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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to
Create a Consistent Regulatory
Framework for the Guidance,
Planning and Evaluation of Integrated
Distributed Energy Resources

Rulemaking 14-10-003

2020 POLICY UPDATES TO THE AVOIDED COST CALCULATOR

TABLE OF CONTENTS

Title	Page
2020 POLICY UPDATES TO THE AVOIDED COST CALCULATOR.....	1
Summary	2
1. Background	4
1.1. Overview of the Avoided Cost Calculator	4
1.2. Procedural Background.....	5
2. Issues Before the Commission	8
3. Overlap With the Integrated Resource Planning Proceeding	8
4. Avoided Transmission and Distribution.....	9
5. Overview of Staff Proposal.....	10
6. Overview of Party Briefs.....	13
6.1. CLECA	14
6.2. CALSSA	15
6.3. CALWEA.....	16
6.4. NRDC.....	17
6.5. CUE.....	18
6.6. Public Advocates Office	18
6.7. SEIA and Vote Solar.....	19
6.8. TURN	20
6.9. Joint Utilities.....	22
7. Adoption of 2020 Updates to the Avoided Cost Calculator	24
7.1. Adoption of a Modified Staff Proposal	24
7.1.1. The Avoided Cost Calculator Should Align with the Integrated Resource Planning Proceeding	25
7.1.2. Adoption of the No New DER Scenario.....	34
7.1.3. Adoption of Production Cost Modeling Using SERVVM.....	38
7.1.4. Continuation of the Straight-line Greenhouse Gas Adder	40
7.1.5. Calculating Short- and Long-term Greenhouse Gas Avoided Cost....	43
7.1.6. Adoption of A System Average Approach to Calculate Unspecified Distribution Deferral Avoided Costs.....	49
7.1.7. Continuation of Current Method to Calculate Unspecified Avoided Transmission Costs.....	56
7.1.8. The Avoided Cost Calculator Should Include an Avoided Cost of High Global Warming Potential Gases	62
7.1.9. Natural Gas Avoided Cost Calculator.....	65
7.2. SEIA/Vote Solar Alternate Proposals	67

7.2.1. SEIA/Vote Solar’s Proposed Avoided Reliability and Resiliency Costs	67
7.2.2. SEIA/Vote Solar’s Proposed Fuel Price Volatility Cost	70
7.2.3. SEIA/Vote Solar’s Proposed Avoided Costs of Grid Services	71
7.3. Minor Changes to the Avoided Cost Calculator	73
8. Next Steps.....	74
9. Comments on Proposed Decision	74
10. Assignment of Proceeding.....	77
Findings of Fact.....	77
Conclusions of Law	86
ORDER	88

Appendix A - Final Staff Proposal

2020 UPDATE OF THE AVOIDED COST CALCULATOR

Summary

This decision adopts new policies to be implemented in the 2020 Avoided Cost Calculator. The new policies are grounded in the Commission's movement to align the Avoided Cost Calculator with the Integrated Resource Planning proceeding, Rulemaking 16-02-007.

First, as a matter of policy, the Avoided Cost Calculator will reflect the Integrated Resource Planning proceeding's modeling inputs and outputs. RESOLVE model outputs, adopted in R. 16-02-012, along with Strategic Energy Risk Valuation Model (SERVM) production cost modeling will be used to estimate avoided energy, ancillary services, and greenhouse gas costs. However, the net cost of new entry of a storage battery will be used to determine avoided generation capacity costs. Additionally, the "No New DER"¹ scenario, developed in the RESOLVE model and based on the Reference System Portfolio, will be the basis for avoided cost inputs.

As part of the 2020 update, we maintain the straight-line greenhouse gas adder, as used in the current Avoided Cost Calculator, but we modify the adder such that it is based on post-2030 values to better reflect average long-term greenhouse gas abatement costs. We adopt the Energy Division (Staff)-proposed calculation of short- and long-run avoided greenhouse gas costs to be consistent with the methods adopted by the Commission for the Fuel Substitution Test and by the California Energy Commission for Title 24 building standards.

Related to issues in this proceeding, Decision (D.) 20-03-005 in R.14-08-013, the Distributed Resources Planning proceeding, directed Staff to further develop

¹ DER is the acronym for distributed energy resources.

the methodology and modeling for unspecified distribution values, for consideration in the Avoided Cost Calculator. The instant decision adopts Method 1, the system average approach. The values for Method 1 will be refined by Staff for further discussion by parties and consideration by the Commission.

With respect to unspecified transmission values, while distributed energy resources provide unspecified transmission cost savings, the values cannot reasonably be determined at this time using California Independent System Operators congestion prices or any other party proposal. However, we confirm that the value for unspecified transmission avoided cost is not zero. Pursuant to the guidance in D.20-03-005, we continue the use of values from utility general rate cases to represent the avoided cost of transmission in the 2020 Avoided Cost Calculator update. Staff is instructed to refine the marginal cost method used by Pacific Gas and Electric Company in its derivation of transmission marginal costs to develop values for San Diego Gas & Electric Company and Southern California Edison Company.

Lastly, we adopt an avoided cost of high global warming potential gases in the Avoided Cost Calculator. This avoided cost will be applied in the form of an increased greenhouse gas adder to all distributed energy resources that reduce (or increase) natural gas consumption, either directly or through reduced (or increased) electricity consumption.

This decision authorizes the Director of the Energy Division to hold a workshop or webinar immediately following the issuance of the draft resolution that adopts the 2020 Avoided Cost Calculator. The purpose of the workshop or webinar is to (a) provide calculations for the Net Cost of New Entry for battery storage; (b) review post-2030 greenhouse gas values; (c) educate parties and other stakeholders on the adopted method to measure greenhouse gas emissions

avoided costs; (d) discuss the final values for the system average approach, Method 1; (e) provide parties with details of refinements to Pacific Gas and Electric Company's marginal cost method to derive avoided transmission costs for San Diego Gas & Electric Company and Southern California Edison Company; and (f) review details of the avoided cost of high global warming gases..

This proceeding remains open.

1. Background

To better understand this decision, an overview of the Avoided Cost Calculator and the history of this proceeding is presented below.

1.1. Overview of the Avoided Cost Calculator

The Avoided Cost Calculator is used to determine the primary benefits of distributed energy resources across Commission proceedings, the primary benefits being the avoided costs related to the provision of electric and natural gas service. The Avoided Cost Calculator calculates six types of avoided costs: generation capacity, energy, transmission and distribution capacity, ancillary services, renewable portfolio standard, and greenhouse gas emissions. The outputs of the Avoided Cost Calculator feed into the cost-benefit analysis for distributed energy resources.

The Commission approved the first Avoided Cost Calculator in 2005 with the adoption of Decision (D.) 05-04-024. A consultant for the Commission, E3, provided "a straightforward costing methodology that is implemented using a spreadsheet model and publicly available data, resulting in avoided cost estimates that are transparent and can be easily updated to reflect changes in

major cost drivers.”² In that decision, the Commission directed Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE), and Southern California Gas Company to use the adopted Avoided Cost Calculator to determine the combination of programs that would best provide cost-effective energy savings and meet our adopted savings goals.

Fifteen years later, the current Avoided Cost Calculator is an Excel-based spreadsheet model. The output of the model is a set of hourly values over a 30-year time horizon that represent marginal costs a utility would avoid in any given hour if a distributed energy resource avoided the provision of energy during that hour. It is important to note that the Avoided Cost Calculator does not determine if a particular distributed energy resources avoids a particular cost. Rather, these avoided costs are compared with energy savings and other program characteristics to estimate program benefits, which are used in determining the cost-effectiveness of a resource.

The Avoided Cost Calculator is updated annually to improve the accuracy of how benefits of distributed energy resources are calculated. The Avoided Cost Calculator has been updated over the years to more closely reflect changing state policies, such as adding value for avoided greenhouse gas emissions. Other minor adjustments have been made as a response to evolving markets. The most recent update was completed in June 2019, which entailed only minor updates.

1.2. Procedural Background

This proceeding, initiated in 2014, is tasked with several issues regarding the integration of distributed energy resources, but the instant decision is

² D.05-04-024 at 9.

focused solely on the issue of improving the cost-effectiveness framework of distributed energy resources. Specifically, the September 1, 2016 *Amended Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge* (Amended Scoping Memo) describes the issue as:

- Continued development of technology-neutral cost-effectiveness methods and protocols, including, but not limited to:
 - a. Refinement and enhancement of valuation or cost-effectiveness methods; and
 - b. Informing or determining a preferred approach to bid evaluation within the competitive solicitation framework.

In D.16-06-007, *Decision to Update Portions of the Commission's Current Cost-Effectiveness Framework*, the Commission adopted, "immediately-required actions recommended by a working group established to address the Commission's current cost-effectiveness framework." Related to the instant decision, the immediate actions included addressing the issues of Avoided Cost Calculator version control, Avoided Cost Calculator data updates, avoided cost estimation, and defining the resource balance year. Moving toward a more consistent cost-effectiveness framework for all distributed energy resources, the Commission directed that a single avoided cost model should apply to all distributed energy resource proceedings.³ D.16-06-007 also required the Commission's Energy Division (Staff) to draft a resolution, no later than May 1st each year, recommending data updates and minor corrections to the Avoided Cost Calculator and, when appropriate, the inputs.⁴

³ D.16-06-007 at 1, 5-6, Finding of Fact 4, Conclusion of Law 2, and Ordering Paragraph 1.

⁴ *Id.* at 6-9, Finding of Fact 6, Finding of Fact 7, and Ordering Paragraph 2.

D.19-05-019, *Decision Adopting Cost-Effectiveness Analysis Framework Policies for All Distributed Energy Resources*, reaffirmed that only minor changes can be made to the Avoided Cost Calculator using the previously-approved resolution process and refined the definition of minor changes. In recognition of the need to address major changes to the Avoided Cost Calculator, D.19-05-019 established two alternative processes: the resolution process to address minor changes occurring in odd-numbered years and the formal process to address major as well as minor changes with a final decision occurring in even years. D.19-05-019 established a schedule of activities for each major update proceeding, beginning with a workshop facilitated by Staff.

On August 30, 2019, Staff hosted the 2020 Avoided Cost Calculator update workshop to discuss proposals for both major and minor changes to the calculator.⁵ Parties filed testimony on October 7, 2019, which included proposals for major and minor changes to the Avoided Cost Calculator. On October 21, 2019, parties filed rebuttal testimony. The assigned Administrative Law Judge presided over an evidentiary hearing on November 18, 2019.

On November 20, 2019, the Administrative Law Judge issued a ruling, *Administrative Law Judge's Ruling Confirming Use of Recommendations from Rulemaking 14-08-013 And Introducing Staff Proposal for Major Updates to Avoided Cost Calculator*. The Ruling directed parties to file comments on the *Energy Division Staff Proposal for 2020 Avoided Cost Calculator Update* (Staff Proposal) along with opening briefs and reply comments with reply briefs. The Staff Proposal is described in Section 5 below.

⁵ A Letter from Commission Executive Director Alice Stebbins granted an extension of time to Staff to delay the workshop from August 1, 2019, as directed in D.19-05-019, to August 30, 2019.

Parties filed opening briefs and opening comments on December 17, 2019 and reply briefs and reply comments on December 30, 2019.⁶

This proceeding remains open to address the issue of alternative sourcing mechanisms for distributed energy resources.

2. Issues Before the Commission

There is one issue addressed in this decision: determination of the major and minor changes the Commission should make to the Avoided Cost Calculator prior to adoption of the 2020 Avoided Cost Calculator.

3. Overlap With the Integrated Resource Planning Proceeding

The primary purpose of the Integrated Resource Planning proceeding (Rulemaking (R.) 16-02-007) is to consider all of the Commission's electric procurement policies and programs and ensure California has a safe, reliable, and cost-effective electricity supply. The proceeding is also tasked with implementation of Senate Bill (SB) 350 requirements related to integrated resource planning (Public Utilities Code Sections 454.51 and 454.52), which required the Commission to establish a process for integrated resource planning to ensure that load serving entities meet targets that allow the electricity sector to contribute to California's economy-wide greenhouse gas emissions reductions goals.

The Commission approved D.20-03-028 in R.16-02-007, which adopted a Reference System Portfolio that meets the requirements of SB 350 and an electric

⁶ The filings were timely. A November 22, 2019 Procedural E-mail from the Administrative Law Judge permitted a delay until December 17, 2019 and December 30, 2019, respectively, to file the opening and reply comments to the Staff Proposal. A December 4, 2019 Letter from Executive Director Alice Stebbins permitted a delay until December 17, 2019 and December 30, 2019, respectively, to file the opening and reply briefs.

sector greenhouse gas target.⁷ Load serving entities will use the Reference System Portfolio to develop individual integrated resource plans, which will be reviewed by the Commission. The Commission will aggregate the plans and perform analysis to ensure the plans meet reliability requirements and greenhouse gas targets, approve and/or modify individual utility plans, and then adopt a final portfolio, called the Preferred System Portfolio. The Preferred System Portfolio will be used as the basis for procurement and CAISO transmission planning. The Reference System Portfolio relies upon the RESOLVE model⁸ to identify a least-cost portfolio of resources to meet the electricity sector greenhouse gas emission target and the Strategic Energy Risk Valuation Model (SERVM)⁹ to provide production cost modeling of portfolios generated by RESOLVE.

4. Avoided Transmission and Distribution

The Commission approved a decision in R.14-08-013¹⁰ that adopts recommendations from the Energy Division's White Paper entitled *Staff Proposal on Avoided Cost and Locational Granularity of Transmission and Distribution Deferral Values* (White Paper) and directs that: i) the specified transmission and distribution deferral values will be estimated through the Distribution Investment Deferral Framework and the California Independent System

⁷ D.20-03-028 at Ordering Paragraph Nos. 1 and 2..

⁸ The RESOLVE model is a capacity expansion model developed by E3 and is used in the Integrated Resource Planning proceeding to select a least-cost portfolio of generation resources to meet future grid needs.

⁹ The SERVM is a probabilistic reliability planning model used in the Integrated Resource Planning proceeding that evaluates the loss of load probability for portfolios of generation and transmission resources generated by RESOLVE.

¹⁰ The Commission adopted D.20-03-005 on March 12, 2020.

Operators' (CAISO) Transmission Planning Process and do not require further modeling to estimate or incorporate their values into other modeling efforts such as the Avoided Cost Calculator; ii) estimations for the unspecified distribution deferral value shall be developed and modeled for adoption in the update of the Avoided Cost Calculator in R.14-10-003; iii) the Commission will continue to use the existing method for determining the unspecified transmission deferral value unless or until a new method is approved; and iv) the Commission may consider the development and subsequent adoption of the avoided transmission method as part of the Avoided Cost Calculator update process.¹¹

5. Overview of Staff Proposal

The Staff Proposal states that “Renewable Portfolio Standard requirements and greenhouse gas reduction goals have resulted in profound changes to the electric grid, so that natural gas generators are less likely to represent the marginal unit of capacity¹² or energy.”¹³ Asserting that renewable units are more and more likely to be the marginal unit during many hours of the day, the Staff Proposal surmises that the Commission should change the basis of the Avoided Cost Calculator by aligning the calculator with the Integrated Resource Planning proceeding and using modeling outputs from that proceeding as inputs to the Avoided Cost Calculator.

The Staff Proposal recommends the Commission align the data, models, and methods used for distributed energy resources cost-effectiveness with the

¹¹ D.20-03-005 at 1.

¹² Staff asserts that natural gas generators are unlikely to be built in California in the future.

¹³ Staff Proposal at 5.

data, models and methods used in the Integrated Resource Planning proceeding. Accordingly, the Staff Proposal includes the following specific recommendations:

- Use RESOLVE model outputs, rather than the cost of a new combustion turbine, to estimate annual avoided generation capacity costs;
- Use the recently developed No New DER scenario RESOLVE run, based on the Reference System Portfolio, as a basis for avoided generation capacity, energy, ancillary services, and greenhouse gas costs;¹⁴
- Use RESOLVE model outputs and production cost modeling, instead of the costs of running natural gas generators, to estimate hourly avoided energy, ancillary services, and greenhouse gas costs with either the PLEXOS or SERVM production cost model;
- Use RESOLVE model output greenhouse gas shadow price as the basis for a greenhouse gas adder and use the 2030 price, discounted to 2020 using the Weighted Average Cost of Capital;
- Use both short- and long-run avoided greenhouse gas costs to account for the increasing decarbonization of the grid;
- Develop avoided transmission and distribution costs based on the recommendations in the Distribution Resources Proceeding's (R. 14-08-013) *Energy Division Staff Proposal on Avoided Costs and Locational Granularity of Transmission and Distribution Deferral Values* (White Paper);
- Base avoided transmission costs on CAISO congestion prices in the short term and for the long term, either project that value forward or use the utility's marginal transmission costs filed in the utility's general rate case;

¹⁴ In the No New DER scenario, staff proposes to remove all distributed energy resources that are associated with utility incentive programs and incremental to the distributed energy resources installed up until 2018. Thus, all energy efficiency, behind the meter solar and storage, and other demand-side resources would remain at the 2018 level and demand response resources are assumed to be zero. See Staff Proposal at 9.

- Use one of two options for developing avoided distribution costs based on data developed in the Distribution Resources Proceeding's Grid Needs Assessment, with long-term costs continuing to use utility general rate case data;
- Use a new avoided cost of high global warming potential gases; and
- Update the natural gas prices and greenhouse gas adder used for the natural gas Avoided Cost Calculator to be consistent with the electric Avoided Cost Calculator.

Figure 1 below is a high-level flow chart of the proposed 2020 Avoided Cost Calculator update process showing the interdependencies of multiple state agencies (California State Legislature, CAISO, California Energy Commission (CEC), and California Air Resources Board (CARB)) and several Commission proceedings (Integrated Resource Planning proceeding (R.16-02-007), Distribution Resources Proceeding (R.14-08-013), and the Integrated Distributed Energy Resources proceeding (R.14-10-003)).

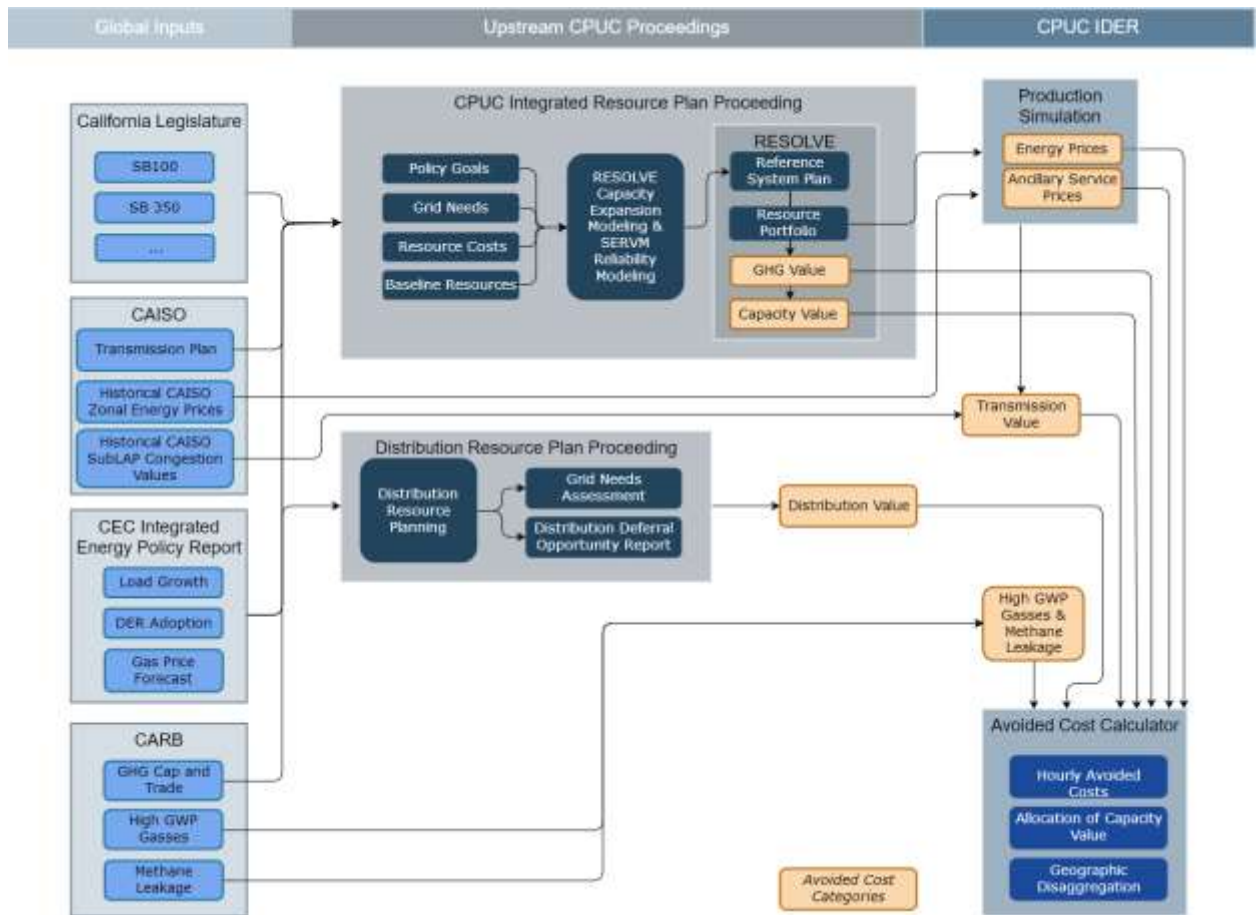


Figure 1: Proposed 2020 Avoided Cost Calculator Update Process

6. Overview of Party Briefs

The following parties filed opening briefs: California Large Energy Consumers Association (CLECA); California Solar and Storage Association (CALSSA); Coalition of California Utility Employees (CUE); Natural Resources Defense Council (NRDC); PG&E, SDG&E, and SCE (Joint Utilities); Public Advocates Office of the Public Utilities Commission (Public Advocates Office); Solar Energy Industries Association (SEIA) and Vote Solar; and The Utility Reform Network (TURN). The following parties filed reply briefs: CLECA, California Wind Energy Association (CALWEA), CUE, NRDC, Joint Utilities,

Public Advocates Office, and SEIA and Vote Solar. Below we present an overview of the recommendations from each of these parties.

6.1. CLECA

CLECA makes four recommendations for the 2020 Avoided Cost Calculator: 1) continue to set the Resource Balance year to the current year and use long-term generation capacity costs to determine avoided costs; 2) continue to calculate the avoided capacity costs with the combustion turbine as the proxy resource; 3) evaluate transmission and distribution costs with the four “right principles;”¹⁵ and 4) adopt the principle that only avoidable costs should be included in the Avoided Cost Calculator.

CLECA also made several assertions about the Staff Proposal: 1) using the results from Integrated Resource Planning proceeding for the Avoided Cost Calculator creates problems because developing inputs for the Avoided Cost Calculator is not the purpose of the Integrated Resource Planning proceeding; 2) the Staff Proposal changes existing Commission policy regarding the use of long-run avoided costs and should not be adopted; 3) use of the RESOLVE model results for generation capacity value will lead to unstable and inconsistent values; 4) adoption of the marginal cost as a proxy for avoided cost will overestimate the avoided cost; 5) the unspecified distribution avoided cost proposal for a No New DER counterfactual omits distributed energy resources’ integration costs and will result in double counting distributed energy resources benefits; and 6) the unspecified transmission avoided cost is very speculative and

¹⁵ The four right principles that CLECA refers to are: right time, right place, right certainty and right availability. These apply in demand response cost-effectiveness protocols. See CLECA Opening Brief, December 17, 2019 at 16; Evidentiary Hearing Transcript (TR), November 18, 2019, Vol. 1, at 114; and CLE-01 at 18.

the proposal to use congestion costs double counts congestion already included in the energy benefits.

6.2. CALSSA

CALSSA endorses the use of the No New DER Case as the basis for both the shadow capacity value and the greenhouse gas adder. CALSSA's support is based on the contention that when distributed energy resources are included as inputs in RESOLVE, fewer additional resources are needed to meet reliability and greenhouse gas requirements. Further, CALSSA contends that distributed energy resources provide values that are unquantified and uncredited today. Use of the No New DER scenario, CALSSA asserts, will acknowledge these values.

CALSSA also supports the proposal to discount the 2030 shadow greenhouse gas price back to prior years rather than interpolating values between 2030 and the 2020 cap and trade price. CALSSA contends this to be a reasonable approach since many distributed energy resources are long-lived and will continue to reduce greenhouse gas emissions. While supportive of the general approach, CALSSA is concerned that applying the greenhouse gas adder only to the difference between the short-run marginal emissions rate and the long-run marginal emissions rate is unnecessarily complex.

Expressing interest in the Staff Proposal's approach for calculating avoided transmission costs, CALSSA cautions that more detailed results are needed to better understand the approach and its implications. CALSSA is concerned the approach would not capture the full value of avoided transmission.

CALSSA references the Staff Proposal's discussion on high global warming potential gases and the expectation that more information from the CARB, with respect to well-to-meter leakage rates, is expected. While the Staff

Proposal anticipates receiving this information in time to inform the Avoided Cost Calculator update, CALSSA expresses concern that waiting for additional analysis could delay incorporation of any methane leakage rate. CALSSA recommends the Commission adopt a value of 1.9 percent for the leakage rate on an interim basis, based on information in the Staff Proposal.

6.3. CALWEA

CALWEA agrees that the Avoided Cost Calculator must be aligned as closely as possible with the Commission's Integrated Resource Planning proceeding process. Noting that the Integrated Resource Planning proceeding process is intended to evaluate all resource options on an equal basis using consistent inputs and assumptions, CALWEA contends that alignment requires that each component of the Avoided Cost Calculator must reflect the actual, marginal costs that a utility avoids by procuring distributed energy resources. Thus, CALWEA submits that the Commission should not adopt values unsupported by the record or sound reasoning, which would inappropriately favor distributed energy resources and raise the cost of achieving the state's carbon-reduction goals.

While supporting the alignment of the two proceedings, CALWEA insists the Staff Proposal should be modified as follows: 1) the 2020 Avoided Cost Calculator update should use the final adopted version of the Reference System Portfolio; 2) the No New DER should be used without a sensitivity case; 3) omit any greenhouse gas adders, as they should be incorporated in the Societal Cost Test, if at all; 4) adopt a zero value for avoided distribution and transmission costs.

With respect to other proposals, CALWEA opposes the inclusion of avoided resiliency or avoided reliability costs in the Avoided Cost Calculator.

Any such benefits are likely to be participant-specific and could not be provided system-wide, as intended to be captured in the Avoided Cost Calculator.

6.4. NRDC

NRDC agrees that the Avoided Cost Calculator should align with the Integrated Resource Planning proceeding and considers the Staff Proposal to be a good first step in updating the Avoided Cost Calculator. However, NRDC contends additional work needs to be done.

NRDC asserts that the staff-proposed greenhouse gas valuation methodology is inaccurate and overly complex. NRDC proposes three principles to be adhered to for improvement. NRDC first recommends that all marginal distributed energy resources' greenhouse gas impact be valued at the greenhouse gas adder. NRDC argues that greenhouse gas emissions saved through the Integrated Resource Planning proceeding determines distributed energy resources portfolio all count towards achieving the electric sector greenhouse gas reduction target. Second, NRDC supports the determination of the greenhouse gas impact of distributed energy resources through the identification of marginal resources at hourly basis through production simulation models. Third, NRDC contends that the long-run marginal emissions should only be applied after 2030, the point at which NRDC states the aggregate impact of all distributed energy resources programs is large enough to change the marginal generation mix of California's grid.

NRDC contends the Staff Proposal should apply the greenhouse gas shadow price from the No New DER scenario modeled through the Integrated Resource Planning proceeding.

In opposition to the Staff Proposal's approach of discounting the 2030 greenhouse gas shadow price backwards through 2020, NRDC recommends that

the Staff Proposal should instead apply RESOLVE estimates of (1) total electric sector spending on clean energy resources, and (2) cumulative greenhouse gas reductions realized through this spending to develop the greenhouse gas adder.

6.5. CUE

CUE supports the Staff Proposal because it uses values from the Integrated Resource Planning proceeding in the Avoided Cost Calculator. CUE states that by using the Integrated Resource Planning proceeding modeling outputs for generation capacity and energy values, the Commission will be better able to evaluate all resources on an equal basis.

However, CUE opposes three aspects of the Staff Proposal, which CUE alleges departs from the alignment of the Avoided Cost Calculator with the Integrated Resource Planning proceeding process. First, CUE asserts that, by using a special greenhouse gas adder for distributed energy resources that is not part of the Integrated Resource Planning proceeding, modeling will disconnect the values used for distributed energy resources from those used for other resources. CUE contends this would result in inefficiencies and increased costs for ratepayers. Second, CUE submits that basing transmission avoided costs on avoided congestion changes also departs from integration with the Integrated Resource Planning proceeding because price formation, as modeled in the Integrated Resource Planning proceeding, is ignored. Third, CUE maintains that the avoided distribution costs in the Avoided Cost Calculator should “reflect the fact that it requires more than one kilowatt (kW) of distributed energy resources to result in a kilowatt of unspecified distribution deferral.

6.6. Public Advocates Office

While supporting the Staff Proposal recommendation that the Avoided Cost Calculator should align with the Integrated Resource Planning proceeding

and reflect the most up-to-date resource planning inputs and outputs, Public Advocates Office contends it is premature to adopt the Staff Proposal in its entirety at this time. Public Advocates Office recommends the Commission determine which components to adopt and direct Energy Division to refine the Staff Proposal into a final detailed proposal.

Regarding the specifics of the Staff Proposal, Public Advocates Office's recommendations focus on four elements: Resource Balance Year, avoided greenhouse gas emissions price, the gas transportation costs, and refrigerant leakage. Public Advocates Office recommends the Commission reinstitute the use of the Resource Balance Year and use the Integrated Resource Planning proceeding's modeling inputs to determine when the Resource Balance Year occurs. Opposing the Staff Proposal's modification to the greenhouse gas adder, Public Advocates Office recommends the avoided greenhouse gas emissions price be based on the cap-and-trade compliance cost. However, if the Commission adopts the Staff Proposals' greenhouse gas adder, Public Advocates Office recommends the Commission not include a discounted 2030 greenhouse gas shadow price. Public Advocates Office opposes increasing gas transportation costs in the Avoided Cost Calculator and including a value to reflect refrigerant leakage because these costs are not avoided costs.

With respect to other party proposals, Public Advocates Office recommends that the Avoided Cost Calculator not incorporate the SEIA and Vote Solar proposals to include reliability and resiliency values in the Avoided Cost Calculator as neither reliability nor resiliency represent avoidable costs.

6.7. SEIA and Vote Solar

SEIA and Vote Solar support a modified Staff Proposal to reflect the full value of distributed energy resources benefits. Asserting that a number of the

recommendations in the Staff Proposal do not contain sufficient detail to be evaluated or implemented at this time, SEIA and Vote Solar urge the Commission to ensure that adequate detail is made available to parties in early 2020 so that the Commission will have all the information necessary prior to issuing a decision.

With respect to the major elements of the Staff Proposal, SEIA and Vote Solar advocate adoption of the No New DER Case as the source for the greenhouse gas adder, capacity shadow price, and the future resource portfolio for production cost modeling. Further, SEIA and Vote Solar support use of the production cost modeling – benchmarked to actual CAISO market prices – to determine avoided energy and use of shadow price for capacity from the No New DER case to determine avoided generation capacity. SEIA and Vote Solar also support the continued use of RECAP loss-of-load-expectation allocators to determine hourly avoided generation capacity.

While advocating for the Staff Proposal generally, SEIA and Vote Solar assert that the Commission should adopt additional benefits not currently in the Avoided Cost Calculator, including avoided fuel cost volatility, avoided methane leakage, reliability and resiliency benefits, and grid services benefits.

With respect to other party proposals, SEIA and Vote Solar oppose the Joint Utilities' proposal to reinstate a modified Resource Balance Year.

6.8. TURN

TURN supports the approach of the Staff Proposal but believes additional work may be necessary before incorporating changes into the Avoided Cost Calculator.

With respect to avoided transmission costs, TURN presents six concerns:
1) whether the congestion components of Locational Marginal Prices are driven

by transmission constraints or by factors that could be mitigated by new transmission construction; 2) whether it is possible to reduce sub-LAP congestion to zero; 3) whether each megawatt of a distributed energy resource offers the same avoided transmission cost; 4) whether the Staff Proposal considers the negative congestion that sub-LAPs experience; 5) a preference to estimate long-term transmission value using utility transmission costs forecasted in general rate cases; 6) a preference that the term “system cost savings” refers to the impact on system cost as measured by market price and not total system cost; and 7) the relevance of the formula: Energy (Congestion) Value (\$/MWh) = the sum of all positive congestion components from all sub-LAPs for all hours of a year.

Regarding avoided distribution costs, TURN contends that long-run distribution marginal costs are not all avoidable and suggests that some allocation of distribution costs must be done if marginal distribution costs are used in the Avoided Cost Calculator. Stating that the Commission must consider both costs and benefits to understand the cost-effectiveness of any ratepayer support for distributed energy resources, TURN cautions that hidden costs contributing to the net benefits analysis have been ignored.

Turning to the Staff Proposal for avoided methane emissions costs, TURN recommends addressing methane leakage in the Societal Cost Test, as it believes there are no actual avoided electric corporation costs resulting from reduced methane leakage.

TURN also provided comments on the SEIA/Vote Solar proposals. TURN recommends the Commission reject the proposal to include large avoided unspecified transmission benefits based on the SEIA/Vote Solar notion that distributed energy resources are responsible for the deferral of \$2.5 billion in

CAISO transmission projects. TURN contends that it is not possible that the significant increase in distribution generation starting in 2014 contributed to the deferrals. TURN also recommends the Commission not adopt the proposal to add resiliency and reliability benefits to the Avoided Cost Calculator. TURN maintains that, while perhaps providing individual or granularly localized benefits, customer installation of backup generation and storage does not avoid or defer utility spending. Further, TURN submits such subsidies should be and are addressed in proceedings that fund distributed energy resources.

6.9. Joint Utilities

Joint Utilities agree that the Commission should align inputs to and use of the Avoided Cost Calculator with the Integrated Resource Planning proceeding. Hence, the Utilities support adoption of the Staff Proposal and use of the No New DER scenario, with the following clarifications and modifications. First, Joint Utilities recommend the Commission-adopted version of the Reference System Portfolio be used, as the current plan referenced in the Staff Proposal includes a number of disputed issues and has not been finalized by the Commission. Joint Utilities recommend the Staff Proposal be modified such that the calculation of capacity costs uses energy market rents derived from energy and ancillary services prices. Joint Utilities also recommend elimination of the year-to-year discontinuity in capacity costs; use of a six-year rolling average discounted by weighted average cost of capacity to produce avoided generation costs; rejection of the discounting method to establish the greenhouse gas price; exclusion of specified distribution deferral costs, specified transmission costs, specified transmission costs and avoided cost of high global warming potential gases; and rejection of the method to calculate unspecified transmission costs based on historical Sub-Load Aggregation Point congestion components.

Joint Utilities propose the Commission reinstate the Resource Balance Year concept but modify it such that annual capacity costs are derived from the cost of the marginal new-build resource for years modeled in the Integrated Resource Planning proceeding, in which new capacity must be added for reliability, and the cost of the marginal existing resources in other modeled years.

Joint Utilities propose that if the Staff Proposal, as modified based on comments, is not selected as the method for estimating avoided generation capacity costs, a 4-hour battery should be used as the marginal generating unit. Joint Utilities reference a Joint Stipulation, entered into with SEIA/Vote Solar and CalWEA, agreeing on the use of a battery as the marginal generating unit.¹⁶ Also in the Joint Stipulation is agreement on the method to be used to determine the revenue streams earned by the marginal generating unit, and energy price shapes and levels. Joint Utilities recommend the Commission adopt the Joint Stipulation.

With respect to other party proposals, Joint Utilities recommend replacement of the SEIA/Vote Solar proposal to use a static capacity price shape based on a static 2020 loss-of-load-expectation with use of the Integrated Resource Planning proceeding projection of hourly expected unserved energy. Joint Utilities oppose five other SEIA/Vote Solar proposals: the increase of forecast natural gas prices, a method to calculate avoided unspecified transmission and distribution costs, inclusion of a fuel price volatility avoided cost, reliability and resiliency avoided costs, and grid services avoided costs.

¹⁶ The following parties have agreed to the joint stipulation: Joint Utilities, SEIA/Vote Solar, and CalWEA. Public Advocates Office does not oppose this joint stipulation. *See* Joint Utilities Opening Brief at 54 and 69 and citing JPS-01.

7. Adoption of 2020 Updates to the Avoided Cost Calculator

This decision adopts both major and minor updates to the Avoided Cost Calculator for 2020. As discussed in detail below, the major updates involve the adopted guidance from D.20-03-005 in the Distribution Resources Planning proceeding (R.14-08-013), modifications to the Staff Proposal, and certain party proposals. Minor updates include: 1) expanding the Avoided Cost Calculator outputs used for demand response, 2) removing outputs used for Permanent Load Shifting, and 3) including one or more historical years in the Avoided Cost Calculator to allow for ex-post cost-effectiveness or greenhouse gas impact evaluations of distributed energy resources to be performed on a consistent basis.

7.1. Adoption of a Modified Staff Proposal

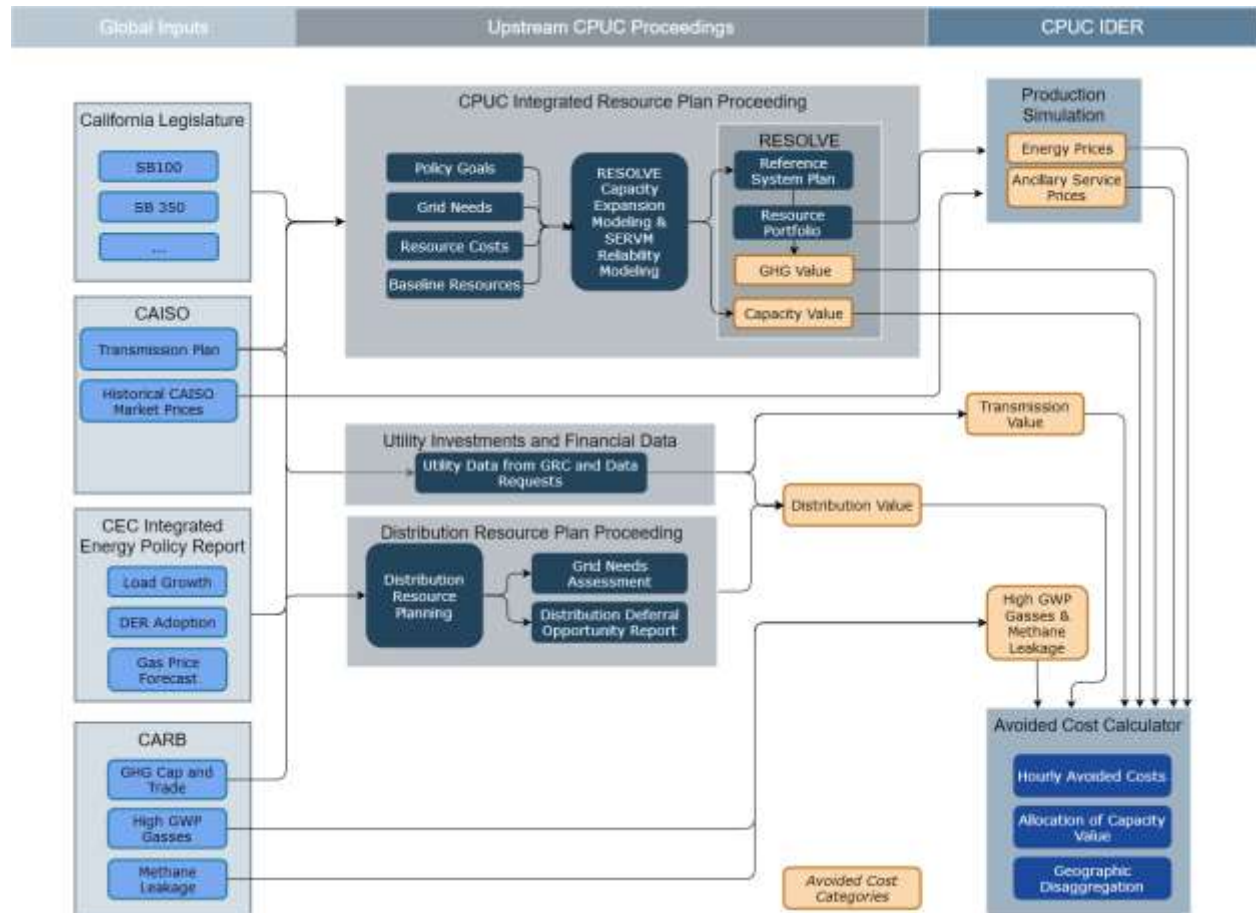
This decision adopts the Staff Proposal to align the Avoided Cost Calculator work in this proceeding with the Integrated Resource Planning proceeding in order to support consistency in the evaluation of supply- and demand-side resources in the electric sector planning. This would encompass aligning the data, models, and methods used for distributed energy resource cost-effectiveness with those used in the Integrated Resource Planning process. Parties generally support coordination between the two proceedings as an accurate reflection of current resource planning objectives. However, as presented in the subsections below, we make several modifications in response to party comments.

In addition to alignment between this proceeding and the Integrated Resource Planning proceeding, the modified Staff Proposal incorporates guidance from D.20-03-005 in the Distribution Resources Planning proceeding

(R.14-08-013) for developing the avoided cost of transmission and distribution capacity. This is discussed further in Section 7.1.6 below.

To assist in understanding the revisions, we provide the following flowchart (Figure 2) updated to show the adopted 2020 Avoided Cost Calculator update process:

Figure 2: Adopted 2020 Avoided Cost Calculator Update Process



7.1.1. The Avoided Cost Calculator Should Align with the Integrated Resource Planning Proceeding

“The Avoided Cost Calculator inputs should reflect the Integrated Resource Planning proceeding’s modeling inputs and outputs,” states Public

Advocates Office,¹⁷ with agreement from CALWEA, CALSSA, CUE, NRDC, SEIA and Vote Solar, TURN, and Joint Utilities.¹⁸ Only CLECA questioned the alignment of the two efforts, arguing that the purpose of the Integrated Resource Planning proceeding is not to develop inputs for the Avoided Cost Calculator and, therefore, using the results from the Integrated Resource Planning proceeding modeling creates problems.¹⁹

CLECA offers two concerns regarding the alignment of the Avoided Cost Calculator with the Integrated Resource Planning proceeding: 1) neither the RESOLVE model nor SERVM are able to identify, model, and value all of the benefits provided by distributed energy resources, specifically the ability of demand response to mitigate unexpected contingencies; and 2) to properly calculate an avoided capacity cost, the Avoided Cost Calculator needs to use a proxy resource that can actually provide capacity in real life and the combustion turbine remains the best option to calculate the value of generation capacity.²⁰

With respect to the concern that RESOLVE and SERVM cannot value all distributed energy resources benefits, especially demand response resources, the Staff Proposal acknowledges that the Commission should consider the impact of Avoided Cost Calculator changes on all distributed energy resources.²¹ In particular, the Staff Proposal underscores that the use of only short-run avoided generation capacity costs in the Avoided Cost Calculator could underestimate

¹⁷ Public Advocates Office Opening Brief at 5.

¹⁸ CALWEA Reply Brief at 2-3, CALSSA Opening Brief at 1; CUE Opening Brief at 1-2; NRDC Opening Brief at 2; and Joint Utilities Reply Brief at vi.

¹⁹ CLECA Opening Brief at iv.

²⁰ CLECA Opening Brief at 4-11.

²¹ Staff Proposal at 15.

the value of having customers who are willing and able to reduce demand once needed.²² In fact, the Staff Proposal contemplates whether the Commission should develop a method for estimating demand response cost-effectiveness over an extended time period. However, the Staff Proposal concludes that this concern should be taken up in a demand-response centric proceeding.²³

We agree with Public Advocates Office, the Joint Utilities, and CALWEA that the Avoided Cost Calculator should not include resource-specific benefits.²⁴ As noted by Public Advocates, the Commission is moving toward a common valuation method with consistent inputs and assumptions across ALL uses of avoided cost data.²⁵ Considering benefits for one resource in the Avoided Cost Calculator proceeding is not consistent with this. Accordingly, we conclude the Commission should address resource-specific benefits in resource-specific proceedings.

We turn to CLECA's recommendation to continue use of a combustion turbine as the proxy resource used as the basis for estimating the cost of new generation capacity in the Avoided Cost Calculator. CLECA argues that reliance on the Reference System Portfolio to determine the proxy generation resource is premature, as "the modeling appears to be a work in progress."²⁶ Referencing a CAISO statement that the Integrated Resource Planning proceeding portfolio should be "subject to more rigorous operational analysis before being

²² *Ibid.*

²³ *Ibid.*

²⁴ Public Advocates Office Opening Brief at 5, Joint Utilities Opening Brief at 2, and CALWEA Reply Briefs at 3.

²⁵ Public Advocates Office Opening Brief at 5 citing D.05-04-024 at 34 and Finding of Fact 6.

²⁶ CLECA Opening Brief at 11.

adopted,”²⁷ CLECA asserts that the Commission is only at an initial step towards alignment between the two proceedings.²⁸

We find that the time is right for advancing the alignment of the Integrated Resource Planning proceeding and the Avoided Cost Calculator. We disagree that the Reference System Portfolio modeling is not ready for alignment. As noted by the Joint Utilities, the CAISO statement that CLECA references is solely about using the Reference System Portfolio in the CAISO’s Transmission Planning Process and not about the Reference System Portfolio itself.²⁹ With respect to CLECA’s assertions of the status of alignment, the statement CLECA references from D.19-05-019 was made nearly a year ago.³⁰ Since that time, modeling improvements and steps toward alignment between the two proceedings have been significant. For example, in December 2019, the Integrated Resource Planning proceeding updated the Unified Resource Adequacy and Integrated Resource Planning Modeling Datasets webpage to include data on the SERVVM Total Unit List for the proposed Reference System Portfolio, which identified baselines and new resources. Additionally, a RESOLVE Scenario Tool and Results Viewer has been developed, which contains inputs and results, including preliminary results for the No New DER Scenario. A proposed Reference System Portfolio was issued through a November 6, 2019 Administrative Law Judge Ruling. Furthermore, on March 26, 2020, the Commission approved a decision adopting the finalized Reference System

²⁷ *Id.* at 12 citing TR at 72.

²⁸ *Id.* at 12 citing D.19-05-019.

²⁹ Joint Utilities Reply Brief at 9.

³⁰ The decision was adopted by the Commission in May 2019.

Portfolio.³¹ The Reference System Portfolio does not anticipate that new natural gas units of any type, including combustion turbines, will be built in the future. While combustion turbines may currently be the marginal unit of generation in some hours, that implies that combustion turbines sometimes are the marginal unit of *energy*. However, the marginal unit of generation *capacity* is determined not by current operational generating units, but rather by the cost of meeting additional future capacity needs. The RESOLVE model determines those future capacity needs and the RESOLVE model results indicate that future capacity expansion will not include natural gas units. We find that CLECA's arguments for continued use of the combustion turbine as the proxy resource rely on indirect statements as well as outdated or unrelated information.

While we are confident that alignment is appropriate at this time, we are concerned by Joint Utilities' contention that the Staff Proposal's method to determine the avoided cost of generation capacity, which relies on RESOLVE shadow prices, results in values that are too high and too volatile to provide a credible or feasible data source.³² For example, the most recent data released in the Integrated Resource Planning proceeding shows capacity shadow prices exceeding \$1200/kW year.³³ Until such time as RESOLVE model outputs can provide usable values, we will adopt the approach recommended in the previously mentioned joint stipulation agreed to by Joint Utilities, CalWEA and SEIA/Vote Solar that states:

³¹ See D.20-03-028.

³² Joint Utilities Opening Brief at 7-16.

³³ See the Integrated Resource Planning proceeding web page at <https://www.cpuc.ca.gov/General.aspx?id=6442464143>

Storage as the avoided resource for avoided generation capacity costs

- 1. The marginal new-build resource is an input into the generation capacity avoided cost methodology. The marginal new-build resource addition should be determined based on analysis in the Integrated Resource Planning proceeding process and may be addressed in response to the Staff Proposal.*
- 2. For purposes of this Avoided Cost Calculator major update cycle, the parties accept, in concept, that a 4-hour battery storage resource will be the avoided resource for determining avoided generation capacity costs.*
- 3. The services provided by, and the revenue streams earned by, the marginal storage resource (i.e., the use case for the marginal storage resource) are to be determined in the Integrated Resource Planning proceeding. Services must be modeled so as to ensure that the storage provides reliable on-peak capacity.*

This is the approach recommended by Joint Utilities for calculating the Net Cost of New Entry of new battery storage as the basis for generation capacity.³⁴ As described by Joint Utilities, this approach is similar in concept to the approach used in prior iterations of the Avoided Cost Calculator, except that the estimated cost for new generation capacity is a battery instead of a natural gas combustion turbine. Thus, we direct that the Avoided Cost Calculator shall use input assumptions from the RESOLVE model for the fixed costs of a new battery to calculate the levelized fixed costs of a battery over its useful life of 20 years. The revenues that batteries earn in the energy and ancillary markets will be calculated and subtracted from the levelized fixed costs to calculate a Net Cost of New Entry. The prices for energy and ancillary services will be provided SERVM production simulation using the Reference System Portfolio and will be used to calculate net market revenues for a new battery. As proposed by Joint

³⁴ IOU-01 at 3-7 to 3-9.

Utilities, and agreed to in the Joint Stipulation, we instruct Staff to perform calculation of net revenues for battery storage and subtract those net revenues from the fixed costs to calculate Net Cost of New Entry for battery storage in each year. During a workshop or webinar to be held following the issuance of the draft resolution adopting the final 2020 Avoided Cost Calculator update, Staff will provide these calculations to parties for review, as part of the workshop or webinar previously directed.

In reply briefs, CLECA restates its arguments against alignment based on a discussion in D.19-12-040 regarding alignment between the Demand Response Auction Mechanism (Auction Mechanism) and the Integrated Resource Planning proceeding, where the Commission states that “neither the Auction Mechanism (still in the pilot phase) nor the Integrated Resource Planning process (still in its early stages) is at a point where alignment is appropriate.”³⁵ It is true that the Auction Mechanism is in its pilot phase and not ready for alignment with the Integrated Resource Planning proceeding. However, alignment between the Auction Mechanism and the Integrated Resource Planning proceeding is not the same as alignment between the Avoided Cost Calculator and the Integrated Resource Planning proceeding. The Commission has been working, for some time, toward coordination and alignment between the Avoided Cost Calculator and the Integrated Resource Planning proceeding. Alignment may not be appropriate at this time between the Auction Mechanism and Integrated Resource Planning proceeding but, as described above, the Commission has the tools to move forward with alignment between Integrated Resource Planning proceeding and the Avoided Cost Calculator.

³⁵ CLECA Reply Brief at 3 citing D.19-12-040 at 45.

The Commission previously expressed its intention to align the cost-effectiveness work in this proceeding with the efforts to develop a Common Resource Valuation Method in the Integrated Resource Planning proceeding.³⁶ Hence, aligning the Avoided Cost Calculator with the Integrated Resource Planning proceeding should be the obvious next step. The Reference System Portfolio provides the Commission with a capacity expansion plan that is the least-cost path to meeting future capacity needs, reliability needs, greenhouse gas targets, and renewable requirements. We note that use of the Reference System Portfolio, as adopted by the Commission, should allay concerns expressed by parties that the previously released draft Reference System Portfolio should not be the basis for the 2020 Avoided Cost Calculator update.³⁷ Further, we clarify that as a result of using RESOLVE outputs, we rely on Integrated Energy Policy Report (IEPR)-based rather than Market Price Reference (MPR)-based natural gas commodity prices.

Relatedly, we address the request by Joint Utilities to reinstate the Resource Balance Year. Explaining that the current version of the Avoided Cost Calculator includes an “unfunctional” Resource Balance Year concept, Joint Utilities assert that the 2020 update of the Avoided Cost Calculator must be modified to include a Resource Balance Year so that the Avoided Cost Calculator is aligned with other resource valuation methods. Joint Utilities maintain that the Avoided Cost Calculator does not incorporate near-term market based costs in its generation capacity calculation and including a Resource Balance Year will align the Avoided Cost Calculator with the Integrated Resource Planning

³⁶ D.19-05-019 at 57.

³⁷ Joint Utilities Opening Brief at 3 and CALWEA Reply Briefs at 3-4.

proceeding and least cost best fit processes.³⁸ Specifically, Joint Utilities call for the Resource Balance Year to be set at the year 2021 in the 2020 Avoided Cost Calculator but assert that based on subsequent Reference System Portfolios, the Resource Balance Year may be in a later year in future Avoided Cost Calculator updates.³⁹ Public Advocates Office supports reinstating the Resource Balance Year.⁴⁰

D.16-06-007 describes the Resource Balance Year as the first future year when there is forecasted need for new generation.⁴¹ As explained by SEIA/Vote Solar, prior to the Resource Balance Year, there is enough existing capacity to meet demand.⁴² D.16-06-007 eliminated the use of the Resource Balance Year because it does not recognize the Commission's clean energy policies and "ignores the fact that short lead times of distributed energy resources add value to the system."⁴³ Both CLECA and SEIA/Vote Solar oppose Joint Utilities' recommendation, contending that the Resource Balance Year disadvantages distributed energy resources with quick installation and development times.⁴⁴

Modifying the Avoided Cost Calculator to make the embedded Resource Balance Year functional is not necessary. The Resource Balance Year was created to distinguish between short-run capacity prices, determined by market conditions, and long-run capacity prices, determined by the cost of building new

³⁸ Joint Utilities Opening Brief at 46-48.

³⁹ *Id.* at 49-50.

⁴⁰ Public Advocates Office Opening Brief at 23-24.

⁴¹ D.16-06-007 at 12.

⁴² SEIA/Vote Solar Opening Brief at 12.

⁴³ D.16-06-007 at 23 and Finding of Fact 21.

⁴⁴ CLECA Opening Brief at 3-4 and SEIA/Vote Solar Opening Brief at 14-15.

generation. But the Commission recognized that using short-run capacity prices had an unfair negative impact on distributed energy resources and eliminated the Resource Balance Year. The Integrated Resource Planning proceeding's RESOLVE model identifies capacity needs starting in 2020 and provides a view of the capacity market price that more accurately reflects actual capacity prices in all years,⁴⁵ negating the need for the capacity prices from the Resource Balance Year. The Commission envisions a future where avoided generation capacity values are based on Integrated Resource Planning proceeding outputs and reflects market conditions. By integrating the Avoided Cost Calculator with the Integrated Resource Planning proceeding modeling outputs now, we take a step toward that future, with the knowledge that market and construction costs of all new capacity that will be needed in future years are now taken into account. Reintroducing the Resource Balance Year into the Avoided Cost Calculator would be duplicative and unnecessary. Accordingly, the Commission should deny the request of Joint Utilities to reestablish the Resource Balance Year in the Avoided Cost Calculator.

7.1.2. Adoption of the No New DER Scenario

We adopt the No New DER Scenario that was modeled as a sensitivity of the Reference System Portfolio. The No New DER Scenario eliminates new distributed energy resources from the modeling assumptions. This allows the model to measure the cost of supply-side resources that would have to be procured in the absence of additional distributed energy resources. There is

⁴⁵ Staff Proposal at 13, Figure 5. RESOLVE produces a high capacity value in the first year when there is a need for new generation resources (2022 in the figure.) In years in which new capacity build is not needed, the capacity value will be lower.

support for the No New DER Scenario, but, as described below, the Joint Utilities argue against using it as a sensitivity.

The Staff Proposal describes the No New DER Scenario as a variation, or sensitivity of the Reference System Portfolio modeling, wherein all distributed energy resources associated with utility incentive programs and incremental to the distributed energy resources installed up to 2018 are removed. The Staff Proposal explains that all demand response resources, which require ongoing annual incentive payments, would be assumed to be zero.

The Staff Proposal describes the No New DER Scenario as providing two different measures of avoided costs of the distributed energy resources included in the proposed Reference System Portfolio: 1) the increased supply-side costs to replace the distributed energy resources the No New DER Scenario is a measure of the system costs avoided by the proposed Reference System Portfolio distributed energy resources portfolio; and 2) avoided supply-side costs will be based on the No New DER Case as a sensitivity.

In opposition to the use of the No New DER as a sensitivity, Joint Utilities consider the scenario unrealistic and not useful. Joint Utilities explain that absent new distributed energy resources, supply-side resources would be added to meet reliability and greenhouse gas targets.⁴⁶ Stating that the Integrated Resource Planning proceeding resource selection process assumes distributed energy resources will be added exactly as estimated in the CEC's IEPR,⁴⁷ Joint

⁴⁶ Joint Utilities Opening Brief at 5.

⁴⁷ The IEPR provides a cohesive approach to identifying and solving the state's pressing energy needs and issues. The report, which is crafted in collaboration with a range of stakeholders, develops and implements energy plans and policies. See CEC website at: <https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report>

Utilities contend use of distributed energy resources' avoided costs in the Avoided Cost Calculator would not be consistent with the resource selection process.⁴⁸ Instead, Joint Utilities recommend the Commission use the outputs of the Reference System Portfolio to calculate the avoided costs of new distributed energy resources.

CLECA also opposes the use of the counterfactual No New DER, claiming the result would be a double counting of specified distributed energy resources: once in the Distribution Deferral Opportunity Report and again in the unspecified distributed energy resources avoided cost because of embedded specified distributed energy resources in the No New DER forecast.⁴⁹

Both CALSSA and SEIA/Vote Solar support the use of the No New DER scenario. SEIA/Vote Solar maintain that use of the No New DER scenario to provide the inputs to the Avoided Cost Calculator is consistent with the objective of evaluating all supply- and demand-side resources together.⁵⁰ SEIA Vote Solar assert that use of the No New DER scenario will result in cost-effective distributed energy resources, while using the results of the Reference System Portfolio base case will undervalue the new distributed energy resources.⁵¹

We find that the No New DER sensitivity scenario provides the Commission with the best indicator of the value of distributed energy resources; it allows us to measure the cost of providing electric service without distributed energy resources. With respect to Joint Utilities' assertion that the scenario is

⁴⁸ Joint Utilities Opening Brief at 5.

⁴⁹ CLECA Opening Brief at 27-28.

⁵⁰ SEIA/Vote Solar Opening Brief at 7 citing D.19-05-019.

⁵¹ *Id.* at 7.

unrealistic, we find that no avoided cost modeling is realistic. Avoided cost modeling determines the value of capacity that will not be built, fuel that will not be purchased or burned, and electricity that will not be used. Although the No New DER scenario will not actually occur, the outputs of the modeling tells us what it would cost to operate the grid replacing the distributed energy resources with supply-side resources. The outputs provide the Commission with the best estimated value of the distributed energy resources. As noted by SEIA and Vote Solar, the use of the metrics from the No New DER best advances the Commission's long-term goal of integrated resource planning and comparing demand-side resources alongside supply-side resources.⁵²

We address CLECA's double-counting concern by noting that the only quantified difference between the two scenarios is the change in supply-side costs. Distribution costs were not included in this comparison of the Reference System Plan and No New DER Scenario, so there is no double counting

We address the concern by Joint Utilities that a No New DER scenario will value all distributed energy resources equal to the first unit of distributed energy resources. Joint Utilities contend this will overvalue distributed energy resources. However, the Joint Utilities' recommendation is to value all distributed energy resources in the portfolio based on the last unit of distributed energy resources, which would result in under valuation of the distributed energy resources. We find that neither scenario is perfect. Furthermore, because the RESOLVE model is currently limited in the number of scenarios that can be run, we cannot run an estimate that averages the two scenarios. Recognizing

⁵² SEIA/Vote Solar Reply Comments at 7.

that distributed energy resources are at the top of the loading order, in comparison to traditional energy resources, we find that the value overestimation is a preferable outcome rather than underestimation.

We conclude that the Commission should adopt the No New DER scenario to measure avoided costs, as described here. The No New DER scenario, developed from Integrated Resource Planning proceeding modeling, will be used for the greenhouse gas value, marginal greenhouse gas emissions, and energy and ancillary services prices. The greenhouse gas value is derived directly from RESOLVE modeling of the No New DER scenario. The marginal greenhouse gas emissions will be provided by SERVVM modeling of the No New DER scenario. The energy and ancillary services prices are derived from SERVVM production simulation modeling of the RESOLVE resource portfolio developed for the No New DER scenario, as further described in Section 7.1.3 below. The generation capacity value will be derived from the net cost of new entry calculation for energy storage, rather than from Integrated Resource Planning proceeding modeling. However, the energy and ancillary prices from the No New DER scenario will be used to calculate net revenues for energy storage in those markets, which is used to determine the net cost of new entry values.

The No New DER scenario is not relevant for the other avoided cost categories, but a similar paradigm is used for distribution capacity costs through the use of counterfactual load forecasts that exclude new distributed energy resources.

7.1.3. Adoption of Production Cost Modeling Using SERVVM

All parties support the use of production cost modeling to estimate hourly avoided energy and ancillary services costs. The Staff Proposal asked parties to

comment on whether to use PLEXOS or SERVVM software for the production cost modeling. Only Joint Utilities express a preference, which is PLEXOS. However, given that SERVVM is currently used in the Integrated Resource Planning proceeding process, we find it reasonable to continue its use for the Avoided Cost Calculator. We discuss our rationale below.

Joint Utilities agree with the Staff Proposal that production simulation is widely used to model operation and association costs of the power system, including interaction between generators and transmission constraints, but also used by CAISO to model reliability impacts.⁵³ Commenting that, with enhancements, production simulation modeling can provide reasonable estimates of future prices for energy and ancillary services, Joint Utilities highlight that such modeling has the advantage of providing forecasts for both ancillary service and real-time energy prices.⁵⁴ While Joint Utilities recommend PLEXOS over SERVVM because they contend it provides more detailed generator characteristics, Joint Utilities also “recognize that SERVVM would also provide added value” in calculations of energy and ancillary service prices.⁵⁵

SERVVM is currently used for the Integrated Resource Planning proceeding and Staff have used it to produce much of the data needed for the Avoided Cost Calculator.⁵⁶ We find SERVVM to be the better fit for the production cost

⁵³ Joint Utilities Opening Brief at 15-16 citing the Staff Proposal at 17 and the CAISO 2018 Summer Loads and Resources Assessment at 2.

⁵⁴ *Id.* at 16.

⁵⁵ *Ibid.*

⁵⁶ Staff Proposal at 18.

modeling needs of the Avoided Cost Calculator. Hence, the Commission should adopt SERVM as the production cost model in the Avoided Cost Calculator.

7.1.4. Continuation of the Straight-line Greenhouse Gas Adder

While maintaining the straight-line greenhouse gas adder, as used in the current Avoided Cost Calculator, based on party comment, we authorize staff to consider modifying the adder such that it is based on post-2030 values to better reflect average long-term greenhouse gas abatement costs. The Director of the Energy Division is authorized to host a workshop no later than ten days following the issuance of the draft resolution updating the Avoided Cost Calculator in compliance with this decision. The purpose of the workshop is to review the analysis of the post-2030 values with parties, prior to consideration by the Commission of the draft resolution adopting a 2020 updated Avoided Cost Calculator.

The Staff Proposal recommends the Commission continue to calculate a greenhouse gas avoided cost value based on the shadow price of greenhouse gas emission reductions from the RESOLVE modeling in the Integrated Resource Planning proceeding. In addition, the Staff Proposal recommends discounting the 2030 greenhouse gas shadow price at the utility weighted average cost of capital.⁵⁷ The Staff Proposal explains this would provide greenhouse gas avoided cost values for 2020 through 2029 and would replace trending values back to the current cap and trade price.⁵⁸ Asserting that the long-term value of greenhouse gas reductions from distributed energy resources is better reflected

⁵⁷ *Id.* at 28.

⁵⁸ *Ibid.*

by discounting the 2030 value back to 2020, the Staff Proposal explains that RESOLVE modeling for the Integrated Resource Planning proceeding results in relatively low greenhouse gas shadow prices in earlier years. The Staff Proposal contemplates that this occurs, in part, because renewable generation is procured prior to 2022 for reliability purposes and to take advantage of the federal Investment Tax Credit before it decreases from 30 to 10 percent.⁵⁹

Both Joint Utilities and CUE assert that the Staff Proposal for the greenhouse gas adder results in unequal treatment of supply- and demand-side resources; CUE adds that it places greater value on a reduction of a unit of greenhouse gas by a distributed energy resources than that by a supply-side resource.⁶⁰ Joint Utilities contend that the Staff Proposal over-estimates the cost-effectiveness of distributed energy resources eligible for the Investment Tax Credit.⁶¹ Explaining that distributed energy resources receiving the cost-reduction from the tax credit would also receive an added benefit with the Staff Proposal's greenhouse gas valuation, Joint Utilities recommend that, if the proposal is adopted, distributed energy resources benefitting from the tax credit not be eligible to include the tax credit in the cost-effectiveness evaluation. Joint Utilities allege this would otherwise result in double-counting.⁶²

Joint Utilities also oppose the proposal of using the greenhouse gas shadow price directly from the RESOLVE model, citing the inability of RESOLVE to select energy efficiency as a resource.⁶³ As an alternative solution and to

⁵⁹ *Id.* at 28-29.

⁶⁰ CUE Opening Brief at 2-3 and Joint Utilities Opening Brief at 19-20.

⁶¹ Joint Utilities Opening Brief at 20.

⁶² *Ibid.*

⁶³ *Id.* at 20-21.

ensure that supply- and demand-side resources are treated equally, Joint Utilities recommend using the same IEPR greenhouse gas forecast as is used in the Integrated Resource Planning proceeding capacity expansion modeling process.⁶⁴

Public Advocates Office also opposes the Staff Proposal's recommendation to discount the 2030 greenhouse gas shadow price at the utility weighted average cost of capital, calling it problematic.⁶⁵ While agreeing with CUE and Joint Utilities that distributed energy resources and supply-side resources should be compared equally, Public Advocates Office alleges the approach will result in greater procurement of greenhouse-gas-reducing distributed energy resources and lead to easement of the greenhouse gas emissions constraint currently placed on supply-side resources in the Integrated Resource Planning proceeding. Public Advocates Office concludes that "by overpaying for greenhouse gas reduction on the demand side, the Commission will skew future supply-side resource planning to higher emitting resources."⁶⁶ Instead, Public Advocates Office recommends the Commission adopt the current and projected cap-and-trade compliance costs as the greenhouse gas price values. Public Advocates Office submits the cap-and-trade compliance costs are the actual abatement costs that are avoided through the deployment and use of distributed energy resources.⁶⁷

We find that the Staff Proposal is consistent with the Commission's prior policy adopted in D.18-02-016, whereby a consistent trajectory to the greenhouse gas adder, without a sharp spike in 2030, will provide a steady market signal and allow for the steady deployment of distributed energy resources that are the

⁶⁴ *Id.* at 21.

⁶⁵ Public Advocates Office Opening Brief at 25-26.

⁶⁶ *Id.* at 26.

⁶⁷ *Id.* at 25.

result of the choices of many customers.⁶⁸ Accordingly, we decline to adopt the proposal by Public Advocates Office to use cap-and-trade values, which the Commission previously declined in D.18-02-018. We also decline to adopt Joint Utilities proposal to use the CEC's IEPR greenhouse gas forecast in place of the RESOLVE greenhouse gas shadow prices. Joint Utilities reasoning lies in the inability of the RESOLVE modeling to include energy efficiency as a candidate resource. We agree with SEIA and Vote Solar that this inability does not negatively impact the outcome of the RESOLVE modeling. However, we agree with parties that basing the magnitude of the adder on the 2030 greenhouse gas shadow price could be overestimating the value.

In response, we direct staff to continue using the straight-line adder previously adopted by the Commission but consider modifying the values based on post 2030 data. Parties shall be provided with this data prior to the final adoption of the updated Avoided Cost Calculator. The Director of the Energy Division is authorized to host a workshop or webinar no later than ten days following the issuance of the draft resolution finalizing the 2020 update of the Avoided Cost Calculator. During the workshop or webinar, staff shall present their analysis to parties and other interested stakeholders.

7.1.5. Calculating Short- and Long-term Greenhouse Gas Avoided Cost

Many parties agree that the current method of determining avoided greenhouse gas emissions overestimates the quantity of greenhouse gas emissions that distributed energy resources avoid. This overestimation will become more relevant as California moves toward electrification, which will

⁶⁸ SEIA/Vote Solar Reply Brief at 13 citing D.18-02-018 at 118.

increase the use of electricity.⁶⁹ We adopt the staff-proposed calculation of short- and long-term avoided greenhouse gas costs, despite any perceived complexity. As discussed below, it is the approach most consistent with the method adopted by the Commission for the Fuel Substitution Test and the method proposed by the CEC for Title 24 building standards. The Director of the Energy Division is authorized to hold a workshop or webinar no later than 10 days following the issuance of the draft resolution approving the 2020 update to the Avoided Cost Calculator. The purpose of the workshop includes educating parties and other stakeholders on the method to measure greenhouse gas emissions avoided costs.

The Staff Proposal describes the current and proposed approach to measuring greenhouse gas emissions.⁷⁰ The current greenhouse gas impacts are based on hourly short-run marginal emissions and calculated using an implied heat rate, which incorporates market price forecasts for electricity and natural gas. The current approach, which is adjusted to reflect increased renewable generation, results in lower implied market heat rates during higher solar generation. However, the current approach does not account for the declining annual average greenhouse gas emissions intensity of the grid nor does it account for the modifications needed in supply-side procurement due to the changes in load.

Hence, the Staff Proposal modifies the greenhouse gas emissions method to more accurately account for the decreasing emissions intensity of the electric grid while simultaneously recognizing California's movement toward

⁶⁹ SB 100 established a goal of 100 percent decarbonized electricity (as measured by retail sales) by the year 2045.

⁷⁰ See Staff Proposal at 25-33.

electrification and the resulting changes in load. The updates include: 1) using production simulation to calculate short run hourly marginal emissions versus the implied market heat rate currently used; and 2) using long run marginal emissions to evaluate the greenhouse gas impacts of demand-side load modifications. In addition, the Staff Proposal recommends use of the annual emissions intensity derived from the Integrated Resource Planning proceeding to reflect the emissions attributed to load-modifying demand-side actions. This requires a new equation to calculate the difference between the direct short run marginal emissions and the intensity target. As the Staff Proposal explains, the new equation, capturing the difference between the direct short run marginal emissions and the intensity target and then multiplied by the greenhouse gas adder, provides us with the avoided electric sector emissions cost of maintaining the annual intensity target.

Further, the Staff Proposal submits that the remaining emissions (the emissions needed to be offset to result in a given measure having zero net emissions impact) should be valued at the CARB cap and trade allowance prices. The Staff Proposal contends that because these remaining emissions do not represent greenhouse gas specific to the electric sector, it is more consistent to value the remaining emissions as emissions from other sectors are valued.

Hence, the new equation, which reflects the net present value of the emissions attributable to a given measure or program, over its useful life, is proposed as:

$$\begin{aligned} & \text{Load Shape (kWh)}_h * [\text{Marginal Emissions (tCO}_2\text{e/kWh)}_h - \text{Annual} \\ & \text{Emissions Intensity (tCO}_2\text{e/kWh)}_y] * \text{GHG Adder (\$/tCO}_2\text{e)}_y + \\ & [\text{Annual Load (kWh)}_y * \text{Annual Emissions Intensity (tCO}_2\text{e/kWh)}_y] * \\ & \text{Cap and Trade Price (\$/tCO}_2\text{e)}_y \end{aligned}$$

For comparison purposes, the equation for greenhouse gas emissions in the 2019 Avoided Cost Calculator is:

$$\frac{\text{Load Shape (kWh)}_h * \text{Marginal Emissions (tCO}_2\text{e/kWh)}_h * \text{GHG Adder (\$/tCO}_2\text{e)}_y}{}$$

While agreeing with the need to update the greenhouse gas emissions measurement to reflect the deployment of renewables, parties consider the Staff Proposal approach to be convoluted and assert that it undervalues greenhouse gas reductions from distributed energy resources in the electric sector.

Joint Utilities contend the use of the long-run greenhouse gas intensity estimate may utilize arbitrary assumptions.⁷¹ Instead, Joint Utilities recommend estimating the hourly marginal greenhouse gas intensity using the IEPR greenhouse gas forecast based on production simulation modeling of the Reference System Portfolio. Joint Utilities submit this would allow greenhouse gas intensity to have an hourly profile that trends downward according to the greenhouse gas targets established in the Integrated Resource Planning proceeding, which can then be used to develop the avoided greenhouse gas costs of distributed energy resources based on the shape of those resources.⁷²

SEIA/Vote Solar, also opposing the Staff Proposal approach, recommend that the marginal greenhouse gas cost should apply to all electric sector emissions in every hour, not just to those that are above an annual average intensity.⁷³ Further, SEIA/Vote Solar support Joint Utilities' contention that any system-wide greenhouse gas intensity target for future years would not be constant on an hourly basis, but would also have an hourly shape that would be

⁷¹ Joint Utilities Opening Brief at 21.

⁷² *Id.* at 21-22.

⁷³ SEIA/Vote Solar Opening Brief at 18-19.

difficult to determine. However, SEIA/Vote Solar recommend that the Commission adjust the 2030 greenhouse gas target adopted in the Integrated Resource Planning proceeding such that the electric sector is on the right trajectory to meet the 2045 goals and confirm that should be addressed in the Integrated Resource Planning proceeding.⁷⁴

We find that the Staff Proposal offers the best proposal in the record to address the concern that greenhouse gas costs have been overestimated. As underscored in the Staff Proposal, the current approach only reflects the avoided electric sector emissions cost of maintaining the annual intensity target, rather than the cost of completely offsetting the changes in emissions relative to a measure or program's load impact.⁷⁵ Neither Joint Utilities' nor SEIA/Vote Solar' proposals appropriately address future reduction requirements. Joint Utilities recommend estimating the hourly marginal greenhouse gas intensity through 2030 from the production simulation modeling of the adopted Reference System Portfolio to obtain the hourly profiles.⁷⁶ SEIA/Vote Solar contend the Staff Proposal will undervalue greenhouse gas reductions resulting in under procurement, and thus recommend applying the marginal greenhouse gas cost to all electric sector emissions in every hour, not just to those above an annual average intensity.⁷⁷ We disagree. Further, we find the Staff Proposal approach is more consistent with the approach taken by the CEC and, with the recent adoption of the Fuel Substitution Test, the Commission.

⁷⁴ SEIA/Vote Solar Reply Brief at 16-17.

⁷⁵ Staff Proposal at 29.

⁷⁶ Joint Utilities Opening Brief at 21-22.

⁷⁷ SEIA/ Vote Solar Opening Brief at 19=20.

In D.19-08-009, the Commission adopted a fuel substitution test and ordered the creation of a fuel substitution guidance document. The Commission ordered that fuel substitution measures must pass the fuel substitution test to be eligible for energy efficiency incentives. The fuel substitution test has two components: 1) the measure must not increase total source energy (Part One); and 2) the measure must not adversely impact the environment (Part Two).⁷⁸ Similar to the Staff Proposal, the conceptual approach in the fuel substitution test first looks at adding load through fuel substitution, which increases greenhouse gasses at short run marginal emissions rates.⁷⁹ The second part of the fuel substitution test then re-optimizes the Renewable Procurement Standard portfolio, reducing emissions to meet sector goals; the net effect is the long-run emissions.⁸⁰

Similarly, the CEC uses an approach that looks at the short-run and long-run emissions, based on production simulation results and a forecasted annual emissions intensity. In the 2022 Title 24 code cycle, the Time Dependent Valuation cost metric calculates a “Cap and Trade Emissions” cost component – the direct costs of short-run emissions – and a “Greenhouse Gas Adder” cost component – the procurement costs of achieving annual supply-side emissions intensity targets – and adds them together. The naming convention is slightly different, but after rearranging equations for these two components, the methodology is effectively the same as proposed in the Avoided Cost Calculator. This is calculated as follows:

⁷⁸ D.19-08-009 at Ordering Paragraph 1.

⁷⁹ Fuel Substitution Technical Guidance for Energy Efficiency, V.1.1, October 31, 2019, Appendix A at Figure 1.

⁸⁰ *Ibid.*

*Load Shape (kWh)h * Marginal Emissions (tCO₂e/kWh)h * Cap and Trade Price (\$/tCO₂e)y + Load Shape (kWh)h * [Marginal Emissions (tCO₂e/kWh)h - Annual Emissions Intensity (tCO₂e/kWh)y] * [GHG Adder (\$/tCO₂e)y - Cap and Trade Price (\$/tCO₂e)y]*

In addition to these fields, the CEC approach incorporates an economy-wide abatement cost component beyond the cap and trade market. This is applied to remaining emissions for the electricity sector as well as natural gas end uses, and is calculated as follows:

*Annual Load (kWh)y * Annual Emissions Intensity (tCO₂e/kWh)y * Emissions Abatement Cost (\$/tCO₂e)y*

Accordingly, the Commission should maintain consistency with these two approaches and adopt the Staff Proposal to use both short- and long-term avoided greenhouse gas costs to ensure that we are properly considering greenhouse gas costs beyond 2030.

7.1.6. Adoption of A System Average Approach to Calculate Unspecified Distribution Deferral Avoided Costs

This decision adopts a system average approach to calculating unspecified distribution deferral avoided costs. We agree that the five-step approach developed by Staff in the White Paper (Method 1) will best calculate the unspecified distribution deferral avoided costs. However, as discussed below, more utility data is needed to develop the avoided distribution costs.

The Staff Proposal explains that the current Avoided Cost Calculator uses marginal cost values from utilities' general rate case phase two proceedings. In R.14-06-013, Staff developed information related to the impact of distributed energy resources on the distribution system in its White Paper. As described in

the Staff Proposal, the White Paper defines two types of avoided costs (specified and unspecified) with respect to the distribution system. Specified deferral avoided costs are Distribution Deferral Opportunity Report avoided costs, which represent the value of deferring distribution investment projects through the addition of distributed energy resources or other load reducing measures that are above and beyond utility expected distributed energy resources growth adopted in the project area.⁸¹ Unspecified deferral avoided costs are avoided costs that reflect the increased need for capacity projects that would have occurred if there were less distributed energy resources growth embedded in the utility base forecasts.⁸²

We begin with the specified distribution deferral avoided costs. The Staff Proposal asserts that because new incremental distributed energy resources for specified deferrals are implemented through the Distribution Investment Deferral Framework, specified distribution deferral costs should not be included in the Avoided Cost Calculator.⁸³ The specified deferral value calculates avoided costs using the distribution deferral methodology.⁸⁴ No party opposes this proposal.⁸⁵ However, the Commission has already determined in the Distribution Resource Planning proceeding that new incremental distributed energy resources for specified deferrals will be implemented through the

⁸¹ Staff Proposal at 34.

⁸² *Ibid.*

⁸³ *Ibid.*

⁸⁴ Staff Proposal at 35.

⁸⁵ Only Joint Utilities address the issue of specified deferrals and agree that these costs should not be included in the Avoided Cost Calculator. (Joint Utilities Opening Brief at 24.)

Distribution Investment Deferral Framework.⁸⁶ Hence, these costs should not be included in the Avoided Cost Calculator.

We turn to the subject of unspecified distribution deferral avoided costs. As noted by the Staff Proposal, while the specified deferral costs are not included as avoided costs in the Avoided Cost Calculator, they are proposed to be used as inputs into the calculations of unspecified deferral avoided costs. The Staff Proposal provides two options for developing avoided distribution costs based on the White Paper: a system-average approach (Method 1) or a granular approach (Method 2). Staff proposes to also use a counterfactual forecast in either approach to determine the impact of distributed energy resources on load. The White Paper describes the counterfactual forecast as the load forecast from which forecasts of load-modifying distributed energy resources have been removed.⁸⁷ To calculate the unspecified deferral value, the Staff Proposal recommends retaining the area-specific information from the Grid Needs Assessment and the project-specific information underlying the Distribution Deferral Opportunity Report calculation. These rely on a five-year planning horizon.

The Staff Proposal recommends extrapolating the avoided cost estimates from the Distribution Deferral Opportunity Report and the Grid Needs Assessment by transitioning to marginal costs from each utility's most recent general rate case. Explaining that the avoided costs in years one to five would be the unspecified deferral values held constant on a real dollar basis, the Staff

⁸⁶ D.20-03-005 at Conclusion of Law No. 1..

⁸⁷ The Staff Proposal explains that the counterfactual forecast removes distributed energy resources load impacts of Commission policies but not Federal or State Codes and Standards. Staff Proposal at 35.

Proposal recommends that years eight and beyond would equal the general rate case level held constant on a real dollar basis.⁸⁸ Years 6 and 7 would linearly transition between years five and eight. While acknowledging that general rate case marginal costs may not be appropriate for use in distributed energy resources cost-effectiveness evaluations, the Staff Proposal recommends that the general rate case values be the source for long-run marginal cost, with the recognition that they be modified for the Avoided Cost Calculator.⁸⁹

Parties have differing views with respect to the issue of calculating the unspecified distribution deferral costs. Parties point to areas of the proposal that require additional development. We begin, however, with SDG&E's opposition to include unspecified distribution deferral costs in the Avoided Cost Calculator.

SDG&E argues that the current structure of the Avoided Cost Calculator does not allow the model to determine whether a specific program or incentive would actually avoid any distribution costs, "let alone quantify such costs."⁹⁰ Highlighting that the distribution costs are incurred at the circuit level, SDG&E contends the Staff Proposal cannot be modified to apply these costs on a locational basis.⁹¹

While not opposing the idea of including unspecified distribution deferral costs in the Avoided Cost Calculator, Public Advocates Office agrees with the Staff Proposal's concerns that general rate case total distribution capacity costs to calculate avoided distribution costs is problematic because 1) the general rate case values are not intended to be long-run marginal costs and 2) the general rate

⁸⁸ Staff Proposal at 40.

⁸⁹ *Id.* at 41.

⁹⁰ Joint Utilities Opening Brief at 28.

⁹¹ *Ibid.*

case values are not location specific.⁹² Public Advocates Office recommends adoption of a zero value for unspecified avoided distribution costs in the Avoided Cost Calculator at this time. Public Advocates Office contends any non-zero value is likely to be uncertain and inaccurate.⁹³

TURN and CLECA also discuss concerns with using general rate case values. TURN states that it is erroneous to assume that distributed energy resources could defer the majority of distribution upgrades which are intended to repair equipment, replace aging equipment, or harden the grid to prevent utility-caused ignitions.⁹⁴ CLECA cautions that the use of general rate case marginal costs for unspecified distribution benefits could lead to over-estimation of the benefits of avoided transmission and distribution costs.⁹⁵ CLECA also contends that additional refinement is required to prevent the over-estimation of unspecified distribution avoided costs through the use of the counterfactual load forecast.⁹⁶

In D.20-03-005, the Commission recognized the uncertainty with respect to the unspecified distribution values. However, the Commission found that the proposed methodology represents a “more empirically based approach to estimating the avoided cost of distribution than the current method, which assumes that the marginal cost of distribution is equivalent to the avoided cost of distribution.”⁹⁷ That decision directed staff to further develop the methodology

⁹² Public Advocates Office Reply Brief at 5.

⁹³ Public Advocates Office Opening Brief at 14-16.

⁹⁴ TURN Opening Brief at 4-5.

⁹⁵ CLECA Opening Brief at 25-26.

⁹⁶ CLECA Opening Brief at 26-28.

⁹⁷ D.20-03-005 at 12..

and modeling of the proposal, for consideration in the Avoided Cost Calculator. Accordingly, this decision reviews the two proposed methods for adoption.

With respect to which method to adopt, no party supports Method 2. SCE and PG&E contend Method 2 is vague and over-estimates total avoided costs, any further development would require increased effort.⁹⁸ Public Advocates Office states that if the Commission were to adopt one of the methods, Method 1 is preferable “because it follows the avoided distribution cost methodology developed in the [White Paper].”⁹⁹ SEIA/Vote Solar generally agree that further work is needed before any approach is used in the Avoided Cost Calculator but marginal distribution costs from the utilities’ general rate cases should be used for long-run avoided distribution costs.¹⁰⁰

In advocating for Method 1, PG&E states that it represents an “improvement to the status quo of using general rate case marginal costs.”¹⁰¹ However, PG&E argues that general rate case marginal costs for the long-run costs in years eight and beyond should not be used. PG&E explains that general rate case marginal costs are likely to overstate distributed energy resources avoided costs because the general rate case analysis does not incorporate the low-cost and no-cost load transfer solutions that are captured through the distribution planning process.¹⁰² SCE supports Method 1, but as a pilot prior to adoption in the Avoided Cost Calculator. SCE contends this could help the Commission and parties understand the work required to perform a modified

⁹⁸ Joint Utilities Opening Brief at 26 and 30.

⁹⁹ Public Advocates Office Opening Brief at 14.

¹⁰⁰ SEIA/Vote Solar Reply Brief at 20.

¹⁰¹ Joint Utilities Opening Brief at 30.

¹⁰² *Id.* at 31-32.

version of Method 1.¹⁰³ SCE recommends the Commission continue to utilize values derived in each utility's general rate case, instead of the Distribution Deferral Opportunity Report, to estimate unspecified deferral value. SCE argues general rate case values may be more representative of values regressed over a long period, while Distribution Deferral Opportunity Report values may change significantly from year to year and are used for the specified deferral use case.¹⁰⁴

We recognize that additional work on refining the values in Method 1 is needed but agree with several parties that Method 1 is the best approach. We do not see the need to pilot this approach, as Method 1 has been thoroughly vetted with stakeholders, as pointed out by PG&E.¹⁰⁵ We also agree that the level of effort required to finalize Method 1 is feasible for the annual update to the Avoided Cost Calculator. However, we disagree with PG&E that general rate case marginal costs should not be used for the long-run costs of unspecified distribution. As pointed out by SEIA/Vote Solar, it has been the practice to use the marginal distribution cost used in ratemaking as the avoided distribution costs in the Avoided Cost Calculator.¹⁰⁶ Further, SEIA/Vote Solar contend that because longer-term spending plans in general rate cases are based on historical investment trends, unspecified avoided distribution costs should transition to marginal distribution costs calculated in general rate cases based on long-term historical distribution investment trends.

Accordingly, we authorize the Director of the Energy Division to continue working with parties and other interested stakeholders to complete development

¹⁰³ *Id.* at 25-28.

¹⁰⁴ *Id.* at 28.

¹⁰⁵ *Id.* at 30.

¹⁰⁶ As well as the marginal transmission costs as the avoided transmission costs.

of the refinement of values for Method 1 for use in the Avoided Cost Calculator. Joint Utilities are directed to work with Staff to provide additional data necessary to complete the development. Further, the workshop previously ordered in this decision shall also include a discussion of the final values for Method 1. The final values of Method 1 shall be considered in the resolution adopting the updated Avoided Cost Calculator.

7.1.7. Continuation of Current Method to Calculate Unspecified Avoided Transmission Costs

As was the case for avoided distribution costs, there are two categories of transmission avoided costs: specified and unspecified. The Commission has determined that specified transmission avoided costs shall be addressed in the CAISO Transmission Planning Process and do not need further consideration in the Avoided Cost Calculator.¹⁰⁷

With respect to the unspecified transmission avoided costs, the Staff Proposal recommends using CAISO congestion prices to reflect the impact of distributed energy resources at the transmission system level. Specifically, the congestion component of Sub-Load Aggregation Points (Sub-LAPs) locational marginal prices would be used to obtain the value of avoided transmission.¹⁰⁸ Congestion prices capture the value that distributed energy resources can provide in alleviating transmission congestion. Further, the Staff Proposal recommends determining these avoided costs on a near-term (3-5 years) and long-term bases. For the short-term, the Staff Proposal proposes to use the

¹⁰⁷ D.20-03-005 at 12, Conclusion of Law 1 and Ordering Paragraph No. 1.

¹⁰⁸ CAISO locational marginal prices consists of three components: congestion, energy and losses.

historical hourly congestion components of Sub-LAPs to calculate a system wide hourly unspecified avoided transmission cost. For the long term, the Staff Proposal suggests either 1) projecting forward the historically-based system wide hourly Sub-LAP congestion components or 2) using general rate case transmission costs, similar to the current Avoided Cost Calculator.¹⁰⁹

Only TURN offers any support for the use of congestion pricing to measure avoided transmission costs but simultaneously cautions that additional work is necessary to avoid overstatement of transmission value.¹¹⁰ CLECA asserts that the Staff Proposal would likely double count congestion value and recommends the Commission not include an unspecified transmission deferral value at this time.¹¹¹ Arguing that the Staff Proposal is factually unsupported, CUE submits that unspecified avoided transmission costs are already reflected in the Integrated Resource Planning proceeding modeling of energy prices.¹¹² Public Advocates Office submits there is no clear evidence showing that distributed energy resources are capable of deferring transmission costs.¹¹³ Both CLECA and Public Advocates Office argue that consistent with the White Paper, the Commission should adopt a zero value for avoided transmission costs.¹¹⁴

Neither SEIA/Vote Solar nor Joint Utilities support the use of congestion data to measure unspecified transmission costs that could be avoided through

¹⁰⁹ Staff Proposal at 49.

¹¹⁰ TURN Comments at 1-4.

¹¹¹ CLECA Opening Brief at 29-31.

¹¹² CUE Opening Brief at 3-4.

¹¹³ Public Advocates Office Opening Brief at 20.

¹¹⁴ CLECA Opening Brief at 31 and Public Advocates Office Opening Brief at 20.

the programs and incentives evaluated by the Avoided Cost Calculator.¹¹⁵ Joint Utilities assert that a system-wide component is not a meaningful measure of unspecified avoided transmission costs. Further, Joint Utilities caution that congestion components are already included in the Integrated Resource Planning proceeding production cost modeling so adoption of this element of the Staff Proposal could result in double counting of these costs.¹¹⁶

SEIA/Vote Solar argue that congestion pricing does not capture the marginal cost of rate base investments in CAISO transmission capacity and therefore the Commission should adopt their proposal.¹¹⁷ SEIA offers the Commission two methods for determining avoided CAISO transmission costs for use in the Avoided Cost Calculator: 1) synchronizing the utilities' methods such that all three use the same regression method for calculating long-run marginal distribution costs for use as avoided transmission costs and 2) use the CAISO's Transmission Access Charge as the proxy.¹¹⁸ SEIA/Vote Solar contend its first proposed method is based on the existing method to calculate marginal transmission and distribution costs for Commission ratemaking. The second proposed method is a simpler approach, SEIA/Vote Solar assert, and recognizes that costs are allocated to the Transmission Access Charge based on a utility's metered load, which distributed energy resources reduce.¹¹⁹

¹¹⁵ Joint Utilities Opening Brief at 36 and SEIA/Vote Solar Opening Brief at 41-42.

¹¹⁶ Joint Utilities Opening Brief at 36.

¹¹⁷ SEIA/Vote Solar at 41-42.

¹¹⁸ SEIA/Vote Solar Opening Brief at 39-41.

¹¹⁹ *Id.* at 41.

Only CALSSA supports SEIA/Vote Solar's two proposals.¹²⁰ Joint Utilities submit that the two approaches are flawed because they ignore reliability-based needs that drive transmission upgrades and presume that transmission upgrades and costs could have been deferred by distributed energy resources.¹²¹ Joint Utilities assert the regression approach "would include significant amounts of transmission costs driven by...needs that cannot be avoided by distributed energy resources."¹²² TURN contends the analysis behind the proposals is factually erroneous.¹²³

We agree with the overriding concern that the two SEIA/Vote Solar proposals do not account for the transmission costs that cannot be avoided by distributed energy resources. Accordingly, we deny the request to adopt either of these proposals. However, we also find that use of the congestion values, as recommended in the Staff Proposal, is not appropriate for determining unspecified avoided transmission costs, and could result in double counting.

The recent decision in R.14-08-013, which adopts the White Paper, states in Section 3.3 that the "Commission declines to draw a conclusion regarding the appropriate value to use for the avoided cost of transmission at this time. The Commission may continue to consider this issue in the Avoided Cost Calculator major updates in the Integrated Distributed Energy Resources proceeding. As of now, the current method of unspecified avoided transmission value calculated in

¹²⁰ CALSSA Opening Comments at 1.

¹²¹ Joint Utilities Opening Brief at 38.

¹²² Joint Utilities Reply Brief at 21.

¹²³ TURN Opening Brief at 10.

the Avoided Cost Calculator shall remain in place subject to further modification by the Integrated Distributed Energy Resources proceeding.”¹²⁴

We have already determined that the method used to calculate avoided Transmission & Distribution costs should follow the guidance provided by the White Paper. We acknowledge that distributed energy resources avoid transmission costs but, at this time, the record in this proceeding provides no reasonable alternate method of determining unspecified avoided transmission costs.

The proposed decision contained a proposal to incorporate local resource adequacy values in developing a method to determine the costs. After review of the comments on the proposed decision, we agree with parties that incorporating local resource adequacy values is not appropriate in this decision, as this element has not been addressed in the record of this proceeding. Specifically, the Joint Utilities state that because the Avoided Cost Calculator estimates avoided costs on a system wide basis, not a local basis, it is not clear that local resource adequacy costs are useful.¹²⁵ While we do not agree with the Joint Utilities’ position, the comments brought to the forefront that parties had not adequately discussed this element on the record of this proceeding.

Hence, we direct Energy Division staff to continue to use the marginal cost method used by PG&E in its derivation of transmission marginal costs to determine unspecified avoided transmission value in the Avoided Cost Calculator; the same method shall then be applied to SCE and SDG&E.

¹²⁴ D.20-03-005 at 13.

¹²⁵ Joint Utilities Opening Comments to Proposed Decision at 13-14. See also TURN Reply Comments on Proposed Decision at 2-3.

We recognize that refinements to the avoided transmission method will be needed. Accordingly, we direct staff to develop those refinements. This will require minor modification of the current method to take into account guidance from the White Paper as follows: “As for the calculation of the marginal cost of transmission, PG&E has provided such in its recent [general rate case] phase II filings. Their transmission marginal cost is based on the capacity-driven projects in their transmission plan and is estimated using a method similar to that used for their marginal costs for distribution. Staff believes that SCE and SDG&E should be able to execute similar calculations based on their respective transmission plans without excessive burden.”¹²⁶ SCE and SDG&E shall work with Staff to use the marginal cost method used by PG&E in its derivation of transmission marginal costs. Staff will apply the same method to SCE and SDG&E.

The Director of the Energy Division is authorized to hold a workshop or webinar no later than ten days following the issuance of the draft resolution finalizing the 2020 update of the Avoided Cost Calculator to provide parties with details of this refinement.

In addition, because the current Avoided Cost Calculator uses utility general rate case data, we adopt the general rate case data hierarchy proposed in Section 5.5.1 of the Staff Proposal. Staff will use data from the following sources, in descending order of preference:

1. Values adopted for revenue allocation from most recently completed proceeding.
2. Values adopted for rate design purposes from most recently completed proceeding.

¹²⁶ White Paper at 18.

3. Values agreed to by majority of parties for revenue allocation in settlement agreement from most recently completed proceeding.
4. Values agreed to by majority of parties for rate design purposes in settlement agreement from most recently completed proceeding.
5. Utility-proposed values for revenue allocation from most recently complete proceeding.

However, if Staff determines that there is a compelling reason to use data from a source that is lower in the order of preference than another source, Staff shall propose their reasoning to parties for comment in the draft resolution adopting the 2020 Avoided Cost Calculator update.

**7.1.8. The Avoided Cost Calculator
Should Include an Avoided Cost
of High Global Warming Potential
Gases**

The Staff Proposal includes a new avoided cost with respect to high global warming potential gases, including refrigerants and methane. According to the Staff Proposal, this avoided cost is proposed partially in response to the increased statewide focus on programs designed to replace natural gas appliances with electric appliances. The Staff Proposal proposes a specific calculation for refrigerant leakage emissions that would apply to programs that change the amount or type of refrigerants, such as programs providing incentives for heat pump devices. For methane leakage emissions, the Staff Proposal suggests including methane leakage in the calculation of the greenhouse gas emissions, using several optional leakage rates. The two potential leakage rates are one from CARB and one from the Alvarez 2018

study.¹²⁷ The Staff Proposal states that it expects the CARB leakage rate to be finalized prior to the issuance of the 2020 Avoided Cost Calculator.¹²⁸

CALSSA and SEIA/Vote Solar support the inclusion of an avoided cost value for global warming potential gases. In particular, CALSSA urges the Commission to move forward with adoption of the 1.9 percent value from the Alvarez study for the methane leakage.¹²⁹ CALSSA cautions that waiting for additional analysis from CARB to inform the methane leakage rate for the Avoided Cost Calculator could run the risk of failing to incorporate any methane leakage rate if the CARB process is delayed.¹³⁰ SEIA/Vote Solar state that they support including in the Avoided Cost Calculator “the climate impacts of methane leakage from the natural gas system.”¹³¹ Supporting the adoption of the 1.9 percent leakage rate, SEIA/Vote Solar also caution against delays in adopting a leakage rate, contending the record of this proceeding contains the information necessary to determine the leakage rate for methane.¹³²

Several parties contend that avoided methane leakage and/or refrigerant costs should not be included in the Avoided Cost Calculator.

Public Advocates Office argues that the Avoided Cost Calculator is not the appropriate venue to value avoided refrigerant leakage because these costs are not dependent on marginal consumption and, furthermore, the record does not

¹²⁷ Staff Proposal at 56-57.

¹²⁸ *Id.* at 56.

¹²⁹ CALSSA explains the 1.9 percent figure is equivalent to the 2.4 percent cited in the Staff Proposal, less 0.5 percent associated with leakage behind the gas meter. (CALSSA at 3-4.)

¹³⁰ *Ibid.*

¹³¹ SEIA/Vote Solar Opening Brief at 50.

¹³² *Id.* at 51-52.

yet contain the evidence needed to assess the climate impact of refrigerant leakage from existing electric heat-pump appliances.¹³³

TURN is concerned about incorporating avoided methane emissions costs in the Avoided Cost Calculator at this time. TURN also suggests that it might be more appropriate to include reduced methane leakage in the Societal Cost Test authorized in D.19-05-019 because there are no actual avoided electric corporation costs resulting from reduced methane leakage.¹³⁴ Joint Utilities agree that neither methane nor refrigerant leakage avoided costs should be included in the Avoided Cost Calculator but are more appropriate in the Societal Cost Test.

We find that because methane and refrigerant leakage are included in the carbon inventory maintained by CARB, any reduction in these greenhouse gas emissions contributes to California's greenhouse gas emissions reduction efforts. Because ratepayers incur costs related to these efforts, we find that the avoided costs of methane and refrigerant leakage, similar to the existing greenhouse gas avoided cost, is a real and quantifiable benefit of distributed energy resources.

Accordingly, we adopt the proposed avoided cost of high global warming potential gases into the Avoided Cost Calculator. We find that while adding the value of avoided methane leakage would have the largest impact on programs designed to eliminate the use of natural gas appliances, which is consistent with the Commission's current advancement toward electrification, it would also impact any distributed energy resource that decreased natural gas use. Further, implementing this avoided cost in the Avoided Cost Calculator, which determines benefits at the program level, will enable the Commission to

¹³³ Public Advocates Office Opening Brief at 27.

¹³⁴ TURN Comments at 6.

accurately determine the greenhouse gas impact of the Commission's multiple decarbonization programs. This avoided cost will be applied in the form of an increased greenhouse gas adder to all distributed energy resources that reduce (or increase) natural gas consumption, either directly or through reduced (or increased) electricity consumption. Additional values will apply to those specific measures and programs that reduce behind-the-meter natural gas consumption, as well as programs related to refrigerant use. Staff will continue to work with the CARB to finalize the leakage rates.

The Director of the Energy Division is authorized to hold a workshop or webinar no later than ten days following the issuance of the draft resolution finalizing the 2020 update of the Avoided Cost Calculator to provide parties with details of this new avoided cost.

7.1.9. Natural Gas Avoided Cost Calculator

The Staff Proposal recommends several changes to the natural gas Avoided Cost Calculator: 1) Simplify the current method for developing the natural gas price forecast by using forward prices for five years and transitioning to the CEC IEPR mid gas price forecast used in the Integrated Resource Planning proceeding thereafter with a three-year transition period; 2) include an adder for natural gas hedging costs; and 3) continue to use a trend-based escalation of recent and currently proposed natural gas transportation rates to forecast in-state natural gas transportation rates in an era of declining throughput. In addition, the Staff proposal recommends using the same cap-and-trade value and Integrated Resource Planning proceeding-based greenhouse gas adder for natural gas greenhouse gas emissions as that used by the electricity sector.

With respect to the changes to the natural gas Avoided Cost Calculator, SEIA/Vote Solar contends the proposed use of forward market prices for five years followed by the three year transition to the IEPR mid-gas price forecast is an improvement but is flawed because it relies too heavily on forward prices. SEIA/Vote Solar argues the proposal will result in a forecast that is “not reflective of market fundamentals.”¹³⁵ No other party opposes this element of the proposal.

On the subject of gas transportation rates, SEIA/Vote Solar argue that gas transportation rates should escalate based on recent or current trends.¹³⁶ Public Advocates Office and Joint Utilities maintain that the Commission should not increase gas transportation costs but continue to rely on the IEPR forecast.¹³⁷

Given that the Integrated Resource Planning proceeding relies on the IEPR forecast, we find it consistent for the natural gas Avoided Cost Calculator to transition to this. We decline to adopt the proposed natural gas hedging adder, which we address in section 7.2.2. below. We adopt the Staff Proposal for changes to the natural gas Avoided Cost Calculator with exclusion of the natural gas hedging adder.

We also agree with the recommendation to use the same overall greenhouse gas value and, therefore, both cap-and-trade value and Integrated Resource Planning proceeding-based greenhouse gas adder for natural gas greenhouse gas emissions as that used by the electricity sector. Joint Utilities highlight the Staff Proposal assessment that it would be problematic to apply

¹³⁵ SEIA/Vote Solar Opening Brief at 22.

¹³⁶ Id at 23-24.

¹³⁷ Public Advocates Office Opening Brief at 26 citing IOU-02 at 17:23-25 to 18:3-18.

different avoided greenhouse gas values to the same avoided cost for technologies that involve fuel switching.¹³⁸ We recognize that greenhouse gas emissions reductions in both the natural gas sector and the electricity sector come primarily from a reduction in natural gas combustion (either direct combustion in buildings or in the powerplant). In addition, under SB32, California has an overall greenhouse gas emissions limit in 2030. Therefore, a shortfall in one sector can be made up for in another to reach the overall goal. Hence, emissions for both sectors should have the same value. The electricity sector Integrated Resource Planning proceeding-based greenhouse gas adder is a reasonable estimate for the economy-wide planning price because the electricity sector is a potential source of additional emissions savings to meet the economy-wide goal. Accordingly, we adopt this proposal.

7.2. SEIA/Vote Solar Alternate Proposals

Below we address three proposals recommended by SEIA/ Vote Solar, which are not directly related to the Staff Proposal.¹³⁹ We decline to adopt the proposals for three new avoided costs in the Avoided Cost Calculator. As discussed below, the proposal for avoided reliability and resiliency should be addressed in a resource-specific proceeding, the proposal for fuel volatility is highly speculative, and the proposal

7.2.1. SEIA/Vote Solar's Proposed Avoided Reliability and Resiliency Costs

SEIA/Vote Solar argue that standalone storage and solar paired with storage provide reliability and resiliency benefits. Further, SEIA/Vote Solar

¹³⁸ Joint Utilities Opening Brief at 45 citing Staff Proposal at 59-60.

¹³⁹ A fourth proposal for the avoided cost of methane leakage was addressed above in Section 7.1.8. within the discussion of avoided cost of global warming potential gases.

submit that these benefits are not isolated to the individuals who install storage or storage plus solar. Rather, “these benefits are much broader, providing a way to maintain functions related to safety, human welfare, and economic activity.”¹⁴⁰

Contending that there are readily-available means to value the reliability benefits of a storage system, and the resiliency benefits of solar-plus-storage, SEIA/Vote Solar propose a dollar per customer value for the reliability value and a dollar per kilowatt year for the resiliency value. SEIA/Vote Solar assert that utilities’ value-of-service studies assess how much customers value reliability in dollars per minute of avoided interruption.¹⁴¹ Proposing to multiply these values-of-service metrics by the minutes of interruption per year to obtain the annual reliability value per customer, SEIA/Vote Solar conclude this value is approximately \$300 per customer per year.¹⁴² With respect to resiliency benefits, SEIA/Vote Solar submit they have quantified the benefits by first determining an average cost for a portable inverter electric generator compliant with CARB emission requirements and then adding sales tax, fuel storage costs, the cost to install a manual transfer switch, and the cost of the air impacts associated with emissions.¹⁴³ SEIA/Vote Solar assert that the total value of the resiliency avoided costs is \$3,650 or \$104 per kW-year.¹⁴⁴ SEIA/Vote Solar maintain these reliability and resiliency benefits can be incorporated into the Avoided Cost Calculator as annual values, escalating with inflation.

¹⁴⁰ SEIA/Vote Solar Reply Brief at 36.

¹⁴¹ SEIA/Vote Solar Opening Brief at 56-57.

¹⁴² *Ibid.*

¹⁴³ *Id.* at 57-58.

¹⁴⁴ *Id.* at 58.

Public Advocates Office, TURN and Joint Utilities oppose adoption of these resiliency and reliability adders. Public Advocates Office offer that the benefits do not represent avoided costs and accrue only to a limited set of customers.¹⁴⁵ Similarly, Joint Utilities contend that because reliability and resiliency benefits are highly localized, programs and incentives designed to enhance reliability and resiliency for certain customer segments are not suitable for evaluation through the Avoided Cost Calculator.¹⁴⁶ Taking a different direction, TURN contends that the resiliency and reliability benefits do not avoid ratepayer costs.

Replying to this opposition, SEIA/Vote Solar maintain that the reliability and resiliency benefits are not isolated to the individuals who install storage or storage plus solar. Noting that these customers are part of the overall utility system, SEIA/Vote Solar contend the benefits they provide should be included in the Total Resource Cost test. While conceding that each storage or solar plus storage installation will not provide a reliability and/or resiliency benefit for every customer on the grid, SEIA/Vote Solar assert that these installations will provide benefits to customers throughout the system. This, SEIA/Vote Solar conclude, justifies including the benefits in cost-effectiveness tests.

There is insufficient evidence to draw a conclusion on whether storage or storage plus solar provides system resiliency and/or reliability benefits. We first focus solely on whether any such benefits should be included in the Avoided Cost Calculator. We agree with TURN that SEIA/Vote Solar's proposal has not shown any deferred or avoided costs to utility ratepayers, but rather has shown

¹⁴⁵ Public Advocates Office Reply Brief at 3.

¹⁴⁶ Joint Utilities Opening Brief at 88.

only that ratepayers who use these technologies receive additional participant benefits. We underscore, however, that participant benefits are not a type of avoided cost. Furthermore, the benefits that SEIA/Vote Solar describe can only be attributable to two resources: storage and storage plus solar. We return to our prior conclusion that the Commission should consider resource-specific benefits in resource-specific proceedings. Hence, we conclude that the Commission should decline to adopt the SEIA/Vote Solar proposals to include reliability and resiliency avoided costs in the Avoided Cost Calculator.

7.2.2. SEIA/Vote Solar's Proposed Fuel Price Volatility Cost

SEIA/Vote Solar propose a new category of avoided costs, the avoided fuel price volatility. SEIA/Vote Solar state that the benefit of avoided fuel price volatility can be quantified by calculating the costs to fix the fuel cost of a marginal gas fired generator for up to a 30-year period. SEIA/Vote Solar explain that the funds to purchase fuel in the future must be set aside today in risk free investments. SEIA/Vote Solar surmise this results in a financial cost because the money set aside could have been deployed to earn a higher return. These costs, which represent the cost of a long-term hedge against future volatility in the natural gas market, can be avoided by substituting an energy efficiency program or a renewable generation resource whose fuel costs are zero.¹⁴⁷ SEIA/Vote Solar propose to quantify these costs and incorporate them into the Avoided Cost Calculator.¹⁴⁸

Joint Utilities oppose the inclusion of these avoided costs in the Avoided Cost Calculator, contending that hedging programs are not designed to reduce

¹⁴⁷ SEIA/Vote Solar Opening Brief at 47-48.

¹⁴⁸ *Ibid.*

volatility in burner-tip natural gas prices. Joint Utilities also assert that SEIA/Vote Solar have provided no evidence that the utilities natural gas hedging programs have resulted in net cost or net benefits.¹⁴⁹ Also in opposition, TURN calls the proposal highly speculative. TURN argues that SEIA/Vote Solar have not demonstrated that the utilities will avoid such costs.¹⁵⁰

We decline to adopt the avoided fuel volatility for inclusion in the Avoided Cost Calculator. We agree that the proposal is highly speculative. Furthermore, there is no evidence that distributed energy resources provide hedging value that results in lower fuel prices due to less market volatility or that less volatility would lead to lower average prices.

7.2.3. SEIA/Vote Solar's Proposed Avoided Costs of Grid Services

SEIA/Vote Solar request the Commission to determine whether the following grid services provided by distributed energy resources can produce avoided costs appropriate for inclusion in the Avoided Cost Calculator:

- i) dispatchable capacity; ii) voltage support; iii) conservation voltage reduction;
- iv) extending the life of distribution system equipment; v) ancillary services; and
- vi) providing additional thermal capacity on distribution systems.

Acknowledging that not all of these services are fully developed, SEIA/Vote Solar explain that the intention is to have the Commission determine the appropriateness of these services being considered as avoided costs now so that once valuation is determined, the avoided costs can be incorporated into the Avoided Cost Calculator.¹⁵¹

¹⁴⁹ Joint Utilities Opening Brief at 81-82.

¹⁵⁰ TURN Opening Brief at 5.

¹⁵¹ SEIA/Vote Solar Opening Brief at 61.

SEIA/Vote Solar provide its rationalization for consideration of these services in the Avoided Cost Calculator. With respect to dispatchable capacity, SEIA/Vote Solar explain that solar-plus-storage units can be dispatched by the utility or grid operator to provide a controllable source of peaking capacity. SEIA/Vote Solar provide an example of dispatchable distributed energy resources program operating in Vermont and assert that “this dispatch not only provides generation capacity and avoids very high energy costs on peak days, but also allows it to avoid high-voltage transmission costs.¹⁵² To justify voltage support as an avoided cost, SEIA/Vote Solar states that, in Resolution E-4898, the Commission recognized there needs to be an evaluation of compensation for the benefit provided by smart inverters associated with DERS that can provide voltage support on distribution circuits.¹⁵³ SEIA/Vote Solar state that smart inverters also provide conservation voltage reduction because they can take the place of voltage-regulating distribution equipment to provide energy and emissions savings from planned distribution voltage reductions up to 4 percent.¹⁵⁴ Noting a PG&E study that determined a 50 kW solar photo voltaic system could extend the life of a substation transformer by 4.6 years, SEIA/Vote Solar highlights that this equipment life extension saved ratepayers \$398,000.¹⁵⁵ On the subject of ancillary services avoided costs, SEIA/Vote Solar asserts that in-front-of-the-meter battery storage units provide ancillary services, making it possible that aggregated, distributed, behind-the-meter storage could also

¹⁵² *Id.* at 62.

¹⁵³ *Ibid.*

¹⁵⁴ *Id.* at 62-63.

¹⁵⁵ *Id.* at 63.

provide ancillary services.¹⁵⁶ Lastly, SEIA/Vote Solar highlights that output from solar distributed energy resources can increase thermal capacity of a distribution system, the primary limiter of its capacity.¹⁵⁷

While no party presented support for SEIA/Vote Solar’s proposals, Joint Utilities argue that making modifications to the Avoided Cost Calculator to account for these proposed avoided costs “creates the distinct possibility of double-compensation to the extent dispatchable capacity is [already] being compensated...and...the Distribution Investment Deferral Framework compensates...voltage support or additional thermal capacity on the distribution system.”¹⁵⁸

We are cognizant of the potential for double-compensation that Joint Utilities allege. But, more importantly, SEIA/Vote Solar provide no evidence that any of these grid services produce avoidable costs. Accordingly, we cannot make a determination that the grid services should be incorporated into the Avoided Cost Calculator. However, we agree that this is a future research need.

7.3. Minor Changes to the Avoided Cost Calculator

We adopt the following minor changes to the Avoided Cost Calculator:

- Expand the Avoided Cost Calculator outputs used for demand response;
- Remove any remaining separate Avoided Cost Calculator outputs used for Permanent Load Shifting;
- Include one or more historical years in the Avoided Cost Calculator; and

¹⁵⁶ *Ibid.*

¹⁵⁷ *Ibid.*

¹⁵⁸ Joint Utilities Opening Brief at 91.

- Correct the minor errors in the 2019 Natural Gas Avoided Cost Calculator.

No party opposes these minor changes. Therefore, we find it reasonable to adopt these minor changes.

8. Next Steps

In D.16-06-007, the Commission required Staff to draft a resolution, no later than May 1st each year, recommending data updates and minor corrections to the Avoided Cost Calculator and, when appropriate, the inputs.

Subsequently, in D.19-05-019, the Commission established a schedule of activities for each major update proceeding, beginning with a workshop facilitated by Staff. However, the schedule for the major update proceeding did not include a date for issuing the necessary draft resolution to approve the 2020 Avoided Cost Calculator. Accordingly, we require Staff to issue the draft resolution providing the final updated 2020 Avoided Cost Calculator consistent with the policies adopted in this decision, no later than 30 days following the issuance of this decision

The next major update of the Avoided Cost Calculator will be in 2022, with the update process to begin in 2021. As previously directed in D.19-05-019, a staff-led workshop shall be held on August 1, 2021 in this proceeding or a successor proceeding. We authorize the assigned Commissioner and/or Administrative Law Judge to revise the procedural schedule for the next major update of the Avoided Cost Calculator, as necessary, to ensure an efficient and effective process.

9. Comments on Proposed Decision

The proposed decision of Administrative Law Judge Hymes in this matter was mailed to parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission's Rules of

Practice and Procedure. Comments were filed on April 2, 2020 by 350 Bay Area, California Efficiency + Demand Management Council, CLECA, CALSSA, CalWEA, Clean Coalition, CUE, Joint Utilities, NRDC, and SEIA/Vote Solar. Reply comments were filed on April 7, 2020 by 350 Bay Area, CLECA, Clean Coalition, CUE, Joint Utilities, Public Advocates Office, SEIA/Vote Solar, and TURN. Clarifications and corrections were made throughout this decision in response to the comments.

Many parties reiterated previously filed positions; we do not address those comments again. However, we address certain comments here where we have not made changes.

Maintaining their opposition to the No New DER the Joint Utilities offer a compromise that would average the per unit avoided costs from the Reference System Plan and the No New DER cases.¹⁵⁹ We are concerned that an average, even a weighted average, of two streams of avoided costs could not accurately replicate production runs with different load and resource mixes. Our concern is that there are many variables, especially as units start up and ramp.

Offering yet another “compromise,” the Joint Utilities propose the Commission adopt the use of geometric sequencing as an alternative to the proposed straight-line greenhouse gas adder. Specifically, Joint Utilities propose use a geometric sequence (constant percentage rate of increase) from the 2020 cap and trade price as forecasted in the 2019 IEPR to the 2030 Reference System Plan greenhouse gas price.¹⁶⁰ As discussed above, the Commission has previously

¹⁵⁹ Joint Utilities Opening Comments on Proposed Decision at 9-11.

¹⁶⁰ *Id.* at 1-4.

declined to adopt values related to the cap and trade values and we maintain that consistent policy here.

On the subject of avoided distribution, CUE asks that the proposed decision be revised to state that unspecified deferral value is the value of deferring unspecified distribution attributable to 1 MW of distributed energy resources.¹⁶¹ CUE contends this is based on the White Paper's analysis indicating that 1700 MW of distributed energy resources would defer 21 MW of unspecified distribution capacity.¹⁶² We consider CUE's calculation to be a misinterpretation of the White Paper. The nature of unspecified deferral is that you do not know where the capacity reduction is needed, and therefore all capacity reductions must be treated equally. Because only a fraction of the distributed energy resources located in the correct but unpredictable area will contribute to reducing distribution capacity costs, the White Paper calculated a system average avoided cost lower on a dollar per kilowatt basis. Accordingly, we do not adopt CUE's recommended interpretation.

With respect to the value of unspecified avoided transmission costs, we address the claim that the Avoided Cost Calculator in the proposed decision underestimates this value.¹⁶³ The statement regarding distributed energy

¹⁶¹ CUE Opening Comments on Proposed Decision at 3-5.

¹⁶² *Id.* citing White Paper at 17.

¹⁶³ 350 Bay Area Opening Comments on Proposed Decision at 4: "value of avoided transmission costs is demonstrated and large"; CALSSA Opening Comments on Proposed Decision at 2: "the current method results in a miniscule avoided transmission value"; Clean Coalition Opening Comments on Proposed Decision at 7: "Growth in distributed energy resources led to a cancellation of \$2.6 billion in initial capital costs but also roughly \$12 billion in future return on equity payments"; and SEIA/Vote Solar Opening Comments on Proposed Decision at 3: "The record in this proceeding shows that the CAISO transmission plans from 2016 through 2019 document more than \$2 billion in previously-approved transmission expenditures that have

Footnote continued on next page.

resources leading to a savings of \$2 billion in avoided transmission costs has been previously refuted in the record of this proceeding. Public Advocates Office and TURN highlight in reply comments that the Joint Utilities presented CAISO's comments indicating this to be a false statement and a factual misinterpretation.¹⁶⁴

10. Assignment of Proceeding

Marybel Batjer is the assigned Commissioner and Kelly A. Hymes is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. The Staff Proposal acknowledges that the Commission should consider the impact of Avoided Cost Calculator changes on all distributed energy resources.
2. The Staff Proposal underscores that the use of only short-run avoided generation capacity costs in the Avoided Cost Calculator could underestimate the value of having customers who are willing and able to reduce demand once needed.
3. The Staff Proposal contemplates whether the Commission should develop a method for estimating demand response cost-effectiveness over an extended time period and concludes that this concern should be addressed in a demand response-centric proceeding.
4. The Commission intends to develop a common valuation method with consistent inputs and assumptions across all uses of avoided cost data.

been cancelled or downsized as a result of lower load forecasts...dropped in significant part as a result of the growth in DERs."

¹⁶⁴ Public Advocates Office Reply Comments on Proposed Decision at 4 and TURN Reply Comments on Proposed Decision at 2, citing exhibit IOU-11 at 2-3..

5. Considering benefits for one resource in the Avoided Cost Calculator is not consistent with Commission intention.

6. The Commission has the tools to move forward with alignment between Integrated Resource Planning proceeding and the Avoided Cost Calculator.

7. A RESOLVE Scenario Tool and Results Viewer has been developed, which contains inputs and results.

8. The Commission has issued a proposed decision to adopt a Reference System Portfolio.

9. The Reference System Portfolio does not anticipate that new natural gas units of any type, including combustion turbine, will be built in the future.

10. CLECA's arguments for continued use of the combustion turbine as the proxy resource rely on indirect statements as well as outdated or unrelated information.

11. The Staff Proposal's method to determine the avoided cost of generation capacity results in values that are too high and too volatile to provide a credible or feasible data source.

12. The approach recommended in the Joint Stipulation and in the Joint Utilities testimony is similar in concept to the approach used in prior iterations of the Avoided Cost Calculator.

13. Alignment between the Auction Mechanism and the Integrated Resource Planning proceeding is not the same as alignment between the Avoided Cost Calculator and the Integrated Resource Planning proceeding.

14. The Commission has the tools to move forward with alignment between Integrated Resource Planning proceeding and the Avoided Cost Calculator.

15. The time is right for advancing the alignment of the Integrated Resource Planning proceeding and the Avoided Cost Calculator.

16. It is not premature to use outputs from the Reference System Portfolio to define the proxy resource.

17. The Reference System Portfolio modeling is ready for alignment with the Avoided Cost Calculator.

18. The Reference System Portfolio provides the Commission with a capacity expansion plan that is the least-cost path to meeting future capacity needs, reliability needs, greenhouse gas targets, and renewable requirements.

19. D.16-06-007 eliminated the use of the Resource Balance Year because the Resource Balance Year does not recognize the Commission's clean energy policies and ignores the fact that short lead times of distributed energy resources add value to the systems.

20. The Resource Balance Year was created to distinguish between short-run capacity prices, determined by market conditions, and long-run capacity prices, determined by the cost of building new generation.

21. Using short-run capacity prices had an unfair and negative impact on distributed energy resources.

22. Integrated Resource Planning proceeding RESOLVE model identifies capacity needs starting in 2020 and provides a view of the capacity market price, that more accurately reflects actual capacity prices in all years.

23. Integrated Resource Planning proceeding modeling outputs in the Avoided Cost Calculator takes into account market and construction costs of all new capacity that will be needed in future years.

24. Reintroducing the Resource Balance Year into the Avoided Cost Calculator is duplicative and unnecessary.

25. The No New DER sensitivity scenario measures the cost of providing electric service without distributed energy resources.

26. The No New DER provides the Commission with the best indicator of the value of distributed energy resources.

27. Avoided cost modeling determines the value of capacity that will not be built, fuel that will not be purchased or burned, and electricity that will not be used.

28. The outputs of the No New DER modeling provide the costs to operate the grid by replacing the distributed energy resources with supply-side resources.

29. The outputs of the No New DER Scenario provide the Commission with the best estimated value of the distributed energy resources.

30. Use of the outputs from the No New DER Scenario advances the Commission's long-term goal of integrated resource planning and comparing demand-side resources with supply-side resources.

31. The only quantified difference between the No New DER Scenario and the Reference System Portfolio is the change in supply-side costs.

32. Distribution costs were not included in this comparison of the Reference System Portfolio and the No New DER Scenario; thus, there is no double-counting.

33. The No New DER scenario values distributed energy resources based on the last unit of distributed energy resources, which may overvalue distributed energy resources.

34. Joint Utilities' recommendation to value all distributed energy resources based on the last unit of distributed energy resources will result in under valuation of the distributed energy resources.

35. Neither overvaluation nor undervaluation of distributed energy resources is perfect.

36. The RESOLVE model is limited in the number of scenarios that can be run.

37. The RESOLVE model cannot run a scenario that averages the two proposals.

38. Because distributed energy resources are at the top of the loading order, overestimating valuation is preferable to underestimation.

39. SERVVM is currently used for the Integrated Resource Planning proceeding.

40. Commission staff have used SERVVM to produce much of the data needed for the Avoided Cost Calculator.

41. SERVVM is the better fit, compared to PLEXOS, for the production cost modeling needs of the Avoided Cost Calculator.

42. In D.18-02-016, the Commission determined that a consistent trajectory to the greenhouse gas adder, without a sharp spike in 2020, will allow for the steady deployment of distributed energy resources that are the result of the choices of many customers.

43. The Staff Proposal to calculate a greenhouse gas avoided cost value based on the shadow price of greenhouse gas emission reductions from the RESOLVE modeling in the Integrated Resource Planning proceeding is consistent with the Commission's policy adopted in D.18-02-016.

44. In D.18-02-018, the Commission declined to adopt cap-and-trade values as the greenhouse gas adder.

45. The inability of the RESOLVE modeling to include energy efficiency as a candidate resource does not impact the outcome of the RESOLVE modeling.

46. Basing the magnitude of the greenhouse gas adder on the 2030 greenhouse gas shadow price could be overestimating the value.

47. The current approach to measuring greenhouse gas emissions only reflects the avoided electric sector emissions cost of maintaining the annual intensity

target, rather than the cost of completely offsetting the changes in emissions relative to a measure or program's load impact.

48. Neither Joint Utilities' nor SEIA/Vote Solar's proposals to measure greenhouse gas emissions appropriately address future reduction requirements.

49. The Staff Proposal to measure greenhouse gas emissions offers the best proposal in the record to address the concern that greenhouse gas costs have been overestimated.

50. The Staff Proposal to measure greenhouse gas emissions is more consistent with the approach taken by the CEC and the Commission.

51. The Staff Proposal to measure greenhouse gas emissions will ensure that greenhouse gas costs beyond 2030 are being properly considered.

52. No party opposes using the distribution deferral method to calculate avoided costs and leaving specified deferral avoided costs out of the Avoided Cost Calculator.

53. The Commission determined in the Distribution Resource Planning proceeding that new incremental distributed energy resources will be implemented through the Distribution Investment Deferral Framework.

54. The Commission determined in the Distribution Resource Planning proceeding that the proposed methodology for calculating unspecified distribution deferral costs represents a more empirically based approach to estimating the avoided cost of distribution than the current method.

55. A decision in R.14-08-013, adopted by the Commission on March 12, 2020, directed staff to further develop the methodology and modeling of the proposal, for consideration in the Avoided Cost Calculator.

56. The Staff Proposal offers two approaches for calculating the unspecified distribution deferral costs: a system-average approach (Method 1) or a granular approach (Method 2).

57. No party supports the adoption of Method 2 for use to develop unspecified deferral avoided distribution costs.

58. Additional work on refining the values for Method 1 is needed.

59. Method 1 has been thoroughly vetted with stakeholders.

60. The level of effort required to finalize the values for Method 1 is feasible for the annual update to the Avoided Cost Calculator.

61. It has been the practice to use the marginal distribution costs used in ratemaking as the avoided distribution costs in the Avoided Cost Calculator.

62. It is reasonable to continue to use general rate case marginal costs for the long-run costs of unspecified distribution.

63. The Commission has determined that specified transmission avoided costs shall be addressed in the CAISO Transmission Planning Process.

64. Specified transmission avoided costs do not need further consideration in the Avoided Cost Calculator.

65. Use of congestion values for determining unspecified avoided transmission costs could result in double counting.

66. Use of congestion values, as recommended in the Staff Proposal, are not appropriate for determining unspecified avoided transmission costs.

67. The SEIA/Vote Solar proposals to measure avoided transmission costs do not account for transmission costs that cannot be avoided by distributed energy resources.

68. The SEIA/Vote Solar proposals to measure avoided transmission costs could overestimate the avoided costs.

69. The recent decision in R.14-08-013, which adopts the White Paper, states that the Commission may continue to consider the issue of avoided cost of transmission in the Avoided Cost Calculator update.

70. The R.14-08-013 decision directs that the current method of unspecified avoided transmission value calculated in the Avoided Cost Calculator shall remain in place subject to further modification in the Avoided Cost Calculator update.

71. The method used to determine avoided Transmission and Distribution costs should follow the guidance of the White Paper.

72. Refinements to the marginal cost method used by PG&E in its derivation of avoided transmission costs are needed to produce values for SCE and SDG&E.

73. Adoption of a new method for avoided distribution cost requires refinements to the avoided transmission method.

74. The current Avoided Cost Calculator uses utility general rate case data.

75. Methane and refrigerant leakage are included in the carbon inventory maintained by CARB.

76. Any reduction in methane and/or refrigerant leakage contributes to California's greenhouse gas emissions reduction efforts.

77. Ratepayers incur costs related to California's greenhouse gas emissions reductions efforts.

78. The avoided costs of methane and refrigerant leakage is a real and quantifiable benefit of distributed energy resources.

79. Adding the value of avoided methane leakage to the Avoided Cost Calculator would have the largest impact on programs designed to eliminate the use of natural gas appliances, which is consistent with the policy of electrification.

80. Adding the value of avoided methane leakage would impact any distributed energy resources that decreased natural gas use.

81. The Integrated Resource Planning proceeding relies on the IEPR forecast.

82. It is consistent for the natural gas Avoided Cost Calculator to transition to reliance on the IEPR forecast.

83. It would be problematic to apply different avoided greenhouse gas values to the same avoided cost for technologies that involve fuel switching.

84. Greenhouse gas emissions reductions in both the natural gas sector and the electricity sector come primarily from a reduction in natural gas combustion.

85. Under SB 32, California has an overall greenhouse gas emissions limit in 2030.

86. A shortfall in one sector can be made up for in another sector to reach the overall goal.

87. Emissions for both sectors should have the same value.

88. The electricity sector Integrated Resource Planning proceeding-based greenhouse gas adder is a reasonable estimate for the economy-wide planning price because the electricity sector is a potential source of additional emissions savings to meet the economical-wide goal.

89. SEIA/Vote Solar's proposal for reliability and resiliency avoided costs has not shown any deferred or avoided costs to utility ratepayers but rather has shown only that ratepayers who use these technologies receive additional participant benefits.

90. Participant benefits are not a type of avoided costs.

91. The benefits that SEIA/Vote Solar has shown in its proposal for reliability and resiliency avoided costs can only be attributable to two resources: storage and storage plus solar.

92. SEIA/Vote Solar's proposal to include fuel price volatility costs in the Avoided Cost Calculator is highly speculative.

93. There is no evidence that distributed energy resources provide hedging value that results in lower fuel prices due to less market volatility.

94. SEIA/Vote Solar provide no evidence that any of the proposed grid services produce avoidable costs.

95. We cannot make a determination that the grid services should be incorporated into the Avoided Cost Calculator.

96. No party opposes the Staff Proposal's recommended minor changes.

97. It is reasonable to adopt the Staff Proposal's recommended minor changes.

98. The schedule for the major update proceeding did not include a date for issuing the necessary draft resolution to approve the 2020 Avoided Cost Calculator.

Conclusions of Law

1. The Commission should consider resource-specific benefits in resource-specific proceedings.

2. The Commission should align the Avoided Cost Calculator with the Integrated Resource Planning proceeding.

3. The Commission should use input assumptions from the RESOLVE model for the fixed costs of a new battery to calculate the levelized fixed costs of a battery over its useful life of 20 years.

4. The Commission should not reestablish the Resource Balance Year in the Avoided Cost Calculator.

5. The Commission should adopt the No New DER Scenario that was modeled as a sensitivity of the Reference System Portfolio to measure avoided cost of capacity.

6. The Commission should adopt the use of SERVVM for its production cost modeling in the Avoided Cost Calculator.
7. The Commission should deny the Public Advocates Office proposal to use cap-and-trade values as the greenhouse gas adder.
8. The Commission should continue using the straight-line greenhouse gas adder, previously adopted in D.18-02-016, but modify the values based on post 2030 data.
9. The Commission should adopt the Staff Proposal to use both short- and long-term avoided greenhouse gas costs.
10. Specified deferral avoided costs should not be included in the Avoided Cost Calculator.
11. The Commission should review Methods 1 and 2 in this decision, to determine which is the better method to adopt to develop unspecified deferral avoided distribution costs.
12. The Commission should direct Staff and stakeholders to move forward with completion of the development of Method 1 for use in the Avoided Cost Calculator.
13. The Commission should not adopt the use of congestion values to measure unspecified avoided transmission costs at this time.
14. The Commission should not adopt either of the two SEIA/Vote Solar proposals to measure unspecified avoided transmission costs.
15. The Commission should continue to use the current method to determine unspecified avoided transmission value in the Avoided Cost Calculator.
16. Staff should develop refinements to the marginal cost method used by PG&E in its derivation of transmission marginal costs in order to determine such values for SDG&E and SCE.

17. The Commission should adopt the general rate case data hierarchy recommended in the Staff Proposal.

18. The Commission should include an avoided cost of high global warming potential gases in the Avoided Cost Calculator.

19. Consideration of the benefits of grid services provided by specific distributed energy resources should be addressed in resource-specific proceedings.

20. The Commission should decline to adopt the SEIA/Vote Solar proposal to include reliability and resiliency avoided costs in the Avoided Cost Calculator.

21. The Commission should decline to adopt SEIA/Vote Solar's proposal to include avoided fuel volatility in the Avoided Cost Calculator.

22. The Commission should decline, without prejudice, to determine whether grid services provided by distributed energy resources can produce avoided costs appropriate for inclusion in the Avoided Cost Calculator.

23. The Commission should adopt the four minor changes to the Avoided Cost Calculator recommended in the Staff Proposal.

24. Staff should issue the draft resolution providing the final updated 2020 Avoided Cost Calculator consistent with the policies adopted in this decision, no later than 30 days following the issuance of this decision.

O R D E R

IT IS ORDERED that:

1. The Commission's Energy Division Proposal for 2020 Avoided Cost Calculator Update (Staff Proposal) is adopted, as revised, as provided in the attached Appendix A.

2. The following policies are adopted with respect to the 2020 update of the Avoided Cost Calculator:

- (a) The Avoided Cost Calculator shall align with work in the Integrated Resource Planning proceeding, Rulemaking 16-02-007.
- (b) The Avoided Cost Calculator shall use a four-hour battery storage resource to determine avoided generation capacity costs. Input assumptions from the RESOLVE model for the fixed costs of a new battery shall be used to calculate the levelized fixed costs of a battery over its useful life of 20 years. The revenues that batteries earn in the energy and ancillary market will be calculated and subtracted from the levelized fixed costs to calculate a Net Cost of New Entry.
- (c) The "No New DER" Scenario shall be used as a sensitivity of the Reference System Portfolio.
- (d) Strategic Energy Risk Valuation Model (SERVM) software shall be used for production cost modeling in the Avoided Cost Calculator.
- (e) The Avoided Cost Calculator shall continue to use the straight-line greenhouse gas adder, as adopted in Decision 18-02-016. The values in the adder may be modified based on post-2030 data.
- (f) The Avoided Cost Calculator shall use both short- and long-term avoided greenhouse gas costs to determine greenhouse gas avoided costs as described in Appendix A of this decision.
- (g) The Avoided Cost Calculator shall use a system average approach, Method 1, to calculating unspecified deferral avoided costs as described in Appendix A of this decision.
- (h) The Avoided Cost Calculator shall continue to use the current method used to determine the unspecified transmission avoided cost. The Commission Energy Division may incorporate refinements such that the marginal cost method currently used by Pacific Gas and Electric Company in its derivation of transmission marginal costs is similarly used to develop transmission

marginal costs values for San Diego Gas & Electric Company and Southern California Edison Company..

- (i) The general rate case data hierarchy proposed in Section 5.5.1 of the adopted Energy Division Staff Proposal for the 2020 Avoided Cost Calculator Update (Staff Proposal), attached as Appendix A
- (j) The Avoided Cost Calculator shall use the avoided cost of high global warming potential gases, as described in the Staff Proposal in Appendix A.

3. The Natural Gas Avoided Cost Calculator is revised to use forward market prices for five years followed by a three year transition to the California Energy Commission's Integrated Energy Policy Report, as described in the adopted Energy Division Staff Proposal for the 2020 Avoided Cost Calculator Update, attached as Appendix A. The Natural Gas Avoided Cost Calculator shall use the same overall greenhouse gas value, cap-and-trade value, and the Integrated Resource Planning proceeding, Rulemaking 14-08-013 greenhouse gas adder.

4. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company are directed to work with the Commission's Energy Division to provide additional data necessary to complete the development of the system average approach, Method 1, adopted in Ordering Paragraph 2(g).

5. The Director of the Commission's Energy Division is authorized to facilitate a workshop or webinar, following the issuance of the draft resolution proposing the 2020 updated Avoided Cost Calculator. The purpose of the workshop or webinar is to: (a) provide calculations for the Net Cost of New Entry for battery storage; (b) review post-2030 greenhouse gas values; (c) educate parties and other stakeholders on the method to measure greenhouse gas emissions avoided costs; (d) discuss the final values for the system average

approach, Method 1, adopted in Ordering Paragraph 2(g) above; (e) provide parties with details of refinements to Pacific Gas and Electric Company's marginal cost method to derive avoided transmission costs for San Diego Gas & Electric Company and Southern California Edison Company; and (f) review details of the avoided cost of high global warming gases.

6. The following minor changes to the Avoided Cost Calculator are adopted:

- (a) Expand the Avoided Cost Calculator outputs used for demand response;
- (b) Remove any remaining separate Avoided Cost Calculator outputs for Permanent Load Shifting;
- (c) Include one or more historical years in the Avoided Cost Calculator; and
- (d) Correct the mismatch in start year between the Setting + Results tab and the Emissions tab in the 2019 Natural Gas Avoided Cost Calculator.

7. The Director of the Commission's Energy Division is authorized to issue a draft resolution providing the final updated 2020 Avoided Cost Calculator consistent with the policies adopted in this decision, no later than 30 days following the issuance of this decision.

8. The process for the next major update of the Avoided Cost Calculator shall begin with a staff-led workshop on August 1, 2021 in this proceeding or a successor proceeding. The assigned Commissioner and Administrative Law Judge are authorized to revise the procedural schedule for the next major update of the Avoided Cost Calculator to ensure an efficient and effective process.

9. Rulemaking 14-10-003 remains open to address the development of alternative sourcing mechanisms for distributed energy resources.

This order is effective today.

Dated April 16, 2020, at San Francisco, California.

MARYBEL BATJER

President

LIANE M. RANDOLPH

MARTHA GUZMAN ACEVES

CLIFFORD RECHTSCHAFFEN

GENEVIEVE SHIROMA

Commissioners

Appendix A: Final Staff Proposal