and whether SJCE takes just GHG-free or both GHG-free and RPS allocated power). The allocations of GHG-free and RPS resources from PG&E's portfolio to SJCE can change the proportion of GHG-free power in SJCE's portfolio from 60 and 100 percent after Diablo Canyon closes (depending on SJCE's load and whether SJCE takes just GHG-free or both GHG-free and RPS allocated power). The amount of renewable power varies from 45 percent to 85 percent depending on whether SJCE receives an allocation and how load may change.

  This important issue is under consideration in PCIA Working Group 3.[2] To address this problem, SJCE supports the proposal developed by Southern California Edison ("SCE") and California Community Choice Association ("CalCCA") in PCIA Working Group 3 that provides for the voluntary allocation of the IOU portfolios to LSEs paying the above market costs of those resources. While the merits of this proposal are under discussion, the Commission has not required the IOUs to inform LSEs of the volume of resources available for allocation. CCAs have obtained preliminary information about RPS and GHG-free resources that may be available, but no information has been forthcoming about the volume of RA.

  If SJCE goes forward with further long-term RA procurement, it risks over-procuring or losing the opportunity to reduce costs for ratepayer by using the resources in the allocation and reducing purchased amounts of RA. The Commission should immediately direct the IOUs to make available estimates of the PCIA resources available for allocation, and then promptly and fairly resolve the issues considered in the PCIA Working Group 3 process. Continued regulatory uncertainty related to this issue hinders medium and long-term investments.

[2] Final Report of Working Group 3 Co-Chairs: Southern California Edison (U-338e), California Community Choice Association, And Commercial Energy. pp. 20-30 Retrieved from CPUC website 8/3/20: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=335710541

- **Direct Access:** When Direct Access was made available in California in 2000, approximately 10 percent of load in San José left PG&E to be served by Energy Service providers. When, in compliance with SB 237, the Commission allowed additional Direct Access in 2019, SJCE lost 1.9 percent of its total load. The Commission's report to the Legislature on whether to fully re-open Direct Access has been substantially delayed. Until the future of Direct Access is resolved, as it considers entering into additional long-term contracts, SJCE must consider potential further losses of load.

- **COVID-19 and recession:** SJCE's average load since mid-March has declined by close to 7 percent due to COVID-19. Estimates of when the Bay Area will return to normalcy are uncertain. Some economists warn that COVID-19 may result in a longer term recession. As it considers entering into additional long-term contracts, SJCE must consider potential losses of load as a result of COVID-19. In addition, customer non-payments have also increased since the shelter-in-place orders began in March 2020, and CCAs should receive the same cost recovery relief that IOUs are granted for the COVID-19-related increase in uncollectible balances from customers.

- **Outages:** In the past several years, San José residents and businesses have been subjected to significant outages and threats of outages stemming from the vulnerability of PG&E's transmission and distribution system including both Public Safety Power Shutoff (PSPS) events and heat related outages. Between August 15th and August 20th, 2020; San José had over 500 separate distribution outages that impacted over 86,000 customers. Over 800 hundred customers experienced power outages lasting more than 24 hours. It is critical that the reliability of the transmission and distribution system is improved to limit these types of outages as this is both a significant life safety issue, and an economic issue as our local economy is tech focused where reliable power is critical. Growing customer dissatisfaction of utility outages is an important risk that must be mitigated.

- **RA issues:**
    - The Commission, the California Independent System Operator ("CAISO") and stakeholders have all recognized that the regulatory requirements for resource adequacy require modification to ensure system reliability given the increasing penetration of renewables, and California's and CCAs' aggressive goals for greenhouse gas reductions. In R.19-11-009, SJCE and CalCCA have presented a joint proposal to reform RA to be more consistent with the requirements of an electric system with a high proportion of renewables. SJCE urges the Commission to give serious consideration to this proposal.
    - In addition, the IOUs continue to hold sizable amounts of RA that is subject to the PCIA and there is no mechanism to ensure these PCIA resources are made available to the market in a timely and fair manner, including pursuant to reasonable market term lengths, or transparent information about the amounts that could be available. SJCE urges the Commission to give serious consideration to the joint proposal of SCE and CalCCA in PCIA Working Group 3 to voluntarily allocate IOU resources in a manner that

provides for better utilization of these resources in a manner that will reduce costs and benefit all ratepayers.

- Finally, SJCE notes that the reliability events of mid-August, 2020 highlight the importance of a reliable system that can withstand converging challenges such as high temperatures throughout the West and unexpected generation outages. However, the causes of these events need to be carefully studied to ensure proposed solutions effectively address the problem and improve reliability in the most cost-effective manner.

The Commission has the ability to substantially address most of these challenges. SJCE looks forward to working constructively with the Commission to create a regulatory and market environment that make it possible for all LSEs to achieve their service and environmental objectives in a manner that is fiscally responsible and assures affordable, safe, and reliable service for all customers.

II. Study Design

SJCE worked jointly with the Joint CCAs to develop its 2020 IRP, with the goal of improving planning and coordination and address concerns expressed by the Commission. For example, during the 2018 IRP cycle, the Commission expressed concern that individual resource build-out plans did not sufficiently address renewables integration issues with respect to California's reliability requirements.[3]

The Joint CCAs represent approximately eight percent of California's load and 40 percent of CCA load. In this coordinated process, the load, resources, power needs, and expansion plans of all participating CCAs were developed and assessed together to understand interactions between the plans and ensure that the CCAs do not all plan to use or build the same resources. The CCAs also developed disaggregated plans to accommodate local requirements and provide for submission of individual plans as required by the Commission.

The joint CCAs hired Siemens to assist in the preparation of their 2020 IRPs. SJCE supported engaging Siemens in part because of Siemens' ability to undertake production cost modeling and stochastic analysis. The analysis undertaken by Siemens complements the Commission's work developing the RSP and 38 MMT scenario and provides a strong analytical underpinning for SJCE's 2020 IRP.

Required and Optional Portfolios

SJCE's 2020 IRP presents a strategy for meeting SJCE's power needs and is guided by the goals and policies established by the San José City Council and the State's procurement requirements for LSEs, including California's RPS and GHG reduction obligations. SJCE's 2020 IRP filing includes two Preferred Conforming Portfolios. Both portfolios developed use the "mid Baseline mid AAEE" version of Form 1.1c of the CEC's 2019 Integrated Energy Policy Report demand forecast and use inputs and assumptions consistent with those used by the staff to develop the RSP.

[3] D. 19-04-040 p.105

Portfolio Name	Purpose	GHG Target
Conforming 46 MMT Portfolio	Preferred Conforming Portfolio for 46 MMT 2030 GHG Target	46 MMT annual emissions from the CA electric sector by 2030. Exceed SJCE's individual CSP Benchmark (0.787 MMT in 2030) by <1.00%
Conforming 38 MMT Portfolio	Preferred Conforming Portfolio for 38 MMT 2030 GHGH Target (This is SJCE's preferred portfolio that will guide its procurement until the next IRP cycle)	38 MMT annual emissions from the CA electric sector by 2030. Exceed SJCE's individual CSP Benchmark (0.629 MMT in 2030) by <1.00%

a. Objectives

SJCE undertook its 2020 IRP to identify the least-cost solutions available to meet its load, State requirements and local goals. SJCE is required to prepare an IRP every two years by the San José City Council[4] and under Public Utilities Code Section 454.52. The City of San José created SJCE to "enhance the public welfare by establishing Community Choice Aggregation in the City . . . and to give its residents and businesses local control over electricity prices, resources and quality of service."[5] The City identified creating a CCA as "a method by which the City of San José can help to ensure the provision of clean, reasonably priced and reliable electricity to residents and businesses in San José."[6]

San José has committed to meeting the goals of the Paris Agreement on climate change. Accordingly, it has created Climate Smart San José[7] as a guidance document and action plan to achieve this commitment. In 2018, the San José City Council adopted 2018 IRP criteria that incorporated many of the energy-related action items in Climate Smart San José. On August 25, 2020, the San José City Council updated the 2018 IRP criteria, adopting the following criteria for the 2020 IRP:

- SJCE will offer at least one power mix option with a rate equal to or less than PG&E's rates.
- SJCE will offer at least one power mix option at 10 percent or more renewables than PG&E.
- SJCE will offer at least one power mix option that is 100 percent renewable.
- SJCE's initial resource mix will include a proportion of renewable energy exceeding California's prevailing RPS procurement mandate.
- SJCE will maintain, at minimum, low-income programs at the same level as PG&E.
- After becoming established, SJCE will develop local programs including energy efficiency, demand response, distributed generation and renewable energy.
- SJCE will encourage distributed renewable generation in the local area through the offering of a net energy metering tariff; a standardized power purchase agreement or "Feed-In Tariff"; and other creative, customer-focused programs targeting increased access to local renewable energy sources.
- By 2030, SJCE's base offering will be at least 60 percent renewable.

[4] San José City Council Resolution No. 78711. June 26, 2018. https://www.sanjoseca.gov/your-government/department-directory/community-energy/public-meetings-and-documents
[5] San José Municipal Code Section **26.01.020**
[6] San José Municipal Code Section **26.01.010**
[7] Climate Smart San José: A People-Centered Plan for a Low Carbon City. 2018. https://www.sanjoseca.gov/your-government/environment/climate-smart-san-jos

- By 2030, San José will have 668 MW of local renewables and by 2040, San José will be the world's first one gigawatt ("GW") solar city.
- By 2030, 60 percent of all passenger vehicles in the City will be electric.
- By 2020, 100 percent of new homes will be Zero Net Energy, and by 2030, 25 percent of existing homes will be energy efficient and all-electric.
- SJCE will comply with all applicable State Law including RPS, RA requirements, and GHG reduction requirements.
- SJCE will identify the disadvantaged communities SJCE will serve, describe the impacts of such service on the disadvantaged communities, and set forth SJCE's plans to benefit these communities.

On August 25, 2020, the San José City Council approved two portfolios to be submitted as part of SJCE's 2020 IRP:

- A Conforming Portfolio that results in SJCE emissions equal to its proportional share of a statewide electric system case that emits 46 MMT of GHG emissions by 2030 (the "Conforming 46MMT Portfolio"); and
- A conforming portfolio that results in SJCE emissions equal to its proportional share of a statewide electric system case that emits 38 MMT of GHG emissions by 2030 (the "Conforming 38 MMT Portfolio").

The San José City Council approved SJCE's recommendation that, of the two Conforming Portfolios, the 38 MMT Portfolio is SJCE's preference.

In addition, the San José City Council authorized the Director of Community Energy to use the findings from the IRP modeling analysis to finalize, approve, and submit to the Commission the 2020 IRP with the two above-mentioned portfolios, provided that the plan reflects the 2020 IRP criteria. The Director must submit the final SJCE 2020 IRP to the San José City Council pursuant to an information memorandum within ten days of filing the plan with the Commission.

As part of its 2020 IRP modeling work, SJCE also directed Siemens to model two additional possible portfolios:

- A portfolio that results in SJCE emissions equal to its proportional share of a statewide electric system case that emits 30 MMT of GHG emissions by 2030. This portfolio is built on the Commission's 38 MMT scenario; and
- A portfolio that results in SJCE attaining carbon neutrality on an annual basis in 2021 and maintaining that criteria going forward. This portfolio is also built on the Commission's 38 MMT scenario.

SJCE is not filing these plans with the Commission because it intends to use these plans to inform stretch goals for its procurement going forward. Currently, several significant regulatory and market risks stand in the way of SJCE pursing the procurement identified by these portfolios. Nonetheless, the San José City Council has authorized SJCE to undertake additional renewable energy and energy storage procurement that would position SJCE to achieve the portfolio that result in SJCE attaining its proportional share of 30 MMT by 2030 if the regulatory and market barriers are resolved. The bulk of the procurement needed to achieve a portfolio consistent with a more ambitious 30 MMT scenario

would occur after 2024. Therefore, SJCE intends to conduct additional analysis, monitor regulatory and market risks and outcomes, and further consider the possibility of adopting a more ambitious portfolio in its 2022 IRP.

The San José City Council eliminated the requirement for SJCE to develop a portfolio that achieves carbon neutrality starting in 2021 in the IRP by developing new resources. Although procuring GHG-free attributes contributes towards the continued operation and maintenance of GHG-free resources, the modeling shows that continued investment in new renewable projects, primarily solar plus storage, is the most cost-effective option to meet aggressive statewide emission reduction targets.

Moreover, SJCE customers are already paying their share towards PG&E's existing in-state GHG-free resources through the PCIA but do not get credit for this on SJCE's Power Content Label. In the current financially challenging environment, SJCE does not believe it is fair or prudent to impose on its customers, including a significant proportion of disadvantaged customers, the cost of paying for additional redundant GHG-free attributes, in order to show these attributes on SJCE's Power Content Label.

The San José City Council directed SJCE to offer a base power mix in 2020 that was 45 percent renewable and 80 percent GHG-free.[8] SJCE will present its proposal for the 2021 base power mix to the San José City Council in Fall 2020. That presentation will take into account the ongoing regulatory treatment of GHG-free assets in the IOU portfolios for purposes of Power Content Label presentation, and the reality that investments in new renewable resources are a better use of limited resources to achieve GHG-free reductions than continued procurement of attributes from existing resources.

b. Methodology

i. Modeling Tools

The modeling software used to develop the IRP was Energy Exemplar's AURORA Forecasting Software (AURORA). The version used is 13.4.1024, released March 10, 2020. AURORA is a chronological unit commitment model which works to simulate the economic dispatch of power plants within a competitive market framework. The model uses a mixed integer linear programming (MIP) approach to capture details of power plant and transmission network operations, while observing real world constraints. Constraints include items such as emission reduction targets, transmission and plant operating limits, renewable energy availability and mandatory portfolio targets.

AURORA is widely used by electric utilities, consulting agencies, and other stakeholders for the purpose of forecasting generator performance and economics, developing IRPs, forecasting power market prices, assessing detailed impacts of regulatory and market changes impacting the electric power industry, and to generate financially optimized generation portfolios. The model can assess the potential

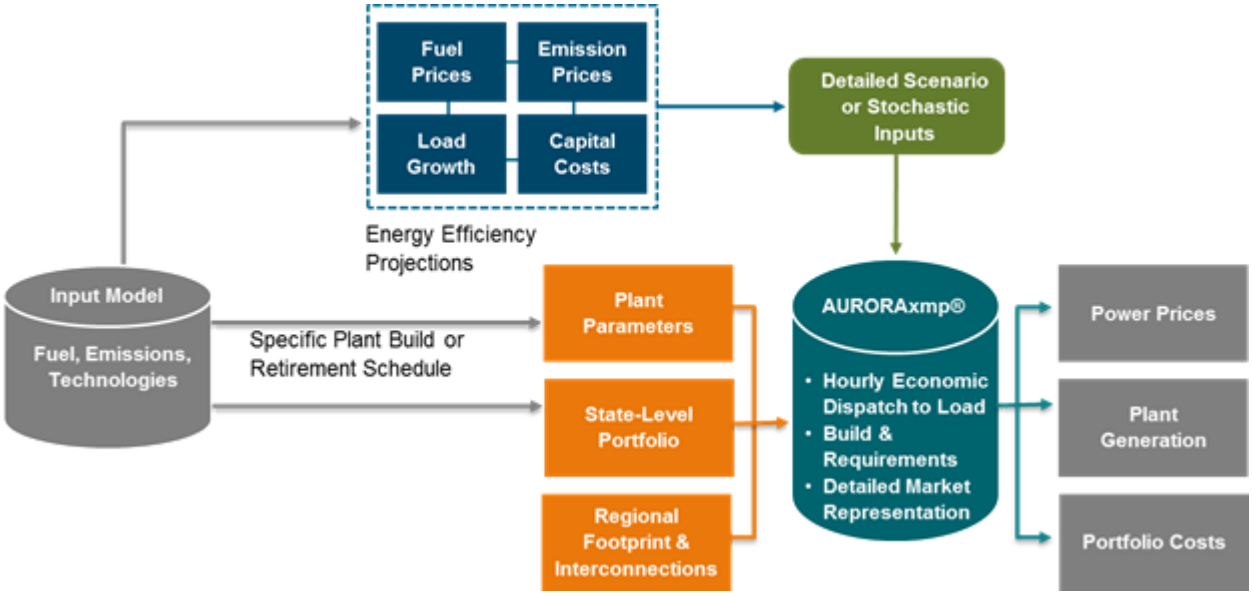
[8] SJCE bought the bulk of the attributes needed to achieve this objective before the Commission encouraged PG&E to allocate to CCA customers the GHG-attributes they already pay for. Thus, SJCE anticipates a power mix for 2020 of 45 percent renewable and about 93 percent GHG-free. Based on SJCE's current estimate of its 2020 load, if PG&E had allocated to SJCE 100 percent of the GHG-free attributes SJCE customers paid for, rather than just the attributes produced after June 15, 2020, SJCE's 2020 Power Content Label would have reflected a base power mix of 100 percent GHG-free.

performance and capital costs of existing and prospective generation technologies and resources, and make resource addition and retirement decisions for economic, system reliability, and policy compliance reasons on a utility system.

The Commission used RESOLVE to develop the RSP, which identifies the new resources that meet the GHG emissions planning constraint applied by the Commission. As opposed to AURORA, which models each generator independently, the RESOLVE model groups together resource categories with similar operational characteristics (e.g. nuclear, coal, gas CCGT, gas peaker, renewables) and models them collectively. RESOLVE uses a linearized unit commitment where the commitment variable for each class of generators is a continuous variable rather than an integer variable. AURORA models the operating cost and performance parameters on a plant-level basis, where the optimization method uses a mixed integer program ("MIP") to determine unit commitment. Based on public documents, RESOLVE is run for a sampled 37 days in a year and only for a few years, therefore, only representative load and renewable profiles were selected to reflect system conditions. The Commission uses SERVM as a separate tool to examine system reliability and simulate production cost. AURORA is both a long-term capacity expansion tool ("LTCE") and a production cost model. In the long-term capacity expansion process, Siemens used a sampling of 104 days and every other hour for each year of the 20-year study horizon (2020-2040). In the final simulation of the system (production cost simulation), AURORA simulates plant operating and market conditions for every hour, every day and every year of the study horizon.

A summary of the methodology with key inputs, algorithms, and outputs are shown in Figure 1.

Figure 1. Market Analysis Methodology



As indicated above, AURORA is both a production model and a capacity expansion optimization model. AURORA is an hourly, chronological production cost model with an integrated long-term capacity

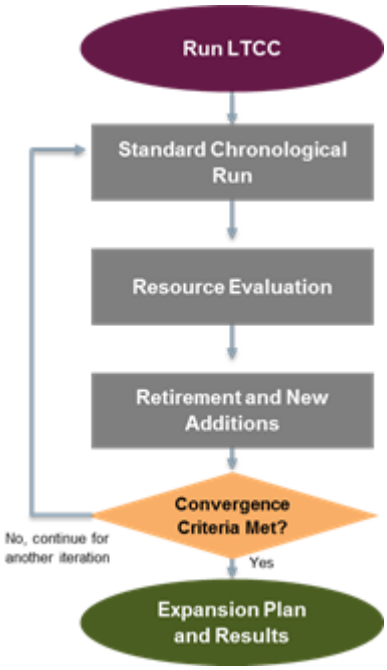
expansion ("LTCE") feature. The LTCE produces a resource expansion plan given resource options and constraints around those options. The options can include supply and demand generic resources, including energy storage, for inclusion in the expansion plan, existing resources and existing resources for economic retirement as desired. The full set of standard operational and cost parameters for new and existing resources are considered in the LTCE, providing a robust framework from which to evaluate different technologies with different operational (intermittent vs. baseload) cost and incentive profiles. The LTCE considers constraints such as reserve margin targets or requirements, RPS requirements, carbon limits, and ancillary service constraints.

The long-term capacity expansion logic is illustrated in Figure 2. The LTCE model makes use of an iterative logic to develop a regional capacity expansion plan. At the end of any given iteration, it has the information it needs to take retirement actions on existing uneconomic resources and to select economically viable new resource options. Convergence criteria reduce the total number of resource alternatives, which are considered by the LTCE model through the iterations, with a converged solution being defined as one in which system prices remain stable even with change in resource alternatives. In other words, the solution reflects an expansion plan that is at once both economically rational and stable.

With this approach, AURORA performs an iterative future analysis where:

1. Resources that have negative going-forward value (revenue minus costs) are retired;
2. Resources with positive values are added to the system on a gradual basis, whereby a set of resources with the most positive net present value is selected from the set of new resource options and added to the study;
3. AURORA then uses the new set of resources to compute all the values again; and
4. The process of adding and retiring resources is continually repeated until the system price stabilizes, indicating that an optimal set of resources has been identified for the study.

Figure 2. Long-Term Capacity Expansion



AURORA and RESOLVE both optimize dispatch for a system under a given set of inputs. RESOLVE is a linear optimization model, which assesses dispatch based on representative days over a defined forecast horizon. AURORA differs in that it is a mixed integer program and hourly chronological dispatch simulation. RESOLVE generally focuses on a single market, reflecting high level interties and market interaction with neighboring regions. AURORA can be set up in several different ways. For this analysis, AURORA was run for most of the Western Interconnection.

Both RESOLVE and AURORA identify the optimal resources to meet needs based on the technology options offered including generation and storage. Both models also allow for the incorporation of different types of market and portfolio constraints including renewable generation, carbon emissions (or emission rates), reserve margin, and timing of new build requirements. Nonetheless, as is described further below, there are important differences in the results of the modeling, particularly with respect to the amount of battery storage to be added.

In evaluating SJCE's 2020 IRP, the Commission should consider that SJCE's IRP was developed using a robust tool and methodology. SJCE's IRP largely uses the same inputs as the Commission's RSP and 38 MMT scenario, thus any differences in results should be explored carefully. All modeling has limitations. Upon careful review, differences in results using similar inputs but different models can provide complementary information and lead to more robust conclusions.

ii. Modeling Approach

A. Inputs and Assumptions

SJCE's 2019-2020 IRP inputs and assumptions reflect those of the Commission's 2019-2020 Inputs and Assumptions document, including:

- Load forecast;
- Fuel prices;
- Emissions costs;
- Technology costs and operational specifications, unless otherwise described below;
- Baseline and candidate resources;
- Resource availability;
- Transmission constraints;
- State's RPS target; and
- 46 MMT and 38 MMT 2030 GHG emissions targets for the electric sector.

The Renewable Energy Certificate ("REC") and GHG-free prices were developed based on S&P Platts North American Emissions Special Report. In the absence of a transparent capacity market, a price of $5 per kw-month was used for capacity. The model also accounts for the costs and benefits of any resources subject to the cost allocation mechanism ("CAM").

B. Load Forecast

SJCE's annual base load forecast and load modifiers were derived from the "mid Baseline mid AAEE" version of Form 1.1c of the California Energy Commission's ("CEC") Integrated Energy Policy Report ("IEPR") 2018 release. SJCE's load was modeled in AURORA to include all load modifiers. The reason for this approach is due to the inability to disaggregate load modifiers provided by the Commission down to individual LSEs, as the data provided by the Commission is aggregated by Transmission Access Charge ("TAC") area.

In order to develop SJCE's annual base load forecast into monthly and hourly data, historical hourly metered data was used. The following process was used to translate the annual energy forecast from Form 1.1c into hourly load inputs:

1. Annual energy forecasts were extracted for 2020-2030 from the "mid Baseline mid AAEE" version of Form 1.1c of the CEC 2019 IEPR;
2. Monthly average load shapes were developed from historic metered data and near-term modeling data from SJCE. The monthly average load shapes were then applied to the annual energy forecasts to provide average demand on a monthly basis;
3. Monthly peak load shapes were developed from historic metered data and near-term modeling data from SJCE. The monthly peak load shapes were then applied to the monthly average energy forecasts to provide peak demand on a monthly basis; and
4. Hourly load shapes were developed from historic metered data and near-term modeling data from SJCE. The hourly load shapes were then applied to the monthly average energy and monthly peak energy to provide load on an hourly basis.

This process used to derive hourly load from the CEC's IEPR data ensures that the total annual energy volumes for load remains consistent with SJCE's assigned forecast.

SJCE used the customized hourly load shape in the CSP Calculator for all the portfolios analyzed. The custom hourly load shape is used for the Baseline demand components of C&I and Non-C&I customers. The custom hourly load shape was derived off historical metered data from the SJCE's territory and thus is more reflective of the actual conditions experienced.

SJCE's 2020-2030 load and peak forecast used in developing its Conforming Portfolios are shown in Table 1.

Table 1: SJCE's 2020-2030 Load Forecast and Peak Forecast**Error! Bookmark not defined.**

SJCE	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Load Forecast (GWh)	4,511	4,462	4,438	4,431	4,437	4,442	4,446	4,446	4,448	4,447	4,449
Peak Forecast (MW)	1,081	1,072	1,066	1,064	1,063	1,067	1,068	1,068	1,066	1,068	1,069

This load forecast shows a slight reduction between 2020 and 2021 and then a mostly stable load. SJCE did not adjust this load for purposes of this IRP given the level of discussion that a modification of the load forecast tends to trigger and competing priorities. Nonetheless, SJCE notes that SJCE's planning

department is projecting significant population and business growth in the coming years, and San José has aggressive electrification and EV expansion goals.[9] Moreover, for the next IRP process, it will be important to assess the impacts on load from substantial efforts necessary on the part of residents, business, and local and State authorities to provide for distribution resiliency in the face of significant problems in the last two years.

C. SJCE Contracted Resources

Existing Resources

Consistent with the definitions provided in the Resource Data Template, other than RA contracts, SJCE had no contracts with existing resources in place or under negotiation as of June 30, 2020.

New Resources

Consistent with definitions provided in the Resource Data Template, Table 2 below sets forth new resources SJCE had under contract or in negotiations to contract as of June 30, 2020. In the AURORA analysis, SJCE modeled 100 MW of solar and 100 MW of wind as a placeholder for a 225 MW wind project from New Mexico that was under negotiation that SJCE subsequently entered into a contract with. This is because at the time the IRP analysis began, negotiations were in an early stage and SJCE was uncertain whether the contract would be signed. In the same time frame as it is filing this IRP, SJCE is executing the agreement for 225 MW of wind from New Mexico with a commercial operation date of December 31, 2021. Thus the long-term contracts in the Resource Data Template are:

Table 2: Long-Term Contracts

Project	Term	Technology	MW	Online Date	Location (County)
1	20 years	Solar + Storage	100 + 10	12/31/2022	Fresno
2	15 years	Solar	100	12/31/2022	Kern
3	12 years	Solar with Guaranteed Delivery in HE 7-22	62	12/31/2021	Kern
4	15 years	Out of State Wind	225	12/31/2021	New Mexico

Hydro resources

To create the Portfolios, the analysis relied on the Commission's 2019-2020 IRP assumptions on availability and contracting price of hydro resources. SJCE followed the RSP to determine out-of-state and in-state hydro availability due to the absence of available public information on contracted hydro or expected to be contracted hydro in the future. Specifically, the RSP indicates there is 2,852 MW of available imported hydro in 2020 to 2030 and 7,070 MW of in-state large hydro during the same time period, as shown in Table 3. For imported hydro, SJCE considered Bonneville Power Administration and Western Area Power Administration as potential counterparties.

[9] The San José City Council approved a building reach code ordinance encouraging electrification and EV readiness, and another ordinance prohibiting natural gas infrastructure in new single-family and low-rise multi-family buildings, in Fall 2019.

The analysis assumed that SJCE would be able to procure no more hydro resources than its relative share of load in California for in-state hydro. For large in-state hydro, the modeling assumed that SJCE can procure hydro from anywhere in California up to SJCE's corresponding share, which is approximately 120 MW and is reflected in Table 5. The model was free to choose as much, or as little of this proportional share as was economic.

The analysis assumed that SJCE would be able to procure its relative share of load in the regions of California with direct interties to the Pacific Northwest for the out of state hydro. There are two main transmission lines connecting the Pacific Northwest to California: one connecting to Northern California, and the other to LADWP. Thus, for out of state hydro, it was assumed that SJCE would have access to its relative share of the combined load of Northern California plus Los Angeles Department of Water and Power ("LADWP"). SJCE's corresponding share is approximately 110 MW and is reflected in Table 4. Again, the model was free to choose as much, or as little of this proportional share as was economic.

SJCE used generation profiles of in-state and out-of-state hydro resources that align with the profiles provided in the CSP Calculators, where the annual capacity factor for imported hydro is 44 percent and the capacity factor for in-state hydro is 31 percent. SJCE assumed contracted hydro prices for each type based on information obtained from Energy Division on forecasted operational costs.

Table 3: Available Large Hydro per 2019-2020 RSP

Annual Availability	**2020-2030**
In State Hydro – MW	7,070
Hydro (Scheduled Imports) - MW	2,852

Table 4: Potentially Available Hydro Imports (MW) based on SJCE's Pro-Rata Share

	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
SJCE	114	113	112	112	111	111	110	109	109	108	108

Table 5: Potentially Available In-State Large Hydro (MW) based on SJCE's Pro-Rata Share

	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
SJCE	126	124	123	122	122	121	120	120	119	118	117

D. Generation shapes

Modelling performed was based on all of SJCE's PPAs currently under contract, and a placeholder for a contract that was under negotiation as of June 30, 2020. The information used included technology, term, contracted generation, price and hourly shapes, among other items. All SJCE's executed PPAs plus the place holder for the contract under negotiation were included in the simulations in the AURORA model along with new capacity selected by the LTCE.

As part of the simulation, SJCE used representative hourly generation shapes for wind and solar assets in Northern and Southern California derived from the 2018 National Renewable Energy Laboratory ("NREL") Annual Technology Baselines ("ATB") report. The shapes differ to some extent with the location-specific shapes available in the CSP Calculators. Figure 3 shows a comparison of the average hourly capacity factors for the representative solar shapes used in the AURORA model compared to the

location-specific solar shapes in the CSP Calculators. Figure 4 shows an equivalent comparison of the average hourly capacity factors for wind resources.

Figure 3: Comparison Solar Tracking Shapes

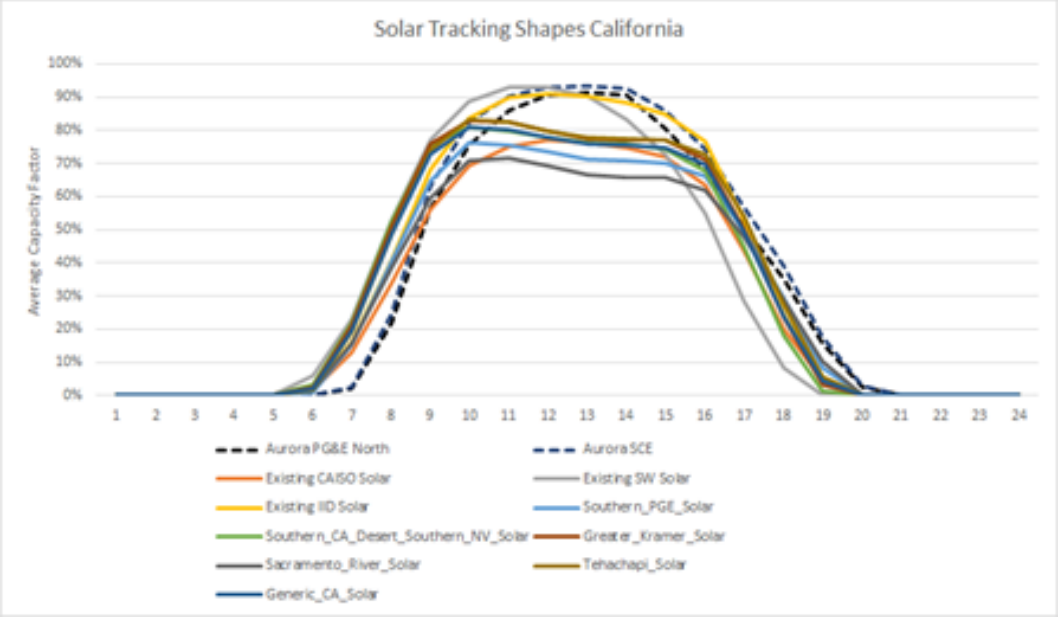
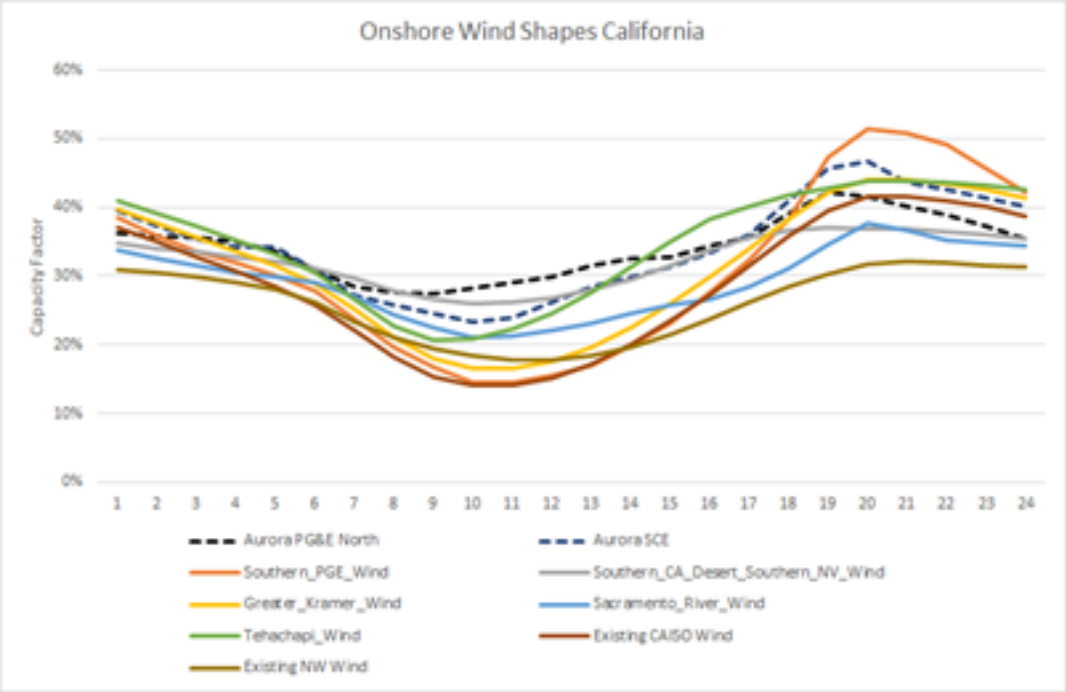


Figure 4: Comparison Wind Shapes



For hydro resources, CSP hourly shapes for in-state and imported hydro were used for new hydro contracts.

The storage component was modeled independently using the AURORA chronological storage dispatch logic.

Please refer to the section on Assignment to geographic regions for the process undertaken to translate resources selected by the model to CSP resource locations.

In addition to the executed PPAs, information on the short-term contracts for resource adequacy and environmental products in place at the time were included in the modeling.

E. Resource Costs

The candidate resources' capital cost, operating cost, and levelized cost of energy used in the analysis were derived from the CPUC's 2019-2020 IRP assumptions. Cost values were taken from the Commission's released "RESOLVE_Resource Costs and Build_2020-02-07.xlsb" file, which are reported in 2016 dollars.

Figure 5 below display the levelized costs assumptions in dollar per megawatt hour ("$/MWh") for the set of critical technologies. These costs include Overnight Capital Costs, Interconnection Cost, and Investment Tax Credits as applicable to each technology. In addition, periodic replacement and augmentation costs for battery storage technologies are included as well. All costs are consistent with CPUC assumptions as provided in the "RESOLVE_Resource Costs and Build_2020-02-07.xlsb file.

Figure 5. Levelized Costs of Energy for Selected Technologies (2016 $/MWh)

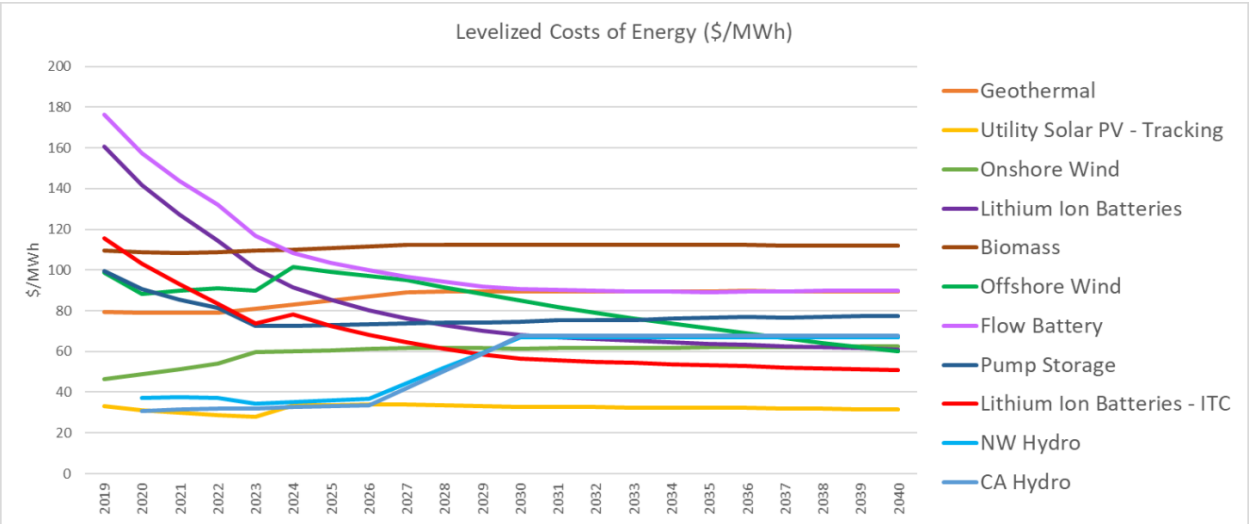


Table 7 shows the fuel and emissions cost assumptions used in developing SJCE's portfolios.

Table 7: Fuel and Emissions Costs Assumptions

Fuel/Emission Costs	CA NG *$/MMBTU*	NW NG *$/MMBTU*	SW NG *$/MMBTU*	CA Coal *$/MMBTU*	Carbon Cost *$/tCO2*	Uranium *$/MMBTU*	PCC 1 RECs *$/MWh*
2019	4.28	3.34	2.54	2.00	14.57	0.70	15.12
2020	4.30	3.35	2.57	2.00	15.25	0.70	15.36
2021	4.31	3.35	2.58	2.00	16.00	0.70	15.60
2022	4.31	3.36	2.59	2.00	16.84	0.70	15.84
2023	4.31	3.36	2.59	2.00	17.71	0.70	16.08
2024	4.32	3.37	2.59	2.00	18.62	0.70	15.36
2025	4.33	3.37	2.60	2.00	19.59	0.70	15.12
2026	4.34	3.38	2.61	2.00	20.59	0.70	14.40
2027	4.34	3.38	2.62	2.00	21.66	0.70	13.44
2028	4.34	3.39	2.62	2.00	22.79	0.70	12.24
2029	4.35	3.39	2.63	2.00	23.99	0.70	9.60
2030	4.36	3.40	2.64	2.00	25.25	0.70	15.12

F. Demand-Response, Energy Efficiency, and Behind the Meter Solar

For purposes of this assessment only, SJCE accepted the CEC assumptions about demand-response, energy efficiency and behind the meter solar, and SJCE's load forecast includes its proportional share of the CEC assumptions about these important resources. In the past, changes to the CEC's assumptions have triggered much debate and SJCE has not yet undertaken extensive analysis of the approaches available to cost-effectively increase the level of these important resources within its portfolio. Nonetheless, SJCE is assessing opportunities to increase these important resources. SJCE has ambitious plans to accelerate energy efficiency and behind the meter solar as well as demand response programs.

G. Post-Processing Calculations

As part of the 2019-2020 IRP filing, several post-processing calculations were used to generate metrics for the portfolio. The post-processing calculations encompassed cost metrics, reliability metrics, emissions metrics and a few other miscellaneous metrics. Almost all the calculations were based off outputs from the AURORA model. Notable exceptions include Power Content Category 1("PCC1") prices, GHG-free prices and system capacity prices as described in the above section on Inputs and Assumptions. Critical post-processed calculations are discussed below.

To provide deeper insights into portfolio costs several variations of cost to serve load on a $/MWh basis were developed. Additional cost metrics included were:

- Weighted Average Cost New Capacity ($/MWh)
- Weighted Average Power Purchase Agreement (PPA) Costs ($/MWh)
- Weighted Average Cost of Short-term Contracts ($/MWh)
- Weighted Average Cost of Spot Purchases ($/MWh)
- Weighted Average Cost of RA Capacity Purchases ($/kW-year)
- Weighted Average Cost of RPS Attributes
- Weighted Average Cost of GHG-Free Attributes

To provide deeper insights into the generation and emission profiles of the portfolio, several metrics were developed to ensure compliance with CPUC requirements and SJCE's internal goals. SJCE applied calculations to determine the percentage of the portfolio covered from long-term contracts to verify compliance with the 65 percent RPS long-term contracting requirement under SB 350. Additionally, post-processing calculations were undertaken for the RPS and GHG-free positions of the portfolio. The AURORA model did not include the ability for SJCE to procure attribute-only contracts to meet RPS and GHG-free internal targets. As a result, a post-processing calculation was created to identify any additional PCC 1 and/or GHG-free attribute-only products that would be required to meet or exceed SJCE's RPS requirements. SJCE considered the following metrics:

- Long-term Contracting Requirements (MWh)
- Pre-Procurement RPS percent of Load
- Pre-Procurement GHG-free percent of Load
- Additional PCC 1 Purchases
- Additional GHG-free Purchases

H. Assignment to geographic regions

The Commission requires LSEs to identify the geographic region in which any planned new resource will be located for purposes of running the CSP Calculator. Until SJCE issues solicitations and obtains real proposals, the identification of any particular location for planned resources would be entirely speculative. Accordingly, SJCE endeavored to apply the distribution of resources selected in the Commission's 2019-2020 RSP and 38 MMT scenario to SJCE's planned resources in its respective portfolios.

To do this, the RESOLVE results viewer was used to extract the incremental capacity built from the RESOLVE model[10] and the analysis used the area listed in the Resource Data Template[11]. As a result of resources not being reported in the years 2025, 2027, 2028 and 2029, SJCE applied the average distribution over the IRP planning horizon. Tables 8 and 9 below indicate the locational allocation of SJCE's future additional resources, purely for purposes of running the CSP Calculator.

Table 8: Locational Allocation of New Solar Resources

Solar	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Avg.
Greater Kramer Solar	0%	0%	7%	5%	5%		5%				4%	4%
Sacramento River Solar	0%	0%	0%	0%	0%		0%				0%	0%
Southern CA Desert	60%	30%	34%	29%	29%		29%				39%	36%
Southern NV Solar	-	-	-	-	-		-				-	-
Southern PGE Solar	0%	0%	2%	24%	24%		24%				19%	13%
Tehachapi Solar	40%	70%	57%	43%	43%		43%				38%	48%

[10] Specifically, the "46MMT_20200207_2045_2GWPRM_NOOTCEXT_RSP_PD" case was used, and data was extracted from the "Portfolio Analytics" tab.

[11] Tab "cns_mapping." Because the Baja_California_Wind RESOLVE location was not included in the "cns_mapping" tab and includes a resource that should have been tied to the Southern_CA_Desert_Southern_NV_Wind CSP category, this incremental expansion was excluded from the distribution calculations.

Table 9: Locational Allocation of Wind Solar Resources

Wind (On-Shore)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Avg.
New Mexico Wind		0%	0%	0%	0%		0%				21%	4%
Sacramento River Wind		100%	74%	74%	67%		67%				51%	72%
Southern CA Desert		-	-	-	-		-				-	-
Southern NV Wind		-	-	-	-		-				-	-
Southern PGE Wind		0%	12%	12%	20%		20%				18%	14%
Tehachapi Wind		0%	14%	14%	13%		13%				10%	11%

I. Curtailment

The AURORA model determines curtailments for solar, wind and other non-dispatchable resources on an hourly basis based on load requirements, battery storage charging and economics. During a specific hour of the day, for instance during solar hours, if there is excess generation, the AURORA model determines how much of that excess generation is used to charge batteries and how much would be curtailed.

J. Stochastic Analysis

The IRP team undertook a stochastic analysis of some of the key variables used to develop its portfolios. The purpose of these analyses was to test SJCE's Conforming Portfolios' performance under a range of market conditions.

The stochastic approach included the development of 200 Monte Carlo iterations of certain key variables to test each portfolio over a broad range of market conditions. SJCE relied on the expertise of Siemens to develop distributions for key variables, including load forecasts, emission prices, gas prices, coal prices, technology cost, and hydro generation, for use in the 200 iterations of the model.[12]

Because reliability is a particularly critical factor in developing a robust resource procurement plan, SJCE focused on a set of stochastic exposures relevant to reliability including market prices, market purchases (spot) exposure, curtailment, and to a lesser extent, emissions.

K. Discussion with SJCE's Community

San José has formed a citizen advisory committee, the Clean Energy Community Advisory Commission ("CECAC"), to provide community input to the San José City Council regarding SJCE matters. It is composed of community members with technical, business, and other areas of expertise. The Committee is the community's liaison to SJCE.

SJCE updates and discusses important policy matters with the CECAC on a regular basis, including portfolio composition and community programs. Unfortunately, because of the shelter in place orders related to COVID 19, the CECAC did not review and provide input to the San José City Council on this 2020 IRP.

[12] Siemens advises that while the analysis does not have weather as a stochastic input, but the stochastic variations to demand can be used to extrapolate the impact of seasonal weather events.

Working with the Joint CCAs, SJCE did have an early call with representatives of the renewable trades and participated in weekly calls organized by PCE with key environmental advocacy organizations. In addition, SJCE has undertaken extensive outreach with the community including disadvantaged sectors as it prepared its roadmap for programs. This is discussed in further detail in the section on disadvantaged communities.

III. Study Results

a. Conforming and Alternative Portfolios

SJCE is submitting two Preferred Conforming Portfolios in this IRP: the Conforming 46 MMT Portfolio and the Conforming 38 MMT Portfolio. SJCE is not submitting any Alternative Portfolios or additional Conforming Portfolios beyond its two Preferred Conforming Portfolios as part of its IRP. The Conforming 38 MMT Portfolio is SJCE's preferred portfolio that will guide its procurement until the next IRP cycle because it provides for less GHG-emissions, and less exposure to fluctuations in market prices although it on an Net Present Value basis, the cost is slightly higher (1.7%).

b. Preferred Conforming Portfolios

For each Conforming Portfolio, SJCE determined the amount of new resource capacity that would be required to meet the various objectives of the portfolio. Specifically, the analysis focused on meeting three primary objectives: (1) serve load in all hours, (2) meet RPS requirements, and (3) meet GHG-free targets. SJCE's analysis determined that long-term contracting with renewable energy and battery storage resources will be key components of a least-cost portfolio for SJCE and is effective at reducing market exposure and risks to the portfolio. However, some short-term contracts with clean resources and spot market purchases were also selected to help fulfill short-term gaps in serving load or meeting compliance targets. In particular, short-term contracts with clean resources were useful in the first three years of the forecast period when SJCE is still building its portfolio.

Because SJCE entered into contracts with a large quantity of renewable energy resources in its first year and a half of operation, SJCE will only need to procure an additional 100 MW of battery storage before 2024 to be on track to achieve its proportional share of GHG emission reductions by 2030 in both Conforming Portfolios. Table 10 provides additional details about the two portfolios. Tables 11-16 provide detailed information about each of the portfolios.

Although demand response, behind the meter solar and energy efficiency are not expressly identified in SJCE's Conforming 46 MMT Portfolio or the Conforming 38 MMT Portfolio, the CEC's assumptions for the addition of these resources over the study period are reflected in SJCE's load forecasts used to prepare the Portfolios. In addition, SJCE is assessing opportunities to increase these important resources, particularly as it seeks to add resiliency in the face of Power Safety Shut-offs and distribution outages. SJCE working with other stakeholders to increase funding statewide to support local community resiliency projects and exploring alternatives to implement these within San José. The 2020 IRP Criteria continue to reflect the goal that by 2040 San José will be the world's first one gigawatt solar city. SJCE expects to apply to administer Commission Energy Efficiency programs in early 2021, subject to San José City Council approval.

Further, the expansion plans indicate that SJCE will buy its proportional share of existing in-state and out of state hydro resources. As stated previously, to avoid assuming it would obtain an unrealistic amount of the existing in and out of state hydro, SJCE limited the amount of hydro available to SJCE to no more than its proportional share taking into account, for out of state hydro, only the entities with transmission access to the Pacific Northwest.

Table 10: Procurement Needs of Conforming Portfolios

	Added MW by 2030*						
Portfolio	**Solar**	**Wind**	**4-Hour Batteries**	**Metric Tons of GHG Emissions in 2030**	**Portfolio Cost NPV (2018, $,000)**	**Portfolio Cost % more expensive than 46MMT Conforming**	**MW Added Renewables before 2024**
Conforming 46 MMT	100	90	150	640,000	$2,330,168	NA	0
Conforming 38 MMT (Preferred)	320	100	200	435,000	$2,369,832	1.7%	0

Table 11. Conforming 46 MMT Portfolio Expansion Plan

MW	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**Total**
Annual Capacity Additions	-	240	-	100	125	50	50	-	-	-	15	580
Battery Storage (Li-Ion)	-	-	-	100	50	-	-	-	-	-	-	150
Biomass	-	-	-	-	-	-	-	-	-	-	-	0
Existing PPAs	-	-	-	-	-	-	-	-	-	-	-	0
Flow Battery	-	-	-	-	-	-	-	-	-	-	-	0
Existing Geothermal	-	-	-	-	-	-	-	-	-	-	-	0
Existing Large Hydro (In State)	-	120	-	-	-	-	-	-	-	-	-	120
Existing Large Hydro (Out of State)	-	120	-	-	-	-	-	-	-	-	-	0
Long Duration (Pumped) Storage	-	-	-	-	-	-	-	-	-	-	-	0
Solar PV	-	-	-	-	-	50	50	-	-	-	-	100
Wind (CA onshore)	-	-	-	-	75	-	-	-	-	-	15	90
Wind (Offshore)	-	-	-	-	-	-	-	-	-	-	-	0
Wind (OOS onshore)	-	-	-	-	-	-	-	-	-	-	-	0

Table 12. Conforming 46 MMT Portfolio Cumulative Expansion Plan

MW	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Cumulative Capacity Additions	-	240	240	340	465	515	565	565	565	565	580
Battery Storage (Li-Ion)	-	-	-	100	150	150	150	150	150	150	150
Biomass	-	-	-	-	-	-	-	-	-	-	-
Existing PPAs	-	-	-	-	-	-	-	-	-	-	-
Flow Battery	-	-	-	-	-	-	-	-	-	-	-
Existing Geothermal	-	-	-	-	-	-	-	-	-	-	-
Existing Large Hydro (In State)	-	120	120	120	120	120	120	120	120	120	120
Existing Large Hydro (Out of State)	-	120	120	120	120	120	120	120	120	120	120
Long Duration (Pumped) Storage	-	-	-	-	-	-	-	-	-	-	-
Solar PV	-	-	-	-	-	50	100	100	100	100	100
Wind (CA onshore)	-	-	-	-	75	75	75	75	75	75	90
Wind (Offshore)	-	-	-	-	-	-	-	-	-	-	-
Wind (OOS onshore)	-	-	-	-	-	-	-	-	-	-	-

Table 13. Conforming 46 MMT Portfolio RPS and GHG-free

GWh	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Load	4,511	4,462	4,438	4,431	4,437	4,442	4,446	4,446	4,448	4,447	4,449
RPS Compliance from LT Contracts (contracted)	90	180	1,349	1,851	1,839	1,826	1,813	1,801	1,790	1,776	1,764
RPS Compliance from LT Solar Contracts (expansion plan)						124	248	247	247	248	248
RPS Compliance from LT Wind Contracts (expansion plan)					194	195	195	195	195	195	219
Total RPS Compliance from LT Contracts	90	180	1,349	1,851	2,033	2,145	2,256	2,243	2,232	2,219	2,231
Existing REC Contracts - PCC1	1,470	1,250	100	-	-	-	-	-	-	-	-
Existing REC Contracts - PCC2	360	308	200	-	-	-	-	-	-	-	-
Additional REC Purchases	-	-	100		-	-	-	107	237	380	467
Required RPS % from Long-term Contracts	6%	11%	79%	101%	104%	103%	103%	97%	91%	86%	84%
RPS % of Load	43%	36%	38.5%	41%	44%	48%	51%	53%	55%	58%	61%
CA RPS Target	33%	35.75%	38.5%	41.25%	44%	46.75%	49.5%	52.25%	55%	57.75%	60%
CA RPS Target MWh	1,489	1,595	1,709	1,828	1,952	2,077	2,201	2,323	2,446	2,568	2,669
GHG-Free Generation		785	785	785	787	785	785	785	787	785	785
Existing GHG Contracts	2,038	876	-	-	-	-	-	-	-	-	-
GHG-Free % of Load	80%	69%	50%	59%	64%	66%	68%	71%	73%	76%	78%

Table 14. Conforming 38 MMT Portfolio (Preferred) Expansion Plan

MW	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Battery Storage (Li-Ion)	-	-	-	100	100	-	-	-	-	-	-	200
Biomass	-	-	-	-	-	-	-	-	-	-	-	0
Existing PPAs	-	-	-	-	-	-	-	-	-	-	-	0
Flow Battery	-	-	-	-	-	-	-	-	-	-	-	0
Existing Geothermal	-	-	-	-	-	-	-	-	-	-	-	0
Existing Large Hydro (In State)	-	120	-	-	-	-	-	-	-	-	-	120
Existing Large Hydro (Out of State)	-	120	-	-	-	-	-	-	-	-	-	120
Long Duration (Pumped) Storage	-	-	-	-	-	-	-	-	-	-	-	0
Solar PV	-	-	-	-	50	50	-	-	-	20	200	320
Wind (CA onshore)	-	-	-	-	-	-	100	-	-	-	-	100
Wind (Offshore)	-	-	-	-	-	-	-	-	-	-	-	0
Wind (OOS onshore)	-	-	-	-	-	-	-	-	-	-	-	0

Table 15. Conforming 38 MMT Portfolio (Preferred) Cumulative Expansion Plan

MW	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Battery Storage (Li-Ion)	-	-	-	100	200	200	200	200	200	200	200
Biomass	-	-	-	-	-	-	-	-	-	-	-
Existing PPAs	-	-	-	-	-	-	-	-	-	-	-
Flow Battery	-	-	-	-	-	-	-	-	-	-	-
Existing Geothermal	-	-	-	-	-	-	-	-	-	-	-
Existing Large Hydro (In State)	-	120	120	120	120	120	120	120	120	120	120
Existing Large Hydro (Out of State)	-	120	120	120	120	120	120	120	120	120	120
Long Duration (Pumped) Storage	-	-	-	-	-	-	-	-	-	-	-
Solar PV	-	-	-	-	50	100	100	100	100	120	320
Wind (CA onshore)	-	-	-	-	-	-	100	100	100	100	100
Wind (Offshore)	-	-	-	-	-	-	-	-	-	-	-
Wind (OOS onshore)	-	-	-	-	-	-	-	-	-	-	-

Table 16. Conforming 38 MMT Portfolio (Preferred) RPS and GHG-free

GWh	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Load	4,511	4,462	4,438	4,431	4,437	4,442	4,446	4,446	4,448	4,447	4,449
RPS Compliance from LT Contracts (contracted)	90	180	1,349	1,851	1,839	1,826	1,813	1,801	1,790	1,776	1,764
RPS Compliance from LT Solar Contracts (expansion plan)					124	249	248	247	247	297	794
RPS Compliance from LT Wind Contracts (expansion plan)							260	260	259	258	239
Total RPS Compliance from LT Contracts	90	180	1,349	1,851	1,963	2,075	2,321	2,308	2,296	2,331	2,797
Existing REC Contracts - PCC1	1,470	1,250	100	0	0	0	0	0	0	0	0
Existing REC Contracts - PCC2	360	308	200	0	0	0	0	0	0	0	0
Additional REC Purchases	0	0	100	2	27	46	0	52	181	274	0
Required RPS % from Long-term Contracts	6%	11%	79%	101%	101%	100%	105%	99%	94%	91%	105%
RPS % of Load	43%	39%	39%	42%	45%	48%	52%	53%	56%	59%	63%
CA RPS Target	33%	35.75%	38.5%	41.25%	44%	46.75%	49.5%	52.25%	55%	57.75%	60%
CA RPS Target MWh	1,489	1,595	1,709	1,828	1,952	2,077	2,201	2,323	2,446	2,568	2,669
GHG-Free Generation		785	785	785	787	785	785	785	787	785	785
Existing GHG Contracts	2,038	876	-	-	-	-	-	-	-	-	-
GHG-Free % of Load	80%	69%	50%	59%	62%	64%	70%	71%	73%	76%	81%

Public Utilities Code Section 454.52(a)(1) requires that IRPs:

> (A) Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each load-serving entity that reflect the electricity sector's percentage in achieving the economy wide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030.
>
> (B) Procure at least 60 percent eligible renewable energy resources by December 31, 2030, consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3.
>
> (C) Enable each electrical corporation to fulfill its obligation to serve its customers at just and reasonable rates.
>
> (D) Minimize impacts on ratepayers' bills.
>
> (E) Ensure system and local reliability on both a near-term and long-term basis, including meeting the near-term and forecast long-term resource adequacy requirements of Section 380.
>
> (F) Comply with subdivision (b) of Section 399.13 [which specifies that a retail seller may enter into a combination of long- and short-term contracts for electricity and associated renewable energy credits. Beginning January 1, 2021, at least 65 percent of the procurement a retail seller counts toward the renewables portfolio standard requirement of each compliance period shall be from its contracts of 10 years or more

in duration or in its ownership or ownership agreements for eligible renewable energy resources.]

(G) Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities.

(H) Enhance distribution systems and demand-side energy management.

(I) Minimize localized air pollutants and other greenhouse gas emissions, with early priority on disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code.

SJCE's portfolios meet those requirements as summarized here:

- SJCE's Conforming 46 MMT Portfolio 2030 GHG emissions are within 1 percent of the assigned 2030 GHG Benchmark of 0.787, as calculated by the CSP Calculator. SJCE's Conforming 38 MMT Portfolio 2030 GHG emissions are within 1 percent of the assigned 2030 GHG Benchmark of 0.629, as calculated by the CSP Calculator.
- SJCE's Conforming Portfolios are both comprised of at least 60 percent eligible renewable energy resources by December 31, 2030.
- SJCE makes every effort to keep costs down and balance building its financial reserves and offering affordable rates and services to customers.
- As described in greater detail below in the section on System Reliability Analysis, SJCE procures resource adequacy to achieve compliance with Commission requirements. SJCE's Conforming Portfolios demonstrate a balanced resource mix that will allow SJCE to continue to contribute to overall grid reliability.
- SJCE has entered into long-term contracts for 487 MW of RPS-eligible resources and plans to enter into additional long term agreements as set forth in the expansion plan. These contracts are anticipated to cover 76 percent of SJCE's RPS requirements in the 2021-2024 compliance period in the Conforming 46 MMT Portfolio, and 75 percent of SJCE's RPS requirements in the 2021-2024 compliance period in the Conforming 38 MMT Portfolio.
- SJCE's Conforming Portfolios include significant quantities of renewable energy and energy storage resources, plans to investigate opportunities for long-duration energy storage, and a long-term contract for RA with natural gas generation. This balanced portfolio contributes to the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and our local community.
- SJCE building financial reserves so that it can ensure rate stability for customers.
- SJCE is working to minimize localized air pollutants and GHG emissions by procuring renewable energy and energy storage resources that displace alternatives such as system power purchases and natural gas generation that disproportionately impact disadvantaged communities. SJCE is partnering with the CEC to fund an incentive project through the California Electric Vehicle Infrastructure Project ("CALeVIP") for the installation of DC fast charging and Level 2 ports, with at least 25 percent of ports being installed in disadvantaged and low-income communities. This overcomes one of the key barriers to widespread EV adoption and reduces pollution that disproportionally affect disadvantaged and low-income communities.

i. Differences between SJCE's portfolios and the RSP

While the Commission has made it clear that it does not require SJCE's Conforming Portfolios to exactly track the Commission's RSP and 38 MMT scenario, key differences between the results merit consideration. Because SJCE's modeling sought to identify an expansion plan for SJCE, building on SJCE's individual procurement to date, one should expect the outcomes to differ. SJCE understands that ultimately, all LSE portfolios must be combined to produce a reliable whole and stands ready to do its part to ensure that the needed resources are in place to achieve the State's environmental goals and maintain reliability.

SJCE has procured aggressively since it commenced substantial operations in February 2019, and has focused on putting into place a portfolio that is balanced, with attention to meeting evening ramp and non-solar hours along with solar hours. SJCE's current procurement will cover 44% of SJCE's expected load in 2023 when all the projects contracted for will be in operation. The procurement to date includes a 225 MW out-of-state wind contract that will provide resources during all non-solar hours as well as solar hours, and an innovative 62 MW fixed delivery agreement that must deliver every day of the year during the hours ending 07-22, and thus includes the challenging evening ramp hours. The fixed delivery agreement is with a solar plus storage facility, since without the storage, the fixed delivery profile would not be possible. However, since the agreement does not dictate how much storage the Seller must add to meet its fixed delivery requirements, the charts below do not give SJCE credit for the storage necessary for the fixed delivery agreement to meet its delivery requirements. In addition, SJCE has entered into two 100MW solar projects, one with 10MWs of co-located batteries. Finally, SJCE entered into a seven year, 150 MW agreement with Calpine for RA from its existing natural gas fleet, and several other three-year agreements with natural gas plants.

Departing from this strong base, for both of SJCEs Portfolios, the AURORA modeling identified a higher proportion of renewables than the RSP and the 38 MMT scenarios. This is not surprising since only renewable resources were considered in the candidate resources. Nonetheless, the model selected similar amounts of storage (slightly less in the Conforming 46 MMT Portfolio and slightly more in the Conforming 38 MMT Portfolio), and no LDS until 2037. Given a higher amount of renewables, and particularly solar in SJCE's portfolios, for a consistent ratio of solar to batteries between the Commission's new resources and SJCE's, a larger amount of batteries would be required in the SJCE Portfolios to match the proportion of new renewables to new batteries in the Commission's RSP and the 38 Scenario.

Table 17. New Resource Cumulative Buildout of 2019-2020 RSP for 2030 based on Decision 20-03-028

Resource (MW)	***2030***	***SJCE Proportional Share - 2030***	***SJCE Conforming 46 MMT Results***
Wind	*2,837*	*59*	90
Wind on New Out-of-State Transmission	*606*	*13*	225
Utility-Scale Solar	*11,017*	*229*	362
Battery Storage	*8,873*	*185*	160
Pumped (long-duration) Storage	*973*	*20*	0
Shed Demand Response	*222*	*5*	0
Natural Gas Capacity Not Retained	*(30)*	*(1)*	0

Table 18: New Resource Buildout of 38 MMT by 2030 Portfolio (Cumulative MW) based on Decision 20-03-028

Resource (MW)	***2030***	***SJCE Proportional Share - 2030***	***SJCE Conforming 38 MMT Results***
Wind	*5,279*	*110*	100
Wind on New Out-of-State Transmission	*3,000*	*62*	225
Utility-Scale Solar	*11,995*	*249*	682
Battery Storage	*9,714*	*202*	210
Pumped (long-duration) Storage	*1,605*	*33*	0
Shed Demand Response	*222*	*5*	0
Natural Gas Capacity Not Retained	*2,046*	*43*	0

Siemens has advised these results may arise because SJCE is a new power provider and has invested in a balanced portfolio, including out of state wind and battery paired with storage. Thus, SJCE's proportional share of *new* battery storage investments is lower as SJCE has paired solar with storage from its inception. It is important to note that the proportion of wind and solar to batteries in SJCE's portfolio including the expansion plans in both the Conforming 46MMT Portfolio and the Conforming 38MMT Portfolio is quite close to the proportion of wind and solar to batteries when both existing and new resources in the RPS and 38 MMT Scenario are included in the comparison.

Another likely source of this difference is the model used and the modeling approach. The modeling undertaken by SJCE relied mostly on Commission inputs, but used a different model (AURORA) and modeling approach as described earlier in this document. The Commission's modeling is based on runs for a sample 37 days in a year for selected years. The AURORA analysis sampled 104 days and every other hour for each year of the 20-year study horizon, and in the final simulation of the system, the model simulated plant operating and market conditions for every hour, every day and every year of the study horizon. As to neighboring regions, as explained earlier, RESOLVE generally focuses on a single market, reflecting high level interties and market interaction with neighboring regions. AURORA was set up to run most of the Western Interconnect.

Each modeling approach and effort has its strengths and weaknesses, and a consideration of more than one analysis will result in more robust information. The discrepancies in the results merit further exploration.

Notwithstanding the results of its IRP analysis, SJCE is continuing to explore long-duration storage and continues to welcome bids from all kinds of renewable resources and battery storage in its solicitations. Moreover, SJCE looks forward to exploring the source of the differences between the Siemen's results and the Commission's results, and the further information that will result from combining the IRPs from all Load Serving Entities ("LSEs"). SJCE understands that California as a whole must have a balanced portfolio of renewables to the flexible capacity needed for their full utilization. SJCE also understands that, particularly once the IOUs existing portfolios are fairly allocated such as proposed by SCE and CalCCA in PCIA Working Group 3,[13] JCE does and will make use of existing resources to help meet the

[13] Final Report of Working Group 3 Co-Chairs: Southern California Edison (U-338e), California Community Choice Association, And Commercial Energy. pp. 20-30 Retrieved from CPUC website 8/3/20: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=335710541

needs of SJCE's load. If appropriate based on further information, SJCE can make adjustments to its IRP (subject to the approval of Its Risk Oversight Committee and San José City Council). In any event, SJCE will meet any proportional share requirements identified by the CPUC.

c. GHG Emissions Results

SJCE used the CSP Calculator to estimate the GHG emissions associated with each Conforming Portfolio. Table 19 below shows the resulting GHG emissions associated with each of SJCE's Conforming Portfolios. SJCE used a custom hourly load shape in the CSP Calculator, as described in more detail in the Study Design section above.

Table 19. GHG Emissions (MMT) Associated with SCJE's Conforming Portfolios

	2020	**2022**	**2026**	**2030**
Assigned Load Forecast (GWh)	4,510	4,438	4,446	4,449
46 MMT GHG Benchmark				0.787
46 MMT Conforming Portfolio Emissions	1.659	0.858	0.777	0.784
38 MMT GHG Benchmark				0.629
38 MMT Conforming Portfolio Emissions	1.654	0.781	0.730	0.625

d. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

SJCE reports its estimate of NO_X, $PM_{2.5}$, and SO_2 emissions associated with its Preferred Conforming Portfolios in Table 20 below.

Table 20: Local Air Pollution Emissions under SJCE's Conforming 46 MMT Portfolio and Conforming 38 MMT Portfolio.

	Conforming 38 MMT Portfolio				Conforming 46 MMT Portfolio			
tons	2020	2022	2026	2030	2020	2022	2026	2030
$PM_{2.5}$	61	32	30	28	61	34	31	36
SO_2	6	3	3	3	6	3	3	3
NO_x	97	60	62	54	97	63	63	69

ii. Focus on Disadvantaged Communities

SJCE believes that the most important and influential way it can benefit San José's disadvantaged communities is by keeping the cost of electricity affordable in order to provide equitable access to an essential service. SJCE's procurement is guided by this objective, taking into account also that disadvantaged communities are most directly affected by environmental impacts.

San José has a very diverse community of residents, with roughly one-third of its population Asian, one-third Hispanic, and one-third white.[14] There are 14 census tracts that score within the top 25 percent of communities with the highest pollution burden using the CalEnviroScreen tool. Those 14 tracts have a population total of 63,925, which represents 18 percent of the approximately 350,000 accounts that SJCE will serve once enrollment is complete. Although the CalEnviroScreen tool only designates 14 census tracts as disadvantaged communities, AB 1550 passed on August 31, 2016 which amended California Health and Safety Code (HSC) § 3971314 designates an additional 53 census tracts in San José as low-income. These 67 census tracts are all represented in seven zip codes (95110, 95111, 95112, 95116, 95122, 95131, and 95133) and five Council districts (3, 4, 5, 7, and 8). These areas are commonly referred to as East Willow Glen, Almaden, Seven Trees, Japantown, Spartan-Keyes, Little Portugal, King and Story, Berryessa, and Mabury.

SJCE seeks to keep the cost of electricity as low as possible for our customers consistent with achieving our regulatory requirements and environmental goals. Program expenditures are monitored closely by SJCE staff, a Risk Oversight Committee, and Council. The City of San José has been a vocal advocate before the CPUC, other State policy makers and the public for regulatory reforms to reduce costs, optimize the value of the IOU resources, and to reduce exit fees. These efforts are central and foremost to SJCE's commitment to serve the needs of its disadvantaged communities.

SJCE also seeks to take advantage of the opportunity a CCA presents to fund and operate programs to benefit local communities. During its first years of operation, SJCE developed a comprehensive community programs roadmap. The SJCE programs roadmap, which was presented to San José's Transportation and Environment Committee on March 2, 2020, was created based on input from the community as well as extensive research into program options and program cost effectiveness. Part of this process included outreach to disadvantaged communities including focus groups in Spanish and Vietnamese in census tracts of disadvantaged communities as well as online surveys in English, Spanish, and Vietnamese. The responses to the online survey represent San José's diverse mix of residents.

The foundational direction of SJCE's programs roadmap is built around the program guiding principles. One of the five program guiding principles is "to promote equity, affordability, and support disadvantaged communities". To build on this equity-focused program guiding principle, SJCE has also incorporated a suite of equity metrics used to evaluate customer programs and their impact on disadvantaged communities. These equity metrics include the percentage of low to middle-income communities able to access the program, percentage of program funding directed to disadvantaged and low-income communities, and percentage change in energy burden for participating customers. SJCE is prioritizing building adequate financial reserves in the early years of operations to ensure financial stability; therefore, SJCE's programs roadmap focuses on lower cost educational programs in the early years.

In late 2020 and subject to San José City Council approval, SJCE plans to submit to the CPUC an application to develop and administer the DAC-Green Tariff program. This program, administered by the Commission and funded through greenhouse gas allowance charges, provides 100 percent renewable electricity and a 20 percent bill discount to CARE/FERA customers. The program will draw electricity from a fully funded and newly constructed, approximately 1.4 MW solar array in Northern California. SJCE estimates around 500 households could benefit from the program.

[14] https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

Currently, SJCE is partnering with the CEC to fund an incentive project through the CALeVIP launching on December 16, 2020 for the installation of DC fast-charging and Level 2 charging ports in workplace, commercial, public sector, and multifamily housing locations. The CEC will allocate $10 million for San José, with SJCE matching $4 million, for a total of $14 million to be disbursed over the next two to four years. This $14 million will go towards installing 1,500 new electric vehicle charging ports throughout San José, with at least 25 percent being installed in disadvantaged and low-income communities. Improving access to affordable EV charging options in disadvantaged and low-income communities is critical for overcoming one of the key barriers to widespread EV adoption, as well as reducing pollution that disadvantaged and low-income communities often are exposed to at higher levels than other communities.

SJCE has also contributed to the community by successfully negotiating a total of $870,000 in community investment funds from its four executed PPAs. These dollars are invested into programs that positively impact disadvantaged communities in San José. The first agreement included $275,000 which has been allocated to SJ Works, a program to place at-risk youth into about 90 internships with sustainability and clean energy companies in San José. Through the specific uses of the remaining investments have not yet been finalized, they will also focus on positively impacting disadvantaged communities in San José.

In its initial year and half of substantial operations, SJCE has added substantial renewable projects to its portfolio, while seeking also to provide for reliability as the state transitions from natural gas to storage and other alternatives to balance renewables. SJCE has entered into four long-term PPAs that will serve 44 percent of SJCE's load when operational. As these projects start to come online beginning December 31, 2021, SJCE's reliance on system power will continue to decrease. At the same time, SJCE has entered into numerous near-term RA agreements with natural gas plants, and one agreement that goes out to 2029 to ensure reliability during a responsible transition to a significantly lower carbon electric system. SJCE has also been exploring opportunities for more cost-effective and longer duration storage with its CCA partners as discussed later in this IRP.

e. Cost and Rate Analysis

As stated earlier, SJCE considers that keeping electric service affordable is critically important not only for its disadvantaged customers but to better serve the community generally. SJCE is considering carefully the data that was developed through the IRP process. The analysis indicated that SJCE's Conforming 38MMT Portfolio is 1.7 percent more expensive on an NPV basis than the Conforming 46 MMT Portfolio. However, the stochastic analysis demonstrates that the Conforming 46 MMT Portfolio SJCE relies more heavily on market purchases, particularly in later years. Therefore, the 46 MMT Portfolio it is at higher risk of increased market prices and in particular increased fuel prices than in the Conforming 38 MMT Portfolio. Thus, provided SJCE has a stable load, pursuing the Conforming 38 MMT Portfolio is consistent with SJCE's rigorous attention to maintaining reasonably priced electric service while striving for environmental quality.

Generally, the IRP results indicate a portfolio cost trajectory, cost mix and expected impacts to rates for the Conforming 46 MMT Portfolio and the Conforming 38 MMT Portfolio will be relatively similar, even though the NPV of the Conforming 38 MMT Portfolio is slightly more expensive than the NPV for the Conforming 46 MMT Portfolio. One reason that the portfolios exhibit similar characteristics through the

study period is a direct result of the process taken to develop the SJCE's Conforming Portfolios. SJCE's portfolios were optimized around meeting California RPS targets and then resources were added or removed to arrive within one percent of SJCE's individual GHG MMT target for the respective case.

SJCE will continue to examine the results of the IRP process along with information from its procurement efforts, and ongoing market information to ensure that its costs are as affordable as possible while meeting SJCE's regulatory requirements and achieving state and local carbon reduction goals.

As noted previously, SJCE's procurement and rate setting activities are overseen in detail by SJCE and San José City management, and by a Risk Oversight Committee that includes the City of San José executive management staff that are focused on the financial stability of all Departments throughout the City of San José. These members include the City's Director of Finance and the City's Budget Manager as well as the City's Deputy City Manager. San José is a large city that operates an annual city budget of over $4 billion dollars and effectively manages several complex utilities and enterprise operations such as water, wastewater, and recycling services as well as the San José Mineta International Airport.

SJCE's procurement authority and rates are subject to the approval of the Risk Oversight Committee and the San José City Council. These bodies will continue to oversee SJCE's procurement and rates for the benefit of the community. SJCE is accountable to the San José City Council, the body directly elected by the customers SJCE serves. San José City Council meetings are open to the public and often gain extensive media coverage which ensures effective oversight of public funds and services provided.

f. System Reliability Analysis

As stated above, SJCE has procured aggressively since it commenced substantial operations in February 2019, and has focused on putting into place a portfolio that is balanced, with attention to meeting the evening ramp and non-solar hours along with solar hours. SJCE continues to procure RA in a commercially reasonable manner to meet all state requirements, including incremental resource adequacy as defined in D. 19-11-016. While facing significant barriers and challenges, described in the section on barriers, SJCE continues to undertake solicitations for short-, medium- and long-term resource adequacy. For example, SJCE issued a Request for Information on Standalone Storage on October 22, 2019; joined East Bay Community Energy's "New Resource Adequacy and/or Peak Energy" Request for Information issued on September 6, 2019; issued a Request for Offers to Sell Incremental Resource Adequacy in November 18, 2019; issued a Request for Offers for long-term Resource Adequacy on March 13, 2020; and joined several CCAs in issuing an RFI for Long Duration Storage on June 6, 2020. As a result, SJCE was able to shortlist several energy storage projects, natural gas facilities, and demand response projects.

Through these solicitations (and related negotiations) SJCE was able to bring the following projects on-line:

- Three-year (2021-2023) System RA agreement with flexible attributes (60, 125 and 150 MW-Mo per year, respectively);
- Seven-year (2023-2029) 150 MW-Mo System RA agreement with flexible attributes; and
- Three-year (2021-2023) 48 MW-Mo System RA agreement.

Furthermore, SJCE has executed several long-term PPAs for energy and capacity. The projects listed below are scheduled to come online on or before January 1, 2023.

- 262 MWs of in-state solar, 62 MWs of which has a fixed quantity in hours ending 7-22;
- 10 MWs of four-hour lithium-ion collocated battery storage, and;
- 225 MWs of out-of-state wind that is dynamically scheduled into the CAISO.

To its knowledge, SJCE is the first CCA to enter into a fixed delivery agreement with a solar project. This agreement moves away from the traditional take or pay agreements that require the buyer to accept all energy produced by a supplier at the time the power is produced. Instead, this agreement requires the Seller to delivery solar power seven from hours ending 7-22 every day of the year. This delivery profile covers the challenging evening ramp hours. This delivery requires the installation of batteries, but the agreement leaves the logistics of making the deliveries possible to the Seller. To SJCE's knowledge, the CPUC has not developed a methodology to accurately ascribe RA value to this innovative arrangement, either for purposes of the conventional RA program or for purposes of the required incremental procurement.

SJCE continues to strategically solicit and evaluate energy and capacity projects. The section on long-duration storage sets forth SJCE's efforts to work with other CCAs to explore and solicit long-duration storage.

The section on barriers outlines some of the challenges SJCE and other CCAs face with RA. As that section details, SJCE decided to pause active negotiations with battery storage developers because of regulatory uncertainty. One near term matter that would significantly help SJCE consider longer term RA procurement is resolution of the possibility of being allocated the IOUs PCIA resources and a decision on a mechanism to ensure IOUs timely and fairly make that capacity available to the market. SJCE particularly would welcome information on the RA that could be allocated to SJCE from PG&E's portfolio, if the SCE/CalCCA recommendation in the PCIA, Working Group III process[15] is implemented.

i. Stochastic Analysis

To assess the relationship between its portfolios and system reliability, SJCE conducted a stochastic analysis to assess its portfolios' performance under a range of market conditions. In addition, SJCE considered the extent to which it has already procured RA to meet its expected RA obligation. Further, SJCE reviewed how its portfolio of resources meets its load on a number of representative days in 2022, 2026 and 2030. Finally, SJCE reviewed stochastic information about the risk of significant curtailment.

SJCE reviewed the results of a stochastic analysis of several portfolios that broadly varied market conditions including load, emission prices, gas prices, coal prices, technology cost and hydro generation to identify extreme price conditions that could signal a supply/demand imbalance and hence a system reliability problem.[16] SJCE undertook a stochastic analysis of the Conforming 46 MMT Portfolio and the scenario, not filed, that achieves carbon neutrality in 2021. These cases were selected because they are

[15] Final Report of Working Group 3 Co-Chairs: Southern California Edison Company (U-338E) and California Community Choice Association. February 21, 2020.
https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M335/K710/335710541.PDF

[16] Siemens advises that while the analysis does not have weather as a stochastic input, but the stochastic variations to demand can be used to extrapolate the impact of seasonal weather events.

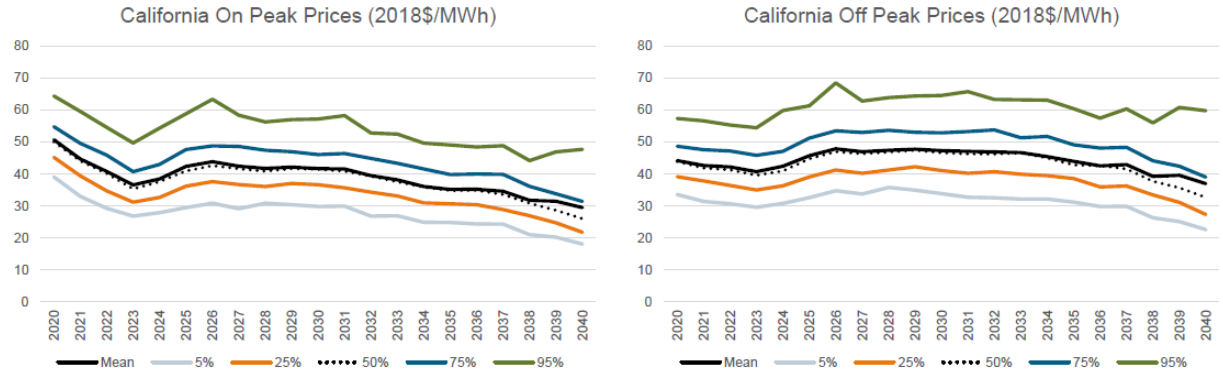
the two extremes modeled, the Conforming 46 MMT Portfolio having the highest carbon emissions and the least new resources, and the Carbon Neutral by 2021 scenario having the lowest carbon emissions and more new resources. The analysis showed stable prices through the study time period, contrary to what could be expected from supply/demand imbalances.

As set forth earlier in this document, the stochastic approach included the development of 200 Monte Carlo iterations of relevant fundamental variables testing the portfolio in question over a broad range of market conditions. Siemens provided distributions for all fundamental variables, including load forecasts, emission prices, gas prices, coal prices, technology cost, and hydro generation that can be used for selecting the 200 iterations of the model. The model utilized a broad range of demand and cost variables. The goal was to provide ranges of market exposures and determine the potential for price impacts experienced by SJCE.

The result of the analysis was that, on an annual basis, prices were relatively stable, even after varying the inputs broadly. This signals that there is not a serious system reliability concern for the CA system. This conclusion assumes that LSEs will not hold onto required amounts of excess capacity relative to their load ratio shares. Given the market disruptions and rolling blackouts of August 2020, it is important that additional analysis is completed to ensure these results are accurate.

As the figures below illustrate, even at the 95% probability band (95% of the results of the stochastic analysis were at or below this level), annual prices are stable, dipping in 2023, spiking in 2026 and then gently declining, with on peak prices declining more steeply than off peak prices. While the table below presents annual average prices, dampening short duration price spikes even if they are dramatic, the analysis does not predict a sustained increase in prices as should result from a supply/demand imbalance.

Figure 9 California Market Price Probability Bands 2020-2040



As SJCE examined the range of prices that could result from varying input conditions, the main driver of high prices proved to be the price of gas (against supply and demand variables) as gas has a heavy influence on system and off-peak pricing.

Figure 10: 46 MMT Compliance

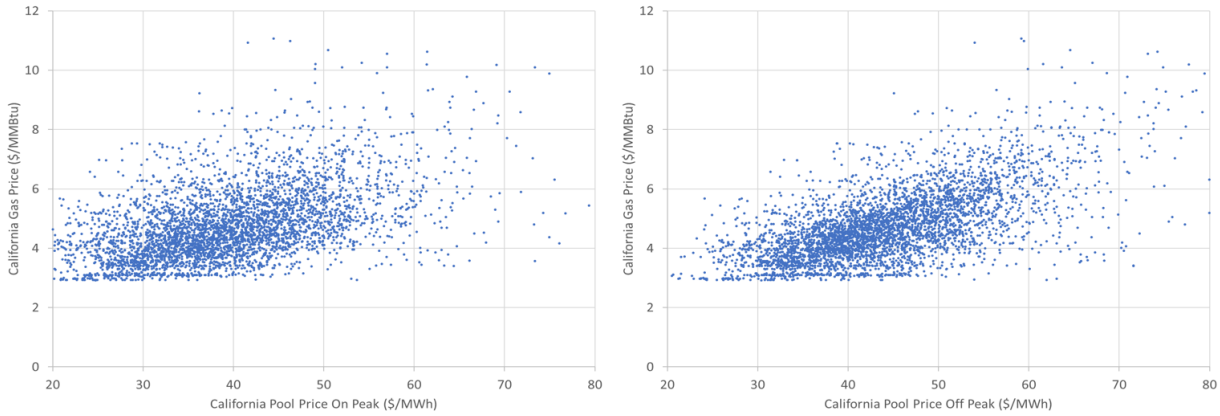
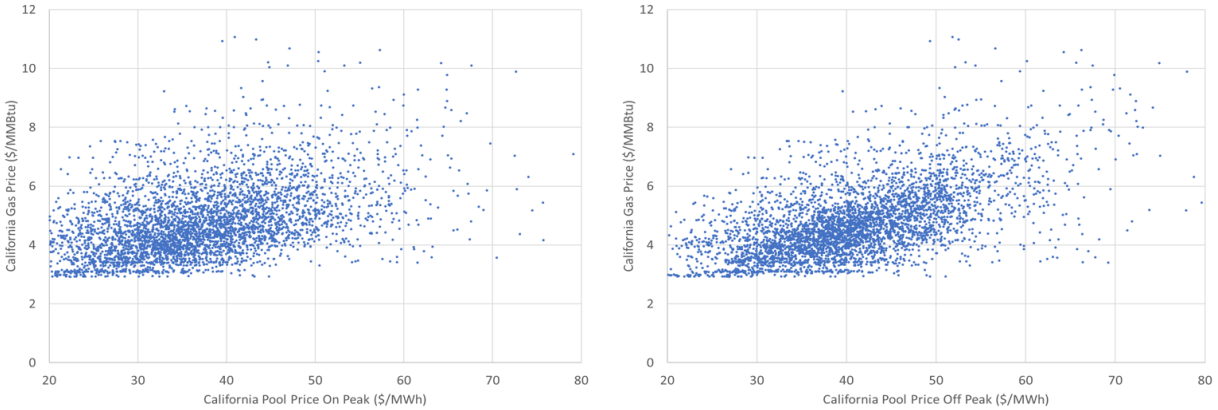


Figure 11: 38 MMT Compliance



It is important to note that the model did not perform a system wide reliability study to determine conditions under N-1 scenarios or other redundancy conditions. The model utilized normal system conditions to model transmission and generation availability. SJCE did not and could undertake a full system reliability study. Thus, SJCE is not intending to imply there are no reliability concerns in California.

However, SJCE is encouraged by these results that suggest there is not a high risk of a supply/demand imbalance, and considers that they merit further exploration. To the extent the CPUC's modeling indicates a different outcome, any such divergences should be investigated further to obtain more definitive insights and results, including considering California results with a more full consideration of the regional context. One of the benefits of using an alternative model to assess outcomes using similar inputs is the possibility of a more robust understanding of potential outcomes and risks, as all models have different strengths and weaknesses.

ii. Reliability Related Procurement Activities:

SJCE considered its progress toward procuring its expected RA requirements. Figure 12 demonstrates that SJCE's RA procurement is substantial through 2023, steps down in years 2024-2029, and is only minor after that.

Table 21 – Current SJCE Net System RA – Annual Peak Coverage Ratio, 46 MMT

System Reliability Progress Tracking Table (NQC MW) for month of September by contract status, 46 MMT portfolio	ELCC type	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
[redacted]												

Table 22 – Current SJCE Net System RA – Annual Peak Coverage Ratio, 38 MMT

System Reliability Progress Tracking Table (NQC MW) for month of September by contract status, 38 MMT portfolio	ELCC type	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
[redacted]												

Figure 12 – Current SJCE Net System RA – Annual Peak Coverage Ratio in August[17]

However, SJCE's RA procurement between 2023-2029 is far more robust than suggested by Figure 12. First, the CPUC has now directed that starting in 2023, the IOUs must procure all local RA on behalf of CCAs. In August 2021, the month in which SJCE has the highest system requirement, the total MW of local RA comprise of approximately 45 percent of SJCE's total monthly system RA requirement.[18] Thus, a significant portion of the open position reflected in the chart is to be procured by the IOUs per Commission direction.

Further, SJCE seeks to retain room in its RA portfolio for excess RA that may be held by the IOUs, particularly PG&E. This is important in order to prevent a significant over procurement of RA because there is not as yet any reasonable mechanism for the excess PCIA resources to be made available to the market, and no transparent information about what the magnitude of these resources is. If, as a result of this lack of mechanism and information, CCAs procure long-term RA resources to meet the bulk of their RA needs, the excess RA resources in the IOU portfolios will become even more stranded and the costs for all California consumers will be unnecessarily elevated. Moreover, SJCE seeks to retain room in its portfolio to accept System RA allocations from PG&E, if this is advantageous to its customers, should the CPUC adopt the joint recommendation of Southern California Edison and CalCCA for voluntary allocations of System RA in the PCIA Working Group 3 process.

Finally, SJCE notes that, it views its mid-term agreement for 150MWs of RA from Calpine's natural gas fleet as a transitional resources. As described in the section on LDS, SJCE is working with other CCAs to explore alternatives to ensure a reliable transition to a cleaner electric system. Even now, before the in-

[17] Per the CPUC's direction with respect to this IRP cycle, this table does not account for the fact that the CPUC has now directed the IOUs to procure local RA for CCAs and that SJCE's RA obligation will be reduced correspondingly.
[18] This estimate is based on SJCE Initial 2021 YA Peak Net RA Requirement CY2021.

service date for the agreement with Calpine, SJCE is exploring alternatives to replace this agreement with cleaner resources when it expires.

iii. How SJCE's portfolio of resources meets its load.

SJCE is aware that an overreliance on solar does not provide for meeting load during non-solar hours and continues to focus on associated solutions. Of the 487 MW of new renewables SJCE has contracted for to date, 225 MW are out of state wind, and 62 MW are solar that must deliver shaped solar energy for hours ending 7-22, seven days a week, 365 days a year.

SJCE modeled how resources from the 2020 IRP Portfolios match its load on key representative dates, in March, July and August, in 2026 and 2030.[19] These dates were selected to show SJCE's coverage during Spring and in Summer when coverage issues are substantially different. The figures below show that SJCE will be buying a moderate amount from the market during the challenging evening peak hours and over-night in the case of its preferred Conforming 38 MMT Portfolio. However, the wind modeled in the portfolios provides resources overnight, and the defined delivery solar project provides important resources during the evening ramp. In fact, SJCE's actual matching of generation to load is better than is reflected by the figures. This is because the figures still reflect the placeholder of 100 MW of solar and 100 MW of in-state wind, which have since been replaced by 225 MW of out-of-state wind, a resource that more closely matches our load. Moreover, reliance on non-solar hour procurement is more marked in the Conforming 46 MMT Portfolio, whereas SJCE intends to pursue the 38 MMT Portfolio.

Figure 13: 38 MMT Conforming (Preferred): March Resource Load Coverage

[19] SJCE also modeled 2022 but these results are not very meaningful since 2 of the 4 projects SJCE has contracted would not yet have been built.

Figure 14: 38 MMT Conforming (Preferred): July Resource Load Coverage

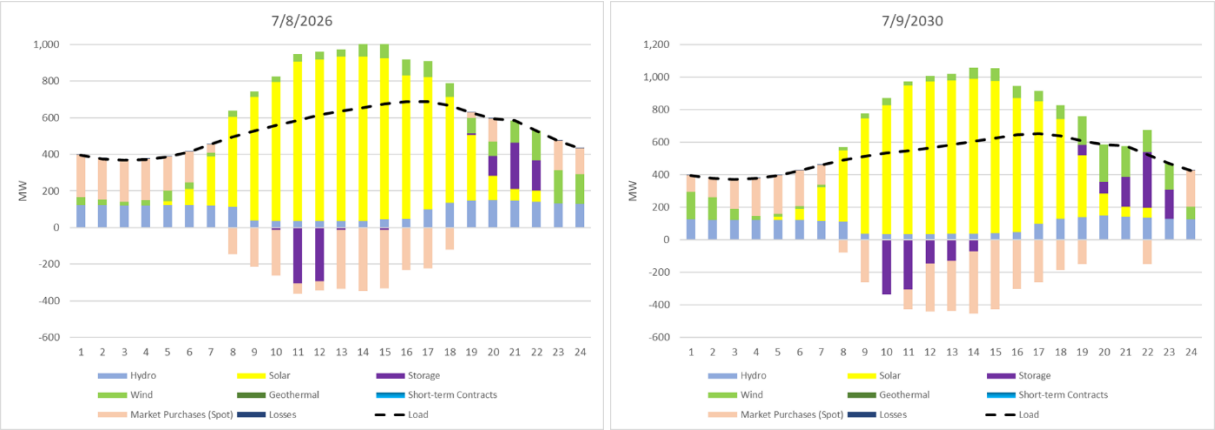


Figure 15: 38 MMT Conforming (Preferred): August Resource Load Coverage

SJCE will continue to work with our partners to create renewable generation shapes that complement market and portfolio needs. At the same time, after the projects in SJCE's long-term contracts commence operations, SJCE's energy procurement will have to focus ever more intensely on unserved hours in the evening and overnight. SJCE has discussed opportunities for 5- to 15-year energy procurement focused on these critical hours with some of its suppliers and is preparing to adjust its energy procurement to explore such opportunities. While in the past SJCE only sought procurement authority for near-term energy procurement (within the upcoming 3 years), on August 25 of this year SJCE obtained procurement authority for $212 million for the period 2024-2032 in order to be able to pursue these types of opportunities.

iv. Curtailment

With an increasing proportion of renewables in California, it may be necessary to curtail these resources during hours of excess, decreasing their value to meet load or provide environmental benefits. The AURORA model calculated curtailments for solar, wind and other non-dispatchable resources on an hourly basis based on load requirements, battery storage charging and economics.

The simulation results show curtailments mostly for wind during the solar hours. There are minimal or no curtailments of renewables during non-solar hours. The AURORA model selects to curtail wind over

solar due to its higher variable operating costs, based on CPUC assumptions. Most of the curtailments happen in the later periods of the study horizon, during the late 2020s and after 2030, when there is greater penetration of renewable generation in the portfolio and in the California market. Furthermore, after the mid-2020s, wind developers are no longer eligible to receive the federal Production Tax Credit for newly constructed wind facility generation, which currently allows them to bid negative prices into the market and dispatch ahead of solar.

The figure below illustrates that in the Conforming 46 MMT Portfolio, for wind, by 2030, at the P-50 probability band (50% of the curtailment results of the stochastic analysis were greater than this estimate and 50% of the curtailment results of the stochastic analysis were less) 10 percent of the annual potential output is subject to curtailment, growing to 30 percent by 2040. In contrast, for solar, even at a P-95 probability bandl, curtailments do not quite get to three percent of the annual potential output in the year with the highest curtailment, 2024, and curtailment is virtually nonexistent after 2030. The results for SJCE's Carbon Neutral Portfolio, built on the CPUC's 38 MMT Scenario are similar.

Figure 16 – 46 MMT Conforming: Onshore Wind Curtailment

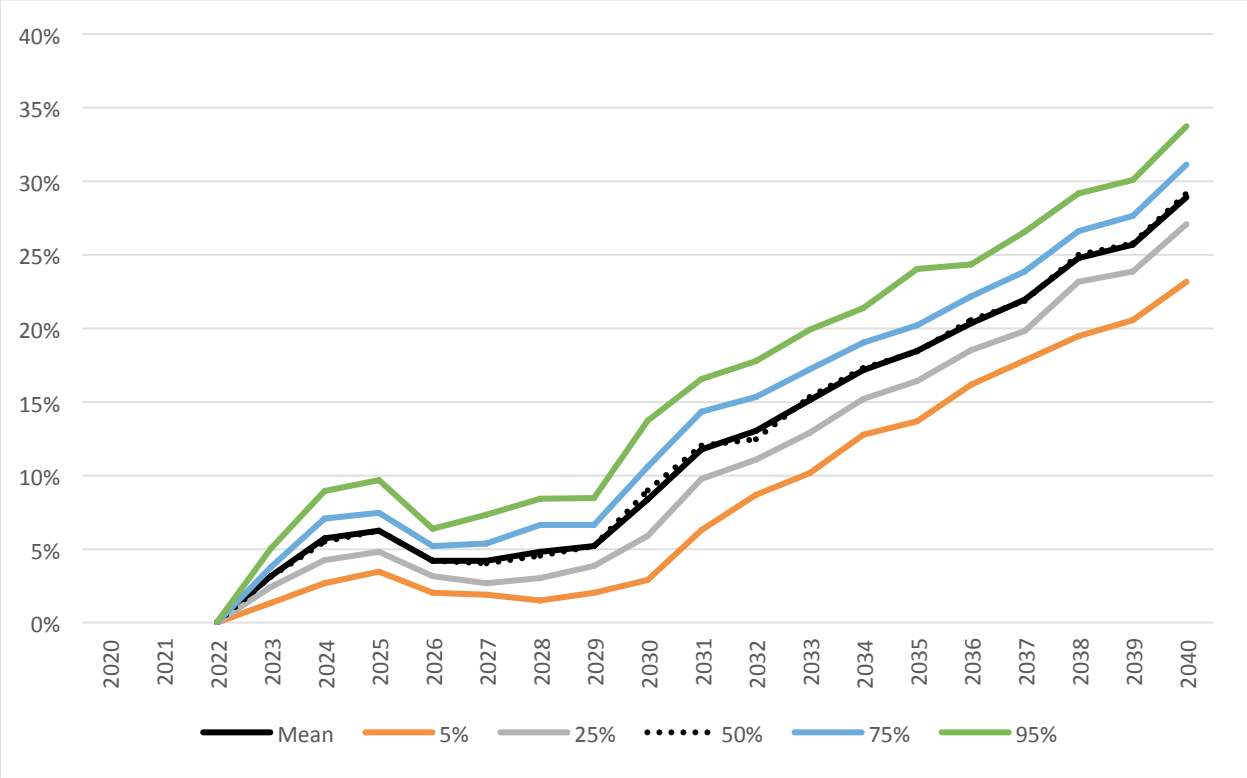
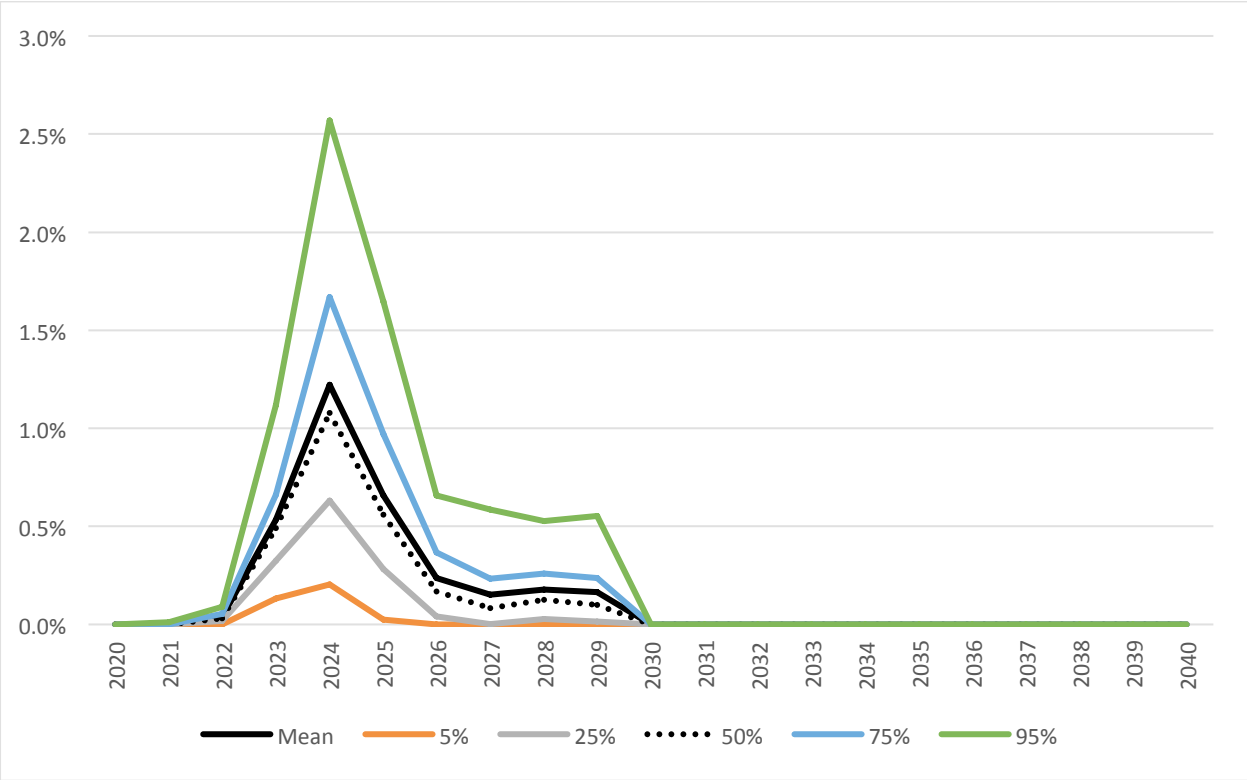


Figure 17 – 46 MMT Conforming: Solar Curtailment



The curtailment results reinforce the importance of seeking to better match resources with load as described in the section above. They also underscore the value of out-of-state wind that has a profile that is shifted from the profile of California wind.

g. Hydro Generation Risk Management

SJCE performed a stochastic analysis to assess the magnitude of risk to its Portfolios from fluctuations in hydroelectric availability, and determine the impact of hydro availability on the Portfolio costs. SJCE's analysis suggests that hydro generation availability poses only a modest risk to its customers, and that SJCE's actions to procure renewable energy and energy storage are effective strategies to mitigating this risk.

The approach to modeling hydro uncertainty was applied in the stochastic analysis for the Conforming 46 MMT Portfolio and in the Carbon Neutral by 2021 Portfolio. Using historic hydro generation years in California, the model randomly assigned identified levels of generation to the 200 stochastic iterations. The approach results in a range of hydro generation that varied across both iterations and years within each iteration.

The analysis showed little correlation between hydro variation and SJCE's Portfolio costs and California wholesale power prices. The correlation was much lower than the correlation between Portfolio costs and variation in load, gas prices, and GHG prices, which each have a larger impact on California price formation and, by extension, SJCE's market purchase/sales costs and revenues. This suggests that at the

levels assumed in SJCE's 2020 IRP Portfolios, the risk from hydrology is not among the more important considerations. This is true even in a case where SJCE opted to continue to pursue aggressive near term carbon neutrality goals such as in the Carbon Neutral by 2021 Portfolio. As with other results, this result merits further examination.

Figure 18 – 46 MMT Conforming – Relationship of available hydro to SJCE portfolio cost

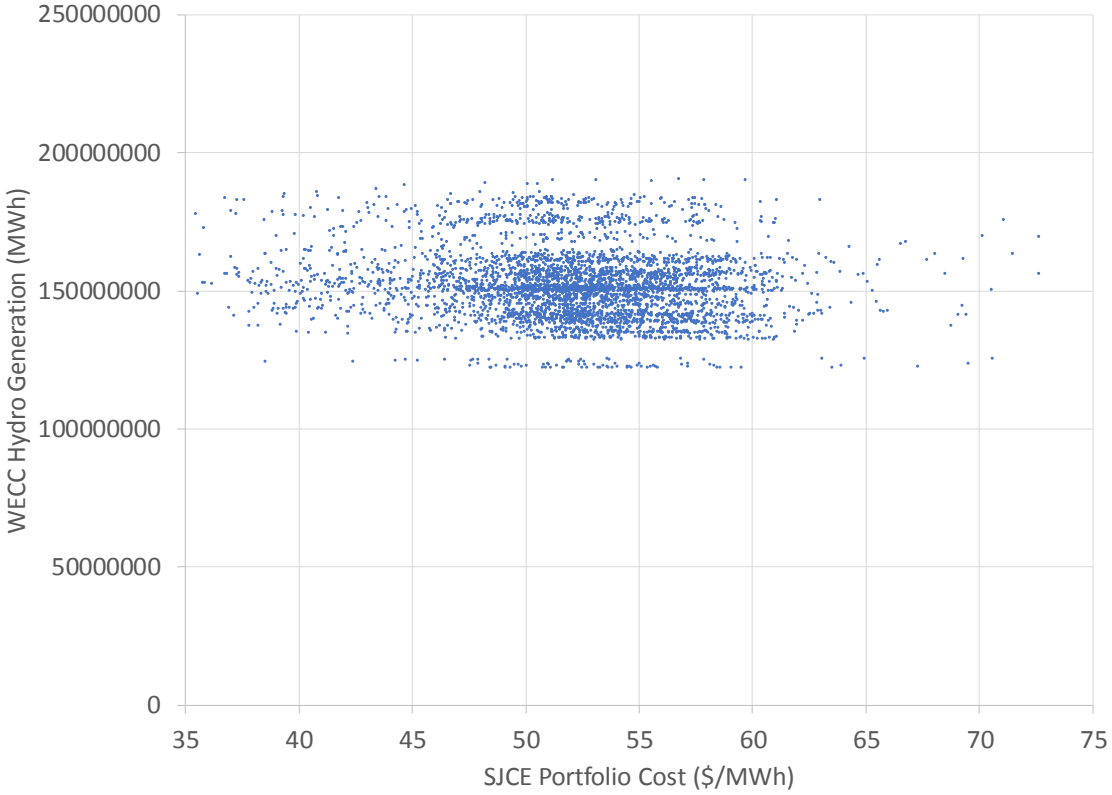
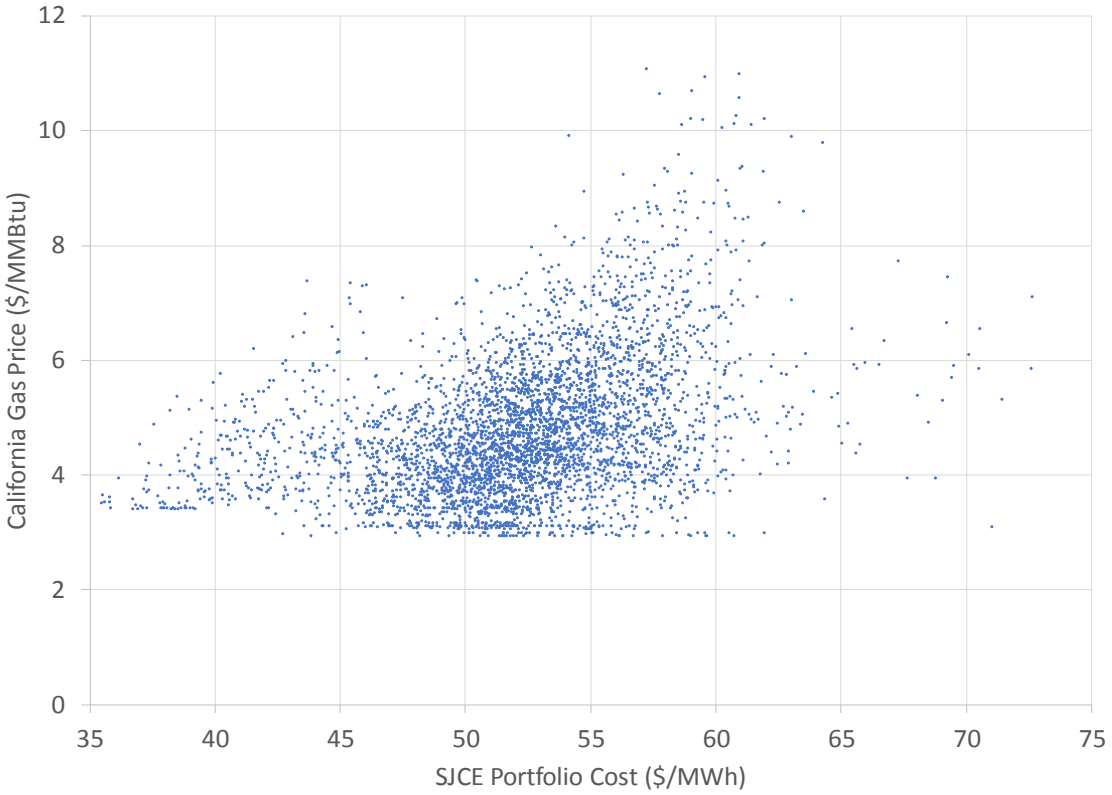


Figure 19 – 46 MMT Conforming – Gas Price relationship to SJCE portfolio cost



Another important question with respect to hydrological variation is the impact on reliability. Because beyond 2021, SJCE has not entered into agreements with in-state or out-of-state hydro providers, fluctuations in hydro do not affect SJCE's analysis of its procurement of RA over the study period.

h. Long-Duration Storage Development

As part of the 2020 IRP analysis, SJCE included 12-hour duration storage as a resource option to for the long-term capacity expansion plan, but long-duration storage was only selected in SJCE's Portfolios in 2037. Nevertheless, SJCE recognizes the potential importance of this type of resource with respect to the value it could provide to overall system reliability in California. Accordingly, SJCE has already taken concrete actions to explore the viability of long-duration storage technologies and is collaborating with other CCAs to identify long-duration storage procurement opportunities that could benefit SCJE customers and the California grid.

The Commission's 2019-2020 RSP identified a need for 973 MW of long-duration storage in 2026 in the 46 MMT portfolio, and 1,605 MW of long-duration storage in the 38 MMT scenario.[20] Moreover, SJCE is aware from its procurement and comparing its load and generation profiles that California needs to prioritize finding cost effective resources to cover off-solar hours, particularly as it prepares to phase out natural gas in order to achieve its electric sector GHG-emissions reduction goals.

SJCE began its exploration of storage generally and long-duration storage in particular in Summer 2019, by surveying existing information and reports and summarizing this in a simple report. SJCE then issued an RFI for standalone storage in October 2019, in coordination with five other CCAs. In March of 2020 SJCE issued an RFP for long-term standalone storage with terms of no more than 15 years, but did not receive any cost-competitive bids from long-duration storage in that process.

In June 2020, SJCE and 12 other CCAs issued an RFI on long-duration storage. This RFI defined long-duration storage resources as those able to discharge at full capacity for at least 8 hours. The RFI requested the following types of information: (1) storage technology and commercial history; (2) project specifics, including location, permitting, financing and development risks; (3) contracting terms and preferences, including indicative pricing.

The participating CCAs received responses from 31 entities representing chemical, mechanical and thermal long-duration storage technologies. They included lithium-ion batteries; vanadium redox and other flow batteries; used electric vehicle batteries; waste to fuels via ultrasound; hydrogen storage; pumped storage hydro; geo-mechanical pumped storage; crane and stacked blocks; compressed air; flywheels; and molten salt and other thermal storage technologies. Respondents identified 25 specific projects that represent more than 9,000 MW of capacity, two-thirds of which can achieve commercial operation by 2026.

SJCE, along with a sub-set of the CCAs that participated in the RFI, intends to issue a joint Request for Offers ("RFO") for long-duration storage later this year. These same CCAs are exploring the formation of a new joint-powers authority to enable the procurement of a long-duration storage resulting from the RFO. Joint procurement for long-duration storage could allow for better economies of scale. While the results from the RFI appear promising from a technical potential basis, SJCE remains concerned about the relative costs of long-duration storage. SJCE will examine the results of its future RFO and discuss options with developers to inform future procurement decisions for long-duration storage. SJCE will consider contracting with long-duration storage in advance of 2037, provided that the proposals it receives provide adequate value.

[20] In CPUC Decision 20-03-028, the 973 MW long-duration storage target is associated with a Reference System Plan that limits system-wide GHG emissions to 46 MMT by 2030, whereas the 1,605 MW long-duration storage target is associated with the scenario that limits system-wide GHG emissions to 38 MMT by 2030.

i. Out-of-State Wind Development

As part of its 2020 IRP analysis, SJCE included out-of-state wind as a resource option. Notwithstanding higher capacity factors when compared to in-state wind, the AURORA model did not select any out-of-state wind through 2040 in either of SJCE's Conforming Portfolios. One possible explanation for this outcome may be higher interconnection costs and higher investments costs to expand the transmission network to access out-of-state wind.

SJCE's Conforming Portfolios, however, are simply the results of sophisticated modeling that depend on certain inputs, such as cost assumptions about various resources. As is the case with other resources, SJCE will continue to make procurement decisions based on outcomes of actual solicitation processes and consistent with the direction and approval of the San José City Council and its Risk Oversight Committee. For example, in the same time frame as the filing of this IRP, SJCE is executing a 225 MW contract with out-of-state wind from New Mexico with an in-service date of December 31, 2021. The power will be dynamically scheduled at two CAISO delivery points and will qualify for Power Content Category 1 RPS energy.

Wind resources generally offer a complementary generation profile to the solar resources in SJCE's portfolio, but this specific project in New Mexico is even more well-suited to match SJCE's evening ramp given its more eastern location. On average, it will generate electricity earlier in the day than California wind typically would. Also, adding geographic diversity to the portfolio can offer as a hedge against regional weather patterns. Because the seller will enter into a Dynamic Scheduling Agreement with CAISO, the energy cannot be withheld for more local use; the transmission is firm.

While the project will rely on one transmission line, having two delivery points will offer some resiliency value. Lastly, this resource contributes to the larger effort by LSEs in the West to build regional optimization and resiliency into the connected areas. With many of the best California wind resource locations already developed, cost-competitive out-of-state wind can add value and diversity.

Given the large volume of this contract compared to SJCE's load, it is unlikely SJCE will pursue another contract for sizable quantities of out-of-state wind resources in the near term, but SJCE's procurement will be determined based on the outcome of its solicitations. SJCE welcomes competitive offers from all kinds of renewable resources in any location provided that they meet California's RPS requirements.

j. Transmission Development

SJCE's Conforming 46 MMT Portfolio and Conforming 38 MMT Portfolio do not identify resources in particular locations, but rather, as explained above, adopt a proportional share of the geographic distribution of resources identified in the CPUC's RSP. This is because until SJCE goes forward with actual solicitations, SJCE does not have any way of knowing what the location of the resources it will contract will be. Other than the New Mexico wind project, SJCE's contracts with new resources all provide for delivery at the generation node rather than NP15. SJCE will have to actively manage any related congestion risk. SJCE has been in ongoing discussions with the New Mexico wind developer, as timely construction of the related transmission is critical for an on-time project COD.

IV. Action Plan

a. Proposed Activities

In the last year, SJCE has contracted for 487 MW of renewable generation, including 262 MW of new in-state solar and 225 MW of new out-of-state wind, as well as 10 MW of co-located 4-hour lithium-ion batteries. These resources will provide enough renewable energy to meet 44 percent of SJCE's load in 2023, the first full year when all of these resources are anticipated to be operational. SJCE plans to add new renewable energy and energy storage at a measured pace over the next decade to ensure SJCE's portfolio is cost-effective and does not result in excess supply. SJCE will also continue to add short-term renewable and GHG-free resources to meet Council-approved portfolio content goals.

In addition, SJCE will continue to monitor key regulatory issues that affect RA and to explore alternatives to provide for stronger reliability to address local, statewide, and regional resource adequacy and resiliency needs.

SJCE's Conforming 38MMT Portfolio, which is its preferred portfolio, selected the following resource additions by 2030:

- 100 MW of wind
- 320 MW of solar
- 200 MW of battery storage

Due to SJCE's significant progress in contracting for new renewable resources, including contracting for fixed shape solar project that utilizes batteries to provide a fixed quantity of renewable energy; the modeling shows that SJCE only needs an additional 100 MW of battery storage to be in service before 2024, with renewable energy added in later years.

SJCE has obtained approval from the San José City Council to procure an additional 100 MW of renewable generation and 50 MW of storage at the time it got Council approval for the 2020 IRP. As described earlier, SJCE supports aggressive GHG-emission reductions and is interested in working with the CPUC, environmental advocates and other LSEs to target a more stringent goal for GHG-reductions. To do this, however, SJCE considers that key regulatory and market risks must be addressed. In the meantime, the authority to procure an additional 100 MW of renewable generation gives SJCE the ability to continue to make progress towards a more aggressive GHG emissions target while these risks are addressed.

The authority to procure an additional 50 MW of storage, in addition to authority previously granted to SJCE but thus far unfilled for another 20 MW of energy storage, will allow SJCE to continue to make progress towards adding 100 MW of storage before 2024. SJCE will consider the results of the long-duration storage RFO as it undertakes procurement. In addition, SJCE intends to continue to push for more innovative approaches for renewables procurement that better match resources with load such as its 62 MW fixed shaped solar agreement. SJCE notes that although this agreement does not give SJCE any rights to battery storage, it requires battery storage to support the fixed delivery profile.

As described in the section on barriers, SJCE was poised to enter into a number of contracts with battery storage developers with a term of at least 10 years. However, this effort has been put on hold as of

early this summer when the CPE decision made it clear that the PG&E will be responsible for roughly half of SJCE's RA requirements (and the substantial majority of its calendar year RA requirements). Additionally, the forecast of substantial PCIA increases highlight the critical importance of optimizing the PCIA resources within the IOU portfolios. Understanding how much of the IOU's PCIA resources could be allocated to CCAs is of critical importance to reducing costs for all ratepayers to ensure SJCE doesn't procure redundant resources.

Continued uncertainty regarding the allocation of PCIA resources hinders procurement planning, and a failure on the part of the IOUs to make their excess RA available in a timely and fair manner adds unnecessary additional costs to SJCE ratepayers. Nevertheless, SJCE will continue to monitor and explore opportunities to strengthen reliability including:

- Procurement of resource adequacy medium to longer term contracts that SJCE had underway when regulatory changes and uncertainty warranted a pause to ensure SJCE does not procure redundant resources due to CPUC direction of the IOU's to procure certain resources.
- Participating in the long-duration storage RFI evaluation and the issuance of a forthcoming RFO, as described above.
- Encouraging renewable providers to focus on offering products with fixed delivery profiles that match SJCE's needs.
- Exploring alternatives to traditional energy procurement that focus on obtaining price certainty in non-solar hours and hence provide a revenue for resources in those hours.

Finally and importantly, as described above, SJCE is assessing opportunities to increase demand response, behind the meter clean energy, and energy efficiency, particularly as it seeks to add resiliency in the face of Power Safety Shut-offs and distribution outages. SJCE working with other stakeholders to increase funding statewide to support local community resiliency projects and exploring alternatives to implement these within San José. As stated earlier, SJCE expects to apply to administer CPUC Energy Efficiency programs in early 2021, subject to City Council approval.

i. Incremental Procurement:

Consistent with D.19-11-016, SJCE sets forth here its procurement to meet its incremental procurement requirement. SJCE has contracted for sufficient resources to meet its requirement and will continue to monitor the progress of the projects under contract to ensure that any delays that could affect SJCE's compliance are identified early and SJCE takes any steps needed to update its current plan. SJCE may have excess starting in 2022, depending on how the CPUC will consider SJCE's 62 MW fixed delivery solar plus storage agreement which has an in-service date of 12/31/2021.

Project	COD	Location	2021	2022	2023
Sutter	1/1/2021		48.8	48.8	48.8
100 MW Solar + 10 MW battery	12/31/2022	System			23.4
225 MW Out-of-State Wind	12/31/2021	System		11.8	15.56
100 MW Solar	12/31/2022	System			15.3
Requirement		**System**	**38.8**	**58.8**	**77.8**
Provided			48.8	60.6	103.1
Also available 62 MW Fixed Delivery Solar Plus Storage	12/31/2021			?*	
* The CPUC has not provided guidance about how a Fixed Delivery Solar Plus Storage Project will be considered for purposes of the incremental procurement requirement.					

b. Procurement Activities

SJCE will take a measured approach to procurement of the identified needed resources to allow for technology maturation, resolution of regulatory uncertainty, additional load certainty, and flexibility as market prices adjust over time. Solicitations in partnership with other CCAs tend to work well and lead to efficiencies, so SJCE anticipates continuing this approach.

In the near term, SJCE has partnered with Peninsula Clean Energy to issue an RFO for renewable resources and co-located battery storage with commercial online dates of 2024 or sooner. Responses are due in the third quarter of 2020. This solicitation encourages bidders to offer innovative delivery approaches to cover non-solar hours. It also permits SJCE to work with another large CCA to encourage responses by bigger projects with more attractive pricing than might otherwise have a chance of being selected. SJCE has been working with Peninsula Clean Energy and the Nature Conservancy to better assess the environmental impacts of projects bid into this solicitation.

As described in more detail above, SJCE is currently working with other CCAs to issue an RFO for long-duration energy storage in Fall 2020 seeking projects with commercial operation dates no later than 2026. These same CCAs are exploring the formation of a new joint-powers authority to enable the procurement of LDS resulting from the RFOSJCE will examine the results of the future RFO and discuss options with developers to inform future procurement decisions for LDS. SJCE will consider contracting for LDS in advance of 2037, provided that the proposals it receives provide adequate value.

SJCE is also working diligently to enhance its financial reserves so that it can become more financially stable and ensure rate affordability. SJCE remains committed to providing affordable rates to all of its customers as it continues to expand its clean energy portfolio. The section on disadvantaged communities above describes SJCE's work and planned activities to address equity and the needs of our disadvantaged communities.

Over a longer time horizon, SJCE anticipates that it will continue to assess its portfolio and request additional procurement authority as needed from the San José City Council on an annual basis. Recommendations to the San José City Council will depend on factors such as results of previous solicitations, changing load, changing regulatory landscape, market prices, unique opportunities, and

program development, among others. Procurement will continue consistent with the direction of the San José City Council and the input of SJCE's Risk Oversight Committee.

SJCE has explored and will continue to explore options for resource adequacy from system and local resources such as battery storage, virtual power plants, battery natural gas hybrid conversions or replacing natural gas plants with battery storage entirely. SJCE is also exploring offering a green tariff, and DER and Demand Response programs, and plans to explore feed in tariffs.

c. Potential Barriers

Key regulatory and market uncertainties that will significantly affect SJCE's procurement going forward include:

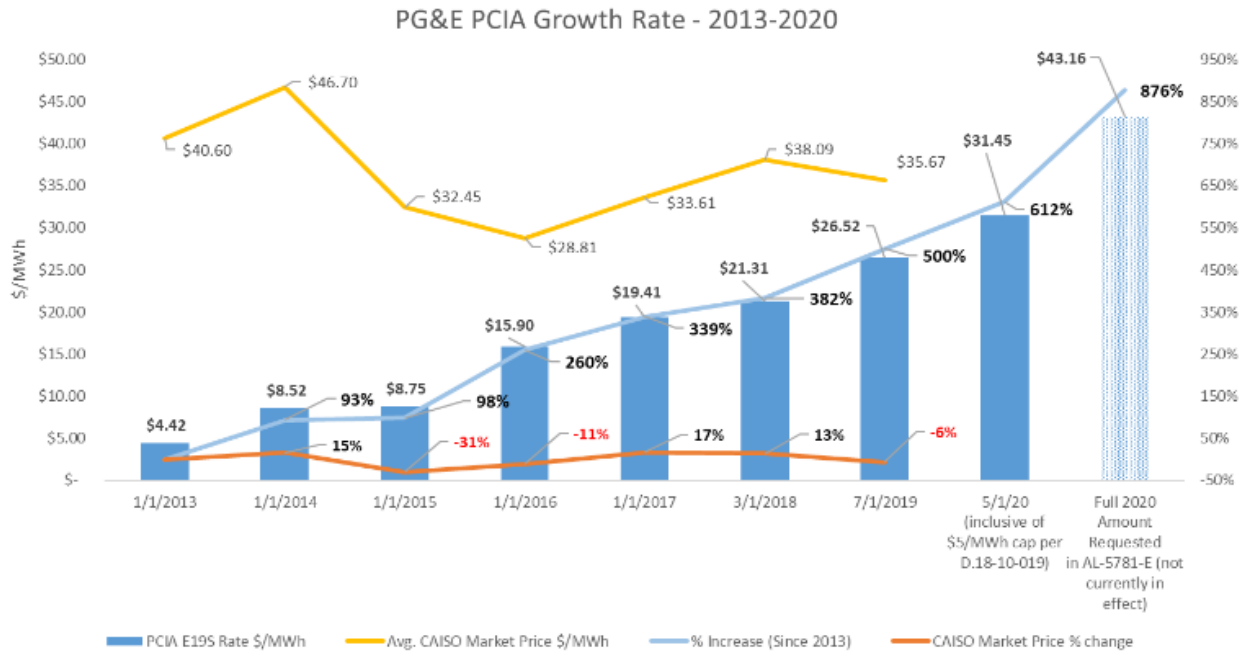
- Dramatically increasing PCIA rates.
- Allocation of IOU PCIA resources.
- The expansion of Direct Access.
- COVID-19 and a, related economic recession.
- Capacity, Resource Adequacy, and System Reliability/

Each of these risks is described in more detail below. Fundamentally, these risks illustrate the challenges SJCE faces as it seeks to prudently and cost-effectively meet projected load with resources pursuant to long-term contracts. Even if SJCE procures excessive resources because of these risks, SJCE may remain financially stable provided that the resources that it procures remain economic. This reality calls for heightened analysis and financial discipline to the extent that SJCE continues to enter into long-term agreements going forward.

i. PCIA Risk

PG&E's PCIA rate has increased by over 600 percent in seven years, as shown in Figure 20. This increase suggests that the approach for calculating the annual PCIA is deeply flawed, particularly given that during the same period, energy markets, and thus the value of PG&E's resources, have been relatively stable. SJCE is advocating for increased and improved transparency in the PCIA calculation process, such as those measures included in AB 2689 (Kalra), which was pulled from this year's legislative session due to COVID-19 considerations but which is to be introduced next session. The IOU-reported increases in above market costs, despite broadly stable California energy markets, may also indicate that incentives for IOUs to operate their resource portfolio efficiently need to be increased. Finally, the current PCIA volatility from the "cap and trigger" mechanism is the opposite of the stability that customers desperately need in these trying times. The CPUC and IOUs should provide a longer term PCIA forecast, along with a true cap, extended amortization period and corresponding balancing account, so that LSEs can plan and procure appropriately and so that all customers see more stable rates.

Figure 20: Increases in the PCIA since 2013



The Commission will determine PG&E 2021 PCIA costs and implementation details in the fall of 2020. Since SJCE launched service in 2019, the PG&E PCIA is projected to double in cost. This results in over $80 Million in reduced revenues in 2020 as SJCE lowers rates to protect customers from these dramatic increases. Investments in SJCE's long-term resources, renewable, and carbon free content must be tempered to ensure SJCE can continue to provide affordable rates to all customers. SJCE is working closely with other stakeholders and the Commission to ensure greater transparency and accuracy in PG&E cost projections and revenue requirements to understand more fully PG&E PCIA costs that have consistently increased year over year. SJCE is also working with stakeholders to identify opportunities to amortize customer costs over time to minimize rate volatility and rate shock, both goals expressed by the Commission in approving D.18-10-019.[21]

ii. Allocation of Utility Resources included in the PCIA

As load has migrated to CCAs, the IOUs have been left with significant volumes of resources. To prevent over-procurement and unnecessary excess cost to California consumers, it is necessary for the Commission to ensure the IOUs make excess resources available for sale to the market in a timely and fair manner. This important issue is under consideration in the PCIA Working Group 3.[22] The Commission is currently considering a proposal to address this problem that would allocate to LSEs their

[21] Decision Modifying the Power Charge Indifference Adjustment, D.18-10-019, 10.11.18

[22] Final Report of Working Group 3 Co-Chairs: Southern California Edison (U-338e), California Community Choice Association, And Commercial Energy. p.20-30 Retrieved from CPUC website 8/3/20: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=335710541

proportional share of the IOUs portfolio of resources they pay for through the PCIA.[23] SJCE supports this proposal, which was developed after extensive negotiations between the IOUs, CCAs, and Direct Access providers, but it is currently delayed and opposed by PG&E. The Commission's final decision is currently anticipated for Fall 2020. If approved, the resource allocation could occur as soon as 2022 or 2023.

The Commission has not required the IOUs to inform LSEs of the volume of resources available for allocation. Through participation in CPUC proceedings, CCAs have obtained preliminary, nonbinding information about the GHG-free and RPS resources that may be available for allocation, but no information has been made available about volume or characteristics of RA that may be allocated to CCAs. Using this information, SJCE can preliminarily estimate the impact of utility allocations to SJCE's RPS and GHG-free resources over the next decade, and is thus able to undertake ongoing long-term procurement of these resources while leaving room for a potential allocation. However, SJCE is unable to develop even a preliminarily estimate the impact of utility allocations to SJCE's RA position because no information about PG&E's RA resources have been made available to LSEs]. It is anticipated that the RA resources are significant given the preliminary information on other products. Resolving this uncertainty is critical to optimizing costs for all ratepayers and committing to longer-term RA investments.

Figures 21 and 22 show the percentage of RPS (Renewable) and GHG-free power SJCE would likely meet with the resources SJCE already has under contract, the additional procurement authority recently authorized by City Council and allocations from PG&E. One chart shows these percentages if PG&E only allocates GHG-free resources included in the PCIA, but not the RPS resources. The second chart shows these percentages if PG&E allocates both the GHG-free resources and the RPS resources included in the PCIA. These charts illustrate that resolving the allocation question is critical for CCAs to continue to procure without foregoing the potential benefits of an allocation or unnecessarily increasing costs for their customers.

The blue lines represent the carbon neutral percentages SJCE would achieve assuming its load does not change and if it is reduced by 20 percent (see sections below on Direct Access risk and the risk of reduced load due to COVID-19). These vary between 80 percent and 140 percent in early years and between 60 percent and slightly over 100 percent after Diablo Canyon closes depending on whether SJCE receives an allocation and how load may change. The amount of renewable power varies from 45 percent to 85 percent depending on whether SJCE receives an allocation and how load may change.

[23] Final Report of Working Group 3 Co-Chairs: Southern California Edison (U-338e), California Community Choice Association, And Commercial Energy. Retrieved from CPUC website 8/3/20: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=335710541

Figure 21: SJCE's expected percent of RPS and GHG-free power with an allocation of PCIA GHG-free resources only

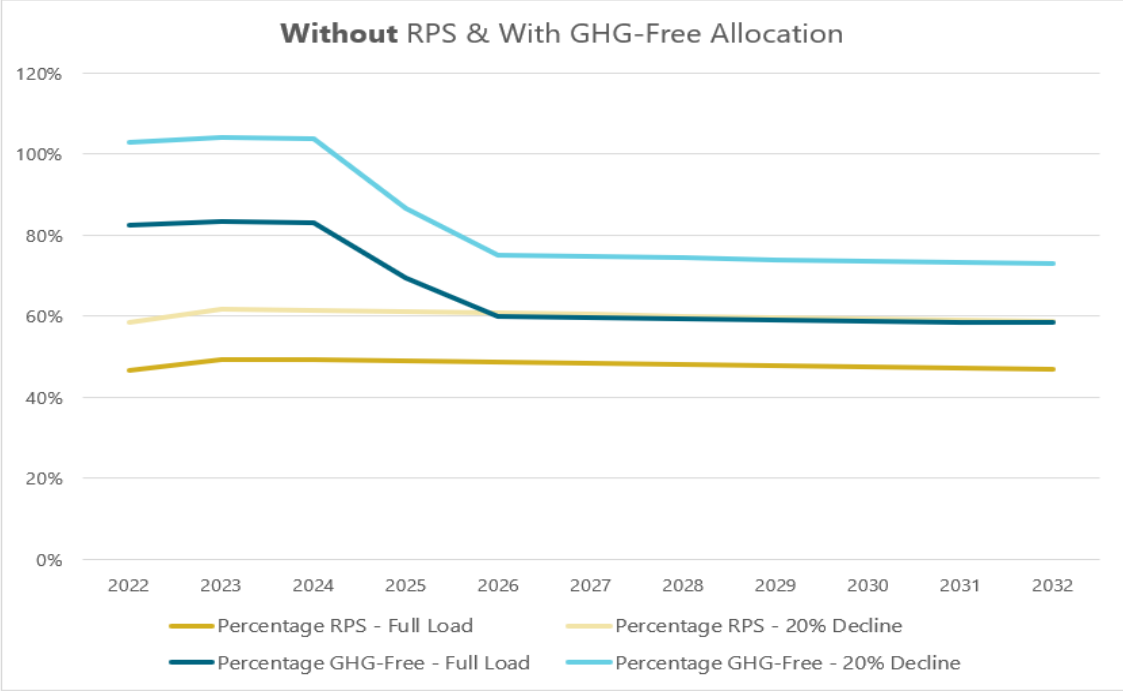
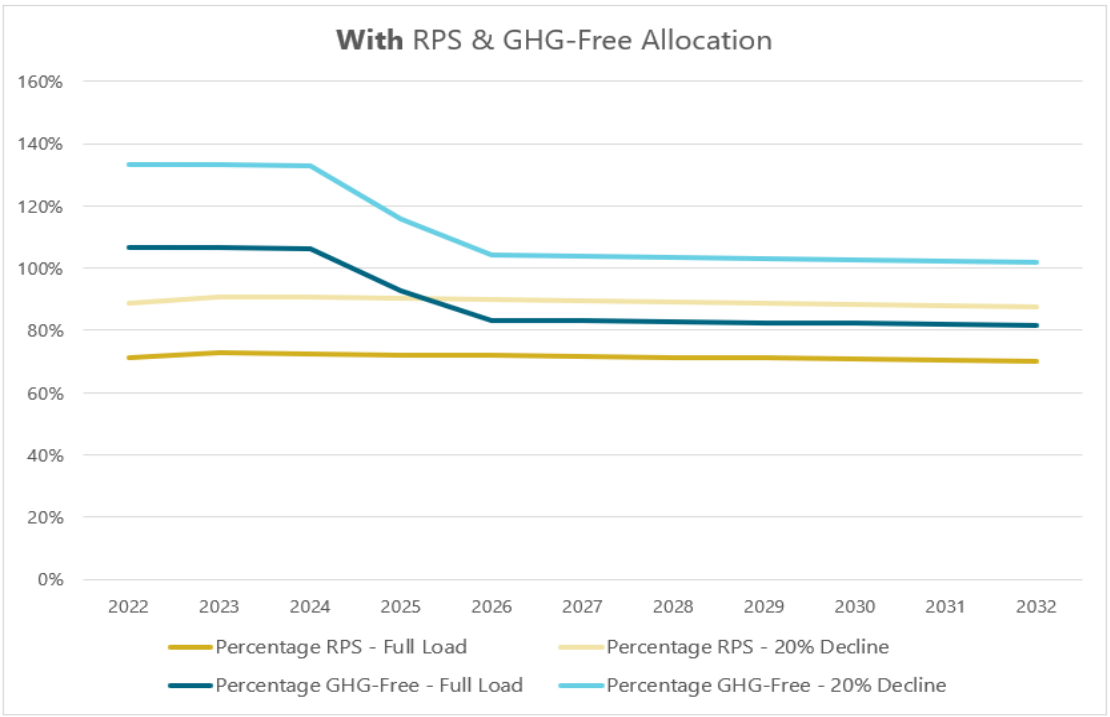


Figure 22: SJCE's expected percent of RPS and GHG-free power with an allocation of PCIA GHG-free & RPS resources.



As currently proposed, both the GHG-free and the RPS allocations would be voluntary rather than mandatory. However, if an LSE rejects the GHG-free allocation, it gets no credit for the value of these resources in the PCIA, whereas if an LSE rejects the RPS allocation, it gets a financial credit, intended to reflect the current market value of the resources, against the cost of the RPS resources in the PCIA. In other words, if an LSE rejects a GHG-free allocation, its customers will continue to pay for GHG-free resources in the PCIA and will get no benefit for this payment. However, if an LSE rejects the RPS allocation, its customers will only have to pay for the above market costs of the RPS resources in the PCIA, rather than the full cost of those resources.

Given the significant volume of PCIA resources that could be allocated to SJCE, it is prudent for SJCE to reserve room for the allocation of resources from PG&E. As shown in Figures21 and 22, these allocations could significantly affect SJCE's portfolio mix. As stated earlier in this document, the PG&E GHG-free allocation saved SJCE customers $5 million even though it was only put into place in June. However, the untimely information about whether and when PG&E would allocate GHG-free power to SJCE in 2020, resulted in SJCE having a higher than approved carbon content that results in unnecessary additional costs to customers. Moreover, as is discussed below in the section on the RA, until the IOUs make available to LSEs information about the volume of RA that is available for allocation, it is prudent to defer long-term RA commitments to avoid either over-procuring or foregoing any potential benefits of an allocation.

iii. Direct Access Expansion Risk

In 2018, SB 237 directed the Commission to expand Direct Access by 4,000 GWh and to prepare a report to evaluate the impacts of re-opening the program to all non-residential customers.[24] If the Direct Access program is expanded, SJCE could lose additional customer load. Commercial customers currently make up half of SJCE's total load. When Direct Access was made available in California in 2000, approximately 10 percent of load in San José's territory left PG&E to be served by an Electric Service Provider. When the Commission expanded Direct Access in 2019, SJCE lost 1.9 percent of its total load. A CPUC report for the Legislature on whether to fully re-open Direct Access was delayed in June 2020 and will likely be released later this year. The impacts of this decision need to be fully assessed in the context of new requirements that LSE's procure a higher percentage of renewables from long-term contracts. SJCE supports these requirements as they align with SJCE goals to accelerate de-carbonization and increase new renewable generation; however, they also present significant risks if SJCE experiences a substantial load reduction due to market changes.

iv. COVID-19 Load Impacts

SJCE's load has been affected by the impacts of COVID-19. SJCE's average load reduction since mid-March 2020 has been 6.7 percent. SJCE is planning for continued impacts of COVID-19 and a likely COVID-19 induced recession. The 2009 recession reduced energy consumption by 4.9 percent over an 18-month period.

[24] Senate Bill 237 and Order Instituting Rulemaking to Implement Senate Bill 237 Related to Direct Access, Retrieved from CPUC website 8/3/20: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M275/K804/275804783.PDF

Customer non-payments have also increased since the shelter-in-place orders began in March 2020, likely due both to increased financial hardship as well as the CPUC-ordered moratorium on customer disconnections until April 21, 2021 (CPUC Resolution M-4842). SJCE, along with CalCCA, is advocating that CCAs should receive the same cost recovery relief that IOUs are granted for the COVID-19-related increase in uncollectible balances from customers.

v. Capacity, Resource Adequacy, and System Reliability:

The Commission, the CAISO and stakeholders have all recognized that the regulatory requirements for resource adequacy require modification to ensure system reliability given the increasing penetration of renewables, and California's and CCAs' aggressive goals for greenhouse gas reductions. In addition, the IOUs continue to hold sizable amounts of RA and there is no mechanism to ensure excess is made available to the market in a timely and fair manner including pursuant to market term lengths, or transparent information about the amounts that could be available. Fortunately, there are proposed solutions for both these problems under consideration, including broad RA structural redesign in R. 19-11-009 Track 3b. Arriving at timely and fair solutions to these two important problems promptly is important to support the aggressive GHG reductions that are necessary to stabilize the Earth's climate while maintaining an affordable reliable electric system.

It is also necessary to address the reliability of the transmission and distribution system. In the past several years, San José residents and businesses have been subjected to significant outages and threats of outages stemming from the vulnerability of PG&E's transmission and distribution system. Providing for system and local reliability from a sufficiency standpoint is expensive. If after doing this, transmission and distribution assets are inadequately or unsafely maintained, customers do not get the full value of this added expenditure because the power, while available, cannot be delivered.

Finally, SJCE notes that the reliability events of mid-August, 2020 highlight the importance of a reliable system that can withstand converging challenges such as high temperatures throughout the West and unexpected generation outages. The causes of these events need to be carefully studied to ensure that any steps taken in response improve reliability in a cost-effective manner. Given the high costs already present in the costs California consumers are paying, further expenditures need to be carefully considered and targeted at solutions that solve the problem. Additionally, this event highlighted that significant improvements need to be made to the distribution infrastructure as San José experienced more than 500 separate outages that impacted over 86,000 customers with hundreds being without power for over 24 hours. Many outages lasted 2-3 days which is critical life safety issue that must be addressed.

A. The regulatory requirements for resource adequacy require modification.

The current resource adequacy requirements fundamentally focus on peak system capacity. With an increasing penetration of intermittent renewables, the CAISO and the Commission have attempted make refinements to address this shortcoming such as changing ELCC values resource categories and MCC buckets. Particularly, the changing ELCC values have made investments in new renewable resources challenging, as LSEs and developers are uncertain of the value of resources in the future.

SJCE appreciates that the Commission is seeking to address the regulatory framework for RA holistically, and has created a track in the RA proceeding to do so. [25] Southern California Edison (SCE) and CalCCA recently jointly filed an innovative new approach in Track 3b that better accounts for the intermittency of renewables and addresses both capacity and energy needs in all hours, while maintaining a reasonable level of procurement autonomy for LSEs and permitting them to put into place and procure in accordance with their own risk management methodologies. SJCE urges the Commission to seriously consider the SCE/CalCCA proposal and to adequately preserve LSE procurement autonomy. Provided that fundamental requirements are in place to provide for system reliability, California benefits from having a diversity of entities operating pursuant to their particular economic imperatives and risk management policies, rather than a few large entities whose failure is disruptive to the entire state.

B. The CPUC must ensure that the IOUs make their PCIA RA supply available to the market

The IOUs hold sizable amounts of RA supplies included in the PCIA, and there is no mechanism in place to ensure that they make this supply available to the market in a timely manner, on reasonable terms and pursuant to a variety of contract lengths. As LSEs seek to procure RA to meet upcoming annual requirements or pursuant to long-term agreements, the lack of a mechanism to address the IOUs RA, or transparent information about the RA that may be available creates barriers to ongoing procurement.

LSEs seeking to enter into long-term RA but also having customers subject to increasing PCIA fees could significantly increase costs for ratepayers. If non-IOU LSEs procure long-term RA resources to meet the bulk of their RA needs, the excess RA resources in the IOU portfolios will become even more stranded and the costs for all California consumers will be unnecessarily elevated. The longer the period over which LSEs forward procure RA, the greater the risk that large volumes of IOU excess RA capacity will become even more uneconomic.

Fortunately, again, there is reasonable solution under discussion. In PCIA Working Group 3, CalCCA and SCE again have come forward with a proposal that would ensure that the IOUs would timely make available to LSEs their proportional share of the resources in the IOUs portfolio, and could the give LSEs some tools to improve the value they obtain from their payment of the PCIA.[26] Again, SJCE urges the Commission to seriously consider this proposal. More immediately, the Commission should direct the IOUs to provide to LSEs information about the system RA that is available to be allocated so that LSEs can consider this information in their procurement. General information has been made available with respect to RPS and GHG-free attributes, and, while it would be helpful to get more detailed updated information, this has permitted SJCE to continue to make progress in those areas without a significant risk of over procuring or giving up the potential benefits of an allocation.

The impacts of this problem, along with the other problems discussed above are very real. SJCE recently solicited bids for RA pursuant to 5-15 year agreements and shortlisted a number of projects. SJCE finalized one seven-year agreement for 150 MW of RA from Calpine that ends on December 31, 2029.

[25] Track 3 of D. 19-11-009

[26] Final Report of Working Group 3 Co-Chairs: Southern California Edison Company (U-338E) and California Community Choice Association. February 21, 2020.
https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M335/K710/335710541.PDF

However, SJCE paused further negotiations with a number of battery storage developers because of the barriers discussed above including the likely dramatic increases in PCIA, the CPE decision which transfers to the IOUs the responsibility to buy local RA, and the realization that a voluntary allocation of the RA in PG&E's portfolio could cause SJCE to become significantly over-procured. SJCE, with its large proportion of disadvantaged customers, has to be particularly vigilant about controlling costs and cannot risk entering in agreements, particularly long-term agreements that risk subjecting them to unnecessary costs.

C. The transmission and distribution system must be prudently and safely maintained.

On February 6, 2019, PG&E filed its first proposed Wildfire Mitigation Plan (WMP) with the Commission in Rulemaking 18-10-007.[27] In this plan, PG&E indicated that it was "significantly expanding the PSPS program to include high voltage transmission lines," and detailed some of the elements of its process and decision factors associated with that program.[28] On April 25, 2019 (just two business days before the Commission issued a decision to approve the WMPs, and after the period for party comment had expired), PG&E made substantive changes to its WMP, acknowledging potential disruption to the distribution service in the Bay Area and, more specifically, San Francisco and San José, if a high-voltage transmission line is de-energized due to potential cascading failures.[29]

A citywide outage in a large urban center such as San José poses an extraordinary risk to the safety, property, and lives of one million residents. San José key management and safety personnel were alarmed that PG&E was considering outages in highly populated cities without any input from local authorities, consideration of mitigation alternatives, or careful planning. Another concern was that this major threat to the City's residents was disclosed in a hastily filed amendment to PG&E's WMP (i.e., a plan to prevent wildfires) without any real discussion of the significant risks to the Bay Area urban dwellers. Upon learning about the amendment to the WMP, San José safety personnel approached PG&E, which confirmed that the City should prepare for a potential outage of the entire Bay Area for a period to extend for up to a week. PG&E was concerned that its ill-maintained powerlines might spark wildfires with catastrophic consequences. The Bay Area did experience a number of extensive and extended outages, and the San José emergency operations team was deployed to address the eventuality of more. PG&E's power shutoffs were unprecedented and dramatically and adversely impact San José's plans to encourage businesses to locate in the City to bring good jobs and prosperity to the area.

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[27] R.18-10-007, *Pacific Gas and Electric Company's Wildfire Mitigation Plan*, Feb. 6, 2019.
[28] *Id*., pp. 94-109.
[29] PG&E has expanded the scope of the PSPS program to include high voltage transmission lines. If these high voltage transmission lines are de-energized during a PSPS event, the interconnected nature of the grid could result in a cascading effect that causes other transmission lines and distribution lines – potentially far from the original fire-risk areas – to be de-energized. *Thus, distribution lines far from HFTD areas that triggered the PSPS event, but which rely on the de-energized lines for power, such as lines in cities like San Francisco or San Jose, could be de-energized*. San Francisco is not in a HFTD areas and is highly unlikely to experience the kind of climate and weather conditions that would trigger a PSPS event. Nor does San Francisco present wildfire risk. But San Francisco could possibly be de-energized if multiple East Bay transmission lines were to be de-energized due to extreme conditions. R.18-10-007, *PG&E Amended Wildfire Mitigation Plan*, Apr. 25, 2019, p. 20 (emphasis added)

On August 14th, in the middle of a pandemic, with temperatures soaring, San José residents again experienced extensive outages, including in the critical downtown areas, this time as a result of a PG&E distribution failures. While other parts of the State experienced outages resulting from a system supply deficiency that is currently undergoing investigation, the San José outages have been confirmed to have been cause by the failure of a PG&E's distribution infrastructure.

The Commission's focus on the RA markets and supply sufficiency, are insufficient if supply cannot be delivered to customers. The significant expense of providing for sufficient supply is wasted, if the Commission does not also ensure that the IOU transmission and distribution systems are adequately and safely maintained.

d. Commission Direction or Actions

SJCE requests that the Commission certify its IRP pursuant to statute.

e. Diablo Canyon Power Plant Replacement

In 2017, the Commission undertook an exhaustive evaluation of the impacts of the retirement of Diablo Canyon on reliability and GHG-emissions. With respect to reliability, the Commission found that "[t]he retirement of Diablo Canyon will not cause adverse impacts on local or system reliability."[30] With respect to GHG emissions, the Commission found: "[t]he impact of the retirement of Diablo Canyon on GHG emissions is not clear. The IRP proceeding is broader in scope than this proceeding, and is considering issues including optimized portfolios of generation resources to achieve the statewide GHG emissions target."[31]

From a GHG-emissions standpoint, Diablo Canyon Power Plant (DCPP) is not unique. Aggressive renewable procurement is possible to ensure the resources that replace DCPP are just as clean and reliable. Nothing in the CPUC's 2019-2020 RSP or 38 MMT scenario or in SJCE's Conforming Portfolios suggest that it will be difficult or unduly costly to replace DCPP with GHG-free renewables.

A more critical examination relates to reliability with the loss of a 24X7 resource. Nonetheless, as noted above, after an extensive analysis in 2017, the Commission concluded that the closure of DCPP would not adversely impact system or local reliability.

In both the 46 MMT and 38 MMT Conforming Portfolios, SJCE is proposing a resource mix that includes solar, wind and storage in the quantities and at the pace needed to maintain reliability after DCPP's retirement without increasing GHG emissions. SJCE also participated in a recent RFI for long-duration storage resources and may consider pursuing such resources in the future, as described above in Section III h. SJCE also welcomes bids from renewable baseload generation such as biomass and geothermal, and will pursue any renewable and energy opportunities that are cost-effective considering their additional reliability value. See also the discussion on system reliability above.

[30] D.18-01-022, FOF 2.
[31] D.18-01-022, FOF 3 and 4.

V. Lessons Learned

This is our second IRP filing process. Overall a statewide planning exercise is important to address key issues of renewable integration and system reliability. Having a standard set of tools, inputs and assumptions is valuable and necessary in building our portfolios to achieve state policy targets. However, we believe there are some improvements to be made in the IRP process. While an iterative process that includes public input and visibility into the assumptions is important, a more organized process is needed in which requirements are well communicated in advance and assumptions and templates do not change continuously and late into the process.

Additionally, SJCE would appreciate greater coordination between the RPS procurement plan and the IRP. We acknowledge and support the current work from staff to coordinate these proceedings under the D. 19-12-042.

Finally, we urge the Commission to seriously consider the challenges discussed in the Barriers section. SJCE seeks the same outcomes as the CPUC: affordable, reliable service for all Californians and an electric sector that operates with substantially reduced GHG-emissions. SJCE intends to continue to work cooperatively with the CPUC and other policy makers and stakeholders to address current challenges for the benefit of all Californians.

Glossary of Terms

Alternative Portfolio: *LSEs are permitted to submit "Alternative Portfolios" developed from scenarios using different assumptions from those used in the Reference System Plan. 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, formerly "Clean Net Short") methodology*: the methodology used to estimate GHG 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.*

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. an LOLE of 0.1.*

Net Qualifying Capacity: *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.*

Reference System Plan: *the Commission's integrated resource plan that includes an optimal portfolio (Reference System Portfolio) of resources for serving load in the CAISO balancing authority area and meeting multiple state goals, including meeting GHG reduction and reliability targets at least cost.*

Reference System Portfolio*: the multi-LSE portfolio identified by staff for Commission review and adopted/modified by the Commission as most responsive to statutory requirements per Pub. Util. Code 454.51; part of the Reference 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 (unle*