Decision 22-05-002 May 5, 2022.

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

DECISION ADOPTING CHANGES TO THE AVOIDED COST CALCULATOR

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DECISION ADOPTING CHANGES TO THE AVOIDED COST CALCULATOR

Summary

This decision recognizes the importance of the Avoided Cost Calculator and its impact on customers, the grid, and the environment. As such, while it is necessary to address certain changes to the calculator for this year, the Commission acknowledges that the current schedule prevents a determination on several issues and policies, which requires a more thorough development of the record, discussion, and review. The Commission anticipates establishing a second successor to this proceeding devoted to the valuation of distributed energy resources and related programs. Hence, this decision calls for continued discussion in the successor proceeding of guiding principles, guidelines for sensitivity cases, further investigation of the staff-proposed Market Equilibrium Approach, development of alternative methods for allocating distribution costs, methods to properly value greenhouse gas emissions avoided costs, and a review of potential improvements to the greenhouse gas rebalancing method.

Parties in this proceeding spoke about the need for improved transparency in future updates of the Avoided Cost Calculator. Hence, this decision adopts an improved schedule that provides a final staff proposal at the beginning of the process, additional opportunities for data requests, and additional and longer review of data produced using inputs derived from the Integrated Resource Planning proceeding.

With respect to the update of the 2022 Avoided Cost Calculator, this decision recognizes the growth of building and transportation electrification and prepares for such a future by removing distributed energy resources' load

growth from the "No New DER" Scenario,[1] creating an avoided gas infrastructure cost, and adopting an interim natural gas-specific greenhouse gas adder.

Parties highlighted the need for accuracy. Hence, other revisions to the Avoided Cost Calculator strived for improved accuracy, including adoption of a new annualization approach using the National Economic Research Association method and allocation of generation capacity values using the production cost modeling from the Integrated Resource Planning proceeding.

The other theme throughout this decision is the importance of aligning the Avoided Cost Calculator with the Integrated Resource Planning proceeding. The intention of the Commission in adopting such an alignment is to ensure that all resources are evaluated equally, be they distributed energy resources or supply-side resources. To ensure such alignment, this decision adopts the policy that the update of the Avoided Cost Calculator will rely on an adopted Reference System Plan or Preferred System Plan.

1. Avoided Cost Calculator Background

The Commission uses the Avoided Cost Calculator 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 seven types of avoided costs: generation capacity, energy, transmission and distribution capacity, ancillary services, Renewables Portfolio Standard, greenhouse gas emissions, and high global warming potential gases. The

[1] "DER" is the acronym for distributed energy resources.

outputs of the Avoided Cost Calculator feed into the cost-benefit analysis for distributed energy resources.

In Decision (D.) 16-06-007, *Decision to Update Portions of the Commission's Current Cost-Effectiveness Framework*, the Commission directed that a single avoided cost model should apply to all distributed energy resource proceedings.[2] In D.19-05-019, the Commission approved a formal biennial process, to be conducted in Rulemaking (R.) 14-10-003 or a successor proceeding, to ensure that major changes to the Avoided Cost Calculator are addressed on a regular basis. The adopted biennial process begins with a workshop facilitated by the Commission's Energy Division on August 1 of the previous year, where energy Division staff presents an initial staff proposal. The biennial schedule includes the service of opening and rebuttal testimony with an evidentiary hearing held in November and culminates with a proposed decision in Spring of even-numbered years. While a decision considers proposed changes to the Avoided Cost Calculator, the actual updated Avoided Cost Calculator is then adopted through a subsequent resolution process. During odd-numbered years, minor changes to the Avoided Cost Calculator are made solely through the resolution process.

Below, this decision presents an explanation of the relationship between the Avoided Cost Calculator and the Integrated Resource Planning (IRP) proceeding, the procedural background for the 2022 Avoided Cost Calculator update, an overview of party proposals as presented in opening testimony and the Energy Division's staff proposal.

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

1.1. Relationship between the Avoided Cost Calculator and the Integrated Resource Planning proceeding

Beginning in 2019, the Commission adopted a process whereby the Avoided Cost Calculator is aligned with the IRP proceeding (R.20-05-003) by using modeling outputs from the IRP as avoided cost inputs. It is therefore important to understand the relationship between IRP modeling (RESOLVE and Strategic Energy Risk Valuation Model (SERVM)) and the Avoided Cost Calculator.

IRP serves two purposes: 1) to consider all electric procurement policies and programs to ensure California has a safe, reliable, and cost-effective electricity supply and 2) to implement requirements in Senate Bill (SB) 350 for integrated resource planning, which ensure that load serving entities meet greenhouse gas emissions reductions goals. As part of the IRP, the Commission adopts Reference System Portfolios and Preferred System Portfolios to meet the requirements of SB 350 and an electric sector greenhouse gas target. These portfolios serve as the basis for procurement and California Independent System Operator (CAISO) transmission planning. Load serving entities use the Reference System Portfolio to develop individual integrated resource plans. Based upon these plans, the Commission adopts a final portfolio, called the Preferred System Portfolio. The Reference System Portfolio and the Preferred System Portfolio rely upon two models: 1) the RESOLVE model, which is a capacity expansion model that identifies a least-cost portfolio of resources to meet the electricity sector greenhouse gas emission target and 2) SERVM, which provides production cost modeling of portfolios generated by RESOLVE. The SERVM is a probabilistic reliability planning model that evaluates the loss of

load probability for portfolios of generation and transmission resources generated by RESOLVE.

Both the Reference System Portfolio and the Preferred System Portfolio produce several scenarios, including a No New DER scenario. This scenario feeds into the Avoided Cost Calculator.

In D.22-02-004, the recent IRP Preferred System Plan decision, the Commission amended the IRP cycle allowing the option to not produce a Reference System Portfolio in every IRP cycle. In the future, IRP cycles will focus primarily on the development of a Preferred System Portfolio. However, the Commission may decide to evaluate and adopt a Reference System Portfolio when circumstances warrant (*e.g.*, an update to the California Air Resources Board climate change scoping plan).

1.2. 2022 Avoided Cost Calculator Update Procedural Background

On July 2, 2021, the assigned Administrative Law Judge issued a ruling granting a request from Energy Division to delay the August 1, 2021 Avoided Cost Calculator Major Update Workshop to no later than August 27, 2021 due to the delayed adoption of the 2021 Avoided Cost Calculator. Accordingly, on August 25, 2021, Energy Division facilitated the 2022 Avoided Cost Calculator update workshop to discuss proposals for both major and minor changes to the calculator.

Parties served testimony on September 27, 2021, which included proposals for major and minor changes to the Avoided Cost Calculator. (*See* Section 1.4 below for an overview of initial party proposals.) On October 11, 2021, parties served rebuttal testimony. The Administrative Law Judge held a virtual Status Conference on October 25, 2021 to prepare parties for participating in a virtual

evidentiary hearing. On November 19, 2021, the Administrative Law Judge presided over the evidentiary hearing.

On December 1, 2021, the Administrative Law Judge issued a ruling, *Email Ruling Providing Staff Proposal and Briefing Guidance*. The Ruling directed parties to file comments on the November 30, 2021 *Integrated Distributed Energy Resources 2022 Update Avoided Cost Calculator Staff Proposal* (Staff Proposal) along with opening briefs on December 22, 2021 and file reply comments with reply briefs on January 5, 2022. The Staff Proposal, which was developed by staff from the Commission's Energy Division, is described in Section 1.3 below.

The following parties filed opening briefs and comments on December 22, 2021: 350 Bay Area;[3] California Large Energy Consumers Association (CLECA); California Solar & Storage Association (CALSSA); Coalition of California Utility Employees (CUE); Natural Resources Defense Council (NRDC); Pacific Gas and Electric Company (PG&E);[4] PG&E with San Diego Gas & Electric Company (SDG&E) and Southern California Edison Company (SCE) (together, Joint Utilities); Public Advocates Office of the Public Utilities Commission (Public Advocates Office); SDG&E with Southern California Gas Company (SoCalGas) (together, Sempra Utilities); Sierra Club; Solar Energy Industries Association (SEIA); and SoCalGas. The following parties filed reply briefs/comments on January 5, 2022: CLECA; CALSSA; CUE; Joint Utilities; NRDC; Public Advocates Office; Sempra Utilities; and SEIA. The record of this proceeding stands submitted, as of January 5, 2022.

[3] 350 Bay Area only filed comments to the Staff Proposal.

[4] The sole issue discussed in this opening brief of PG&E is the issue of the Avoided Gas Infrastructure Cost. All other issues for this proceeding are addressed in the joint opening brief of PG&E, SDG&E, and SCE.

There being no other issues to address in this proceeding, R.14-10-003 is closed. A successor proceeding will be established to address future updates of the Avoided Cost Calculator and other related distributed energy resources and programmatic valuation issues.

1.3. Overview of Staff Proposal

The Staff Proposal is comprised of recommendations on seven topics: i) method for calculating greenhouse gas, resource adequacy/generation capacity and Renewables Portfolio Standard/SB 100[5] avoided costs; ii) allocation of generation capacity value; iii) non-hourly avoided costs; iv) distribution avoided costs; v) natural gas avoided costs; vi) the coordination between the Avoided Cost Calculator and the IRP proceeding; and vii) the schedule for updating the Avoided Cost Calculator. Below is a high-level overview of each of the recommendations. Additionally, the Staff Proposal clarifies aspects of the Avoided Cost Calculator process for additional transparency.

1.3.1. Calculating Greenhouse Gas, Resource Adequacy/Generation Capacity, and Renewables Portfolio Standard/SB 100 Avoided Costs

To improve alignment of the Avoided Cost Calculator with the IRP proceeding, the Staff Proposal recommends a major revision to the approach for establishing avoided greenhouse gas costs, resource adequacy/generation capacity costs, and Renewables Portfolio Standard costs. Currently, these three

[5] SB 100 (De Leon), also known as "The 100 Percent Clean Energy Act of 2018" establishes a 2045 goal of powering all retail electricity sold in California and state agency electricity needs with renewable and zero-carbon resources; updates the state's Renewables Portfolio Standard to ensure that by 2030 at least 60 percent of California's electricity is renewable; and requires the Commission, California Energy Commission, and the Air Resources Board to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter.

avoided costs are calculated separately. The avoided costs of resource adequacy are based on the net cost of new entry (CONE) of four-hour battery storage as the marginal capacity resource, and the avoided costs of achieving the Renewables Portfolio Standard is combined with the greenhouse gas planning avoided cost, which is based on the 2030 RESOLVE greenhouse gas shadow price. Energy Division recommends estimating the three avoided costs together with a new Market Equilibrium model, which bases these values on the cost recovery needs of resources that meet demand, provide system reliability, contribute to California's greenhouse gas emissions reduction goals, Renewables Portfolio Standard and SB 100 requirements.

1.3.2. Allocating Annual Generation Capacity Value

The Staff Proposal offers two methods for allocating the annual generation capacity value, which is currently based on Renewable Electricity Capacity Planning (RECAP) modeling of Expected Unserved Energy. Expected Unserved Energy is the expected amount of energy not supplied by the generating system in any hour where load is expected to exceed generation, *i.e.*, the hours when system is likely to be short capacity. The proposal explains that there is a concern that RECAP allocates most capacity value to the month of September and SERVM allocates capacity value across July, August, and September. Proposed Method #1 would use RECAP with 24 hours in 10 years, which modifies the RECAP model results by having Expected Unserved Energy distributed across more summer hours. Proposed Method #2 would use SERVM but remove Expected Unserved Energy in early morning spring hours that are driven by ramping rather than peak capacity constraints.

1.3.3. Including Non-hourly Avoided Costs in the Avoided Cost Calculator

The Staff Proposal considers whether and how categories of avoided costs not driven by hourly or coincident peak loads can be included in the Avoided Cost Calculator. These include secondary distribution costs, natural gas infrastructure costs, and refrigerant costs. (The Commission previously developed a refrigerant avoided cost calculator (RACC); proposals for revisions to the RACC are discussed separately in Section 1.3.4 below.)

In its General Rate Case 2020 Phase 2 Application (A.) 19-11-019, PG&E has proposed a new approach to allocate secondary costs: using the non-coincident final line transformer demand. The Staff Proposal notes that the current Avoided Cost Calculator does not have a secondary costs allocation method based on non-coincident final line transformer. Energy Division recommends including secondary costs with primary costs in the Avoided Cost Calculator that are allocated based on peak diversified load, as is currently done for PG&E. Energy Division proposes that SCE and SDG&E provide comparable final line transformer calculations or develop and alternate approach that could be consistently applied across each of the Joint Utilities.

The Staff Proposal recommends the development in this Avoided Cost Calculator update of an approach to estimate the avoided cost of natural gas distribution infrastructure for all new electric construction. Energy Division proposes such a method could use data from utility general rate case and marginal cost filings. Energy Division underscores that these avoided costs would be added separately to the benefits used in the cost-effectiveness tests and would only apply to new electric-only construction projects, measures, and programs that avoided the cost of natural gas distribution infrastructure.

1.3.4. RACC

The Staff Proposal recommends three changes to the RACC: i) discounting leakage cost at the mid-year; ii) allowing for various measure types; and iii) allowing for user-input refrigerants.

Energy Division explains that, currently, the annual refrigerant leakage cost is discounted at the end of each year. To be more consistent with continuous leakage occurring throughout each year of a device's lifetime, Energy Division proposes to discount at the mid-year and at one-year increments thereafter.

The RACC calculates the avoided cost of a single piece of equipment over the course of its effective useful life. Energy Division proposes to revise the RACC so that the avoided cost is calculated for a measure rather than a single device. Energy Division explains that there are three measure types: i) normal replacement measure, where the existing equipment is replaced with new equipment at the end of its effective useful life; ii) accelerated replacement measure, where the existing equipment is retired before the end of its effective useful life and replaced with new equipment; and iii) add-on equipment measure, where add-on equipment is installed alongside existing equipment and devices are retired at the end of their effective useful life. Energy Division contends the current method only accounts for the first measure type: normal replacement measure. Energy Division asserts that because a large portion of refrigerant leakage tends to come when equipment is retired or replaced, the RACC should account for this spike in leakage. Energy Division also asserts that the RACC should account for the additional overall leakage with accelerated replacement of a device.

The Staff Proposal recommends annually updating the list of refrigerants to reflect the most current set of refrigerants available from the California Air

Resources Board (CARB). Energy Division also proposes an optional input to allow users to specify additional refrigerants to account for devices not appearing in the CARB list.

1.3.5. Distribution Avoided Costs

The Staff Proposal explains that distribution avoided costs are calculated using utility data. Near-term distribution avoided costs are calculated from the Grid Needs Assessment and Distribution Deferral Opportunity Report data, which is filed annually by Joint Utilities. Long-term distribution avoided costs are calculated from general rate case data. Energy Division evaluated general rate case and Grid Needs Assessment data for each of the Joint Utilities noting that the initial comparisons provided in the Staff Proposal are not perfect because of the mismatch of historical and forecast years.

The Staff Proposal cautions that the magnitude of the initial differences raises questions about the data, including whether the marginal costs are low or whether the general rate case-based values are high. The Staff Proposal recommends continuing to review the data to determine whether modifications to the methods for developing near- and long-term distribution avoided costs can and should be developed, adopted, and implemented.

1.3.6. Natural Gas Avoided Costs

With respect to natural gas avoided costs, the Staff Proposal provides recommendations on gas price forecasts, the natural gas greenhouse gas emissions adder, and natural gas transportation rates.

Energy Division proposes to use the California Energy Commission's (CEC's) Integrated Energy Policy Report (IEPR) gas price forecast for short- and long-term natural gas prices in the electric and gas Avoided Cost Calculator. The Avoided Cost Calculator now uses forward natural gas prices from the

Intercontinental Exchange (ICE) in the short term and the IEPR forecast in the long term. Noting the IEPR gas price forecast is currently used in IRP modeling, Energy Division asserts using it in the Avoided Cost Calculator will promote consistency and reduce unnecessary complexity caused by using two gas price forecasts.

Noting challenges to developing an avoided cost of greenhouse gas emissions specific to the natural gas sector, Energy Division recommends the Commission continue using the electric sector avoided cost of greenhouse gas emissions for both the electric and gas sectors. Energy Division contends this will allow consistent evaluation of fuel substitution and electrification measures.

The Staff Proposal recommends using the CEC IEPR projections of natural gas transportation rates, which are currently used in IRP modeling.
Energy Division contends using the same forecast in the Avoided Cost Calculator will provide consistency with IRP modeling, evaluation of supply and demand side resources, and evaluation of fuel switching measures.
Energy Division notes IEPR projections of natural gas transportation rates are anticipated to be updated in the near future.

1.3.7. Coordination Between the Avoided Cost Calculator and the IRP

The Staff Proposal makes recommendations regarding the use of IRP modeling results in the biennial major update of the Avoided Cost Calculator with respect to: i) coordination and review process; ii) price extrapolation methodology; iii) scarcity pricing approach; and iv) parameters of the "No New DER" scenario.

For transparency and timing purposes, Energy Division recommends the following changes to the interaction between IRP modeling and the Avoided

Cost Calculator: i) each Avoided Cost Calculator update will use input from the most recent Reference System Plan, Preferred System Plan or Transmission Planning Process Plan, if that plan is no more than one year old; ii) following adoption of a final capacity expansion plan, Energy Division will release SERVM files; iii) following the issuance of the Avoided Cost Calculator update decision, staff will release draft Avoided Cost Calculator results for stakeholder review and hold a workshop to discuss the results.

Energy Division proposes the following methodology to extrapolate prices used in the 2022 Avoided Cost Calculator: i) 2022-2032 – use SERVM outputs; ii) 2032-2045 – linearly extrapolate prices for this time period after aligning prices with the Avoided Cost Calculator calendar; and iii) 2045-2050 – use prices from 2045 and inflate prices for future years.

The Staff Proposal recommends using a similar scarcity pricing approach used in the 2021 Avoided Cost Calculator with one set of scarcity factor developed and applied to all price regions modeled. SERVM prices will be benchmarked before scarcity adjustments against actual 2020 historical prices. Energy Division proposes to back out the marginal heat rates as implied by prices in the benchmark year. As part of the benchmarking step, the number of hours in which scarcity exists in historical benchmark year will be identified and then scaled up to approximate the historical pattern and magnitude. The scarcity scalars based on the benchmarked year will be applied to each year of the SERVM forecast to adjust for scarcity.

With respect to the "No New DER" scenario, Energy Division proposes to include increased electric load from transportation and building electrification in the list of distributed energy resources removed from the base case to create the "No New DER" scenario.

1.3.8. Revising the Avoided Cost Calculator Update Schedule

The Staff Proposal recommends elimination of the biennial minor update resolution process that occurs in odd-numbered years. Staff contends there is too little time between the major and minor update processes, which results in a continual expenditure of Commission and party resources and rushed review and benchmarking. Staff proposes that, in the event of a delay that makes a major update impossible in a given even-numbered calendar year, the Commission authorize Energy Division to perform a minor update to the Avoided Cost Calculator and release that update using the resolution process.

1.4. Overview of Party Proposals

Parties presented proposals for updating the Avoided Cost Calculator in opening testimony. A brief overview of each party's proposal is presented in this section. This section focuses on party proposals for adoption in this proceeding and does not include proposals for adoption in other proceedings or discussions of opposition to other proposals. Justification for the proposal is only briefly discussed here.

1.4.1. CLECA[6]

CLECA contends that revisions need to be made in the 2022 Avoided Cost Calculator major update to correct instances where avoided costs have been over or underestimated.

For the avoided cost of generation capacity, CLECA asserts the current Avoided Cost Calculator does not properly account for the "fact that battery cost is forecast to decline over time" leading to an under estimation of avoided cost.

[66] An overview of CLECA's recommendations can be found in its opening testimony, CLE-01 at 1-2.

CLECA proposes to adjust the calculations in the Avoided Cost Calculator worksheet to properly calculate an annualized avoided cost. Additionally, CLECA asserts the Avoided Cost Calculator underestimates avoided capacity costs by incorrectly assuming a 20-year battery life and should, instead, use a 15-year battery life, which CLECA contends is typical of utility battery storage contracts. CLECA recommends revising the Pro Forma tab of the Avoided Cost Calculator, which calculates battery costs.

With respect to avoided transmission and distribution costs, CLECA states the Avoided Cost Calculator relies on marginal cost values filed in utilities' general rate cases, which CLECA asserts includes costs that are not avoided by the addition of distributed energy resources. CLECA recommends adjusting the general rate case values until a proper study can be performed to examine what are avoidable and non-avoidable costs.

1.4.2. CUE[7]

CUE states the Commission should do more to align the Avoided Cost Calculator with the IRP and improve the estimates of avoided costs.

CUE asserts the Avoided Cost Calculator should only contain costs avoided by the Utilities. Further, CUE proposes that the avoided costs be limited to those resulting by statute or regulations and modeled first in the IRP. Hence, CUE recommends the exclusion of costs such as methane leakage from the Avoided Cost Calculator.

With respect to improving avoided costs, CUE contends the Avoided Cost Calculator overestimates long term distribution avoided costs and recommends they be decreased to 1.2 percent of the general rate case values currently used.

[7] CUE's recommendations can be found in its opening testimony, CUE-01 at 4, 7-8, and 10.

CUE also contends the avoided transmission costs used in the Avoided Cost Calculator should be limited to unspecified values. Because the Avoided Cost Calculator currently uses specified values, CUE maintains these values are overstated and recommends they be "dropped or updated to be unspecified values."

1.4.3. Joint Utilities[8]

Joint Utilities offer a set of guiding principles the Commission should adopt, recommendations for continued alignment of the Avoided Cost Calculator and the IRP processes, and modeling refinements.

Joint Utilities offer seven guiding principles the Commission should adopt and follow when reviewing avoided costs in the Avoided Cost Calculator: i) consistently applied across supply- and demand-side resources; ii) use of market-based pricing; iii) regularly updated; iv) appropriately scoped and linked to rates; v) appropriately applied to planning; vi) feasible; and vii) with respect to non-marginal avoided costs, can be generally applied to non-targeted programs.

With respect to aligning the Avoided Cost Calculator and IRP processes, Joint Utilities first offer two changes to the Avoided Cost Calculator process to improve transparency. First, Joint Utilities recommend the Commission rely on "approved portfolios," *e.g.*, the 2022 Preferred System Plan adopted by the Commission. Second, because the "No New DER" scenario is only used for Avoided Cost Calculator purposes, Joint Utilities recommend parties have an opportunity to provide comments on mechanical issues related to this scenario prior to its use in SERVM and incorporation in the Avoided Cost Calculator. For additional improved alignment between the Avoided Cost Calculator and IRP,

[8] Joint Utilities' recommendations can be found in its opening testimony, JUT-01.

Joint Utilities recommend basing the post-2030 avoided energy and ancillary services values and hourly marginal emission rates on a 2045 SERVM run, eliminating the straight-line methodology for the greenhouse gas adder, excluding rate-payer funded load-growth programs from the "No New DER" scenario; updating the net CONE methodology to use the most recent effective load carrying capability factors; and using consistent assumptions across the electric and natural gas Avoided Cost Calculators.

With respect to other modeling refinements, Joint Utilities recommend removing secondary distribution capacity costs from the Avoided Cost Calculator and propose three updates to the Refrigerant Avoided Cost Calculator: i) calculate net present value for the base year; ii) allow discounting annual leakage at the mid-year, starting with year 0.5, followed by discounting in increments of one year thereafter; and iii) utilize measure application type as an input.

1.4.4. NRDC[9]

Related to the Avoided Cost Calculator, NRDC proposes a set of guiding principles for adoption by the Commission; an approach for developing a gas specific greenhouse gas adder; and the development of disaggregation factors. NRDC also poses recommendations for matters not in the scope of the Avoided Cost Calculator: societal costs and benefits.[10]

NRDC recommends the Commission adopt six guiding principles for major updates of the Avoided Cost Calculator, as follows: i) the Avoided Cost

[9] NRDC's recommendations can be found in its opening testimony, NRD-01.

[10] The Commission conducted a pilot test and evaluation of the Societal Cost Test, which will be considered in a successor proceeding. The Societal Cost Test is not in the scope of a major update of the Avoided Cost Calculator. Rather, the outputs of the Avoided Cost Calculator are used in cost-effectiveness tests such as the Societal Cost Test.

Calculator should provide accurate estimates of costs avoided by the utility when a distributed energy resources either generates or reduces demand for a marginal unit of energy; ii) the Avoided Cost Calculator should include all relevant utility costs and utility system related policy compliance costs that would be incurred by the utility in the absence of a demand side initiative; iii) the Avoided Cost Calculator should be technology neutral and evaluate all demand side resources on an equal footing among each other and relative to supply side resources; iv) the Avoided Cost Calculator should be attributable to incremental distributed energy resources adoption; v) avoided cost values should be calibrated and grounded in real-world data to the extent feasible; and vi) avoided cost documentation should clearly explain data sources, calculation methodology and rationale, and how the avoided costs should be applied to determine cost-effectiveness.

With respect to the mechanics of the Avoided Cost Calculator, NRDC advocates for development of a greenhouse gas adder for the gas sector. NRDC proposes that the Commission run a total resource cost (TRC) test to determine the benefits and costs of electrifying a gas space heater and gas water heater, with the difference between the benefits and the costs being the value of the gas greenhouse gas emissions. NRDC proposes that the greenhouse gas abatement costs can be rendered by dividing the gas greenhouse gas emissions value by the total amount of greenhouse gas emissions reduced by the gas sector through electrification.

Lastly, NRDC offers an initial proposal to attribute a resource's net CONE value between energy, ancillary services, greenhouse gas reductions, and capacity avoided costs. NRDC proposes the development of two disaggregation factors from multiple RESOLVE runs that use different constraints in order to

estimate how much of each year's capacity expansion is driven by the need to meet demand, and how much is driven by the need to meet greenhouse gas emission reduction goals. NRDC notes the proposal may be modified over the course of the proceeding due to the complexity and novelty of the topic.

1.4.5. Public Advocates Office[11]

Public Advocates Office proposes guiding principles to assist the development and evaluation of proposals for updating the Avoided Cost Calculator but not predetermine the resolution of contested issues of fact and law. Public Advocates Office recommends the guiding principles explicitly define what constitutes an avoided cost, what is appropriate to be considered for an avoided cost category in the Avoided Cost Calculator, and what are the appropriate applications of the avoided cost values in order to pinpoint use-cases for the Avoided Cost Calculator across distributed energy resources proceedings.

As such, Public Advocates Office recommends the adoption of two guiding principles: i) Avoided costs values shall represent the known costs associated with the provision of electric and natural gas service to ratepayers that a utility company can avoid through the procurement of distributed energy resources; and ii) the scope of inputs into the Avoided Cost Calculator are limited to costs that a utility can avoid in a technology-neutral manner and directly impact customer rates.

1.4.6. Sempra Utilities[12]

Sempra Utilities focus on the issue of whether the Avoided Cost Calculator should incorporate the avoided cost of natural gas infrastructure, which was

[11] Public Advocates Office's recommendations can be found in their opening testimony, PAO-01.

[12] Sempra Utilities' recommendations can be found in its opening testimony, SEM-01.

adopted in the energy efficiency proceeding. Sempra Utilities submit this proceeding is the correct venue to assess incorporation of an avoided gas infrastructure cost (AGIC) value. However, Sempra Utilities contend a more thorough consideration of the definition of an AGIC and its use "is necessary to properly develop AGIC values and their application in the [Avoided Cost Calculator]." Hence, Sempra Utilities support the consideration of policies and implications regarding avoided gas infrastructure costs in the Gas Planning and Reliability Rulemaking (R.20-01-007). However, if a change is adopted in this proceeding, Sempra Utilities recommend a similar treatment should be adopted for fuel substitution programs in the energy efficiency proceeding to accurately reflect costs and benefits.

Relatedly, Sempra Utilities submit the Commission should not incorporate the avoided cost of natural gas infrastructure adopted in the energy efficiency proceeding into the Avoided Cost Calculator, as those values solely reflect values in PG&E's service territory. Instead, to accurately reflect AGIC values for the Avoided Cost Calculator, Sempra Utilities propose the Commission define the AGIC such that it integrates into the existing cost-effectiveness tests and includes the following cost components: the main extension, service extension, and gas meter costs, but not participant costs. Additionally, Sempra Utilities recommend the consideration of utility allowances provided for new natural gas service as cap to inform AGIC values.

1.4.7. SEIA[13]

SEIA recommends structural and process changes with respect to the use of the IRP modeling results, additional modeling of the "No New DER" scenario,

[13] SEIA's recommendations can be found in its opening testimony, SEI-01.

improved standards for minor updates to the Avoided Cost Calculator, and supplemental sensitivities in the Avoided Cost Calculator for the natural gas forecast, cap-and-trade allowance forecast, and greenhouse gas adder values. Additionally, SEIA contends that other modeling platforms to value distributed energy resources are becoming available, of which the Commission should be cognizant.

SEIA proposes specific changes to components of the Avoided Cost Calculator.

- SEIA recommends that Production Cost Modeling be limited to calculating annual average CAISO market prices. If the Commission continues to use Production Cost Modeling for forecasting hourly prices, SEIA states that it supports the proposal to allow parties to review and comment on the Production Cost Modeling and to provide more details on the Production Cost Modeling benchmarking.
- SEIA proposes the continued use of the CEC's IEPR forecast with three modifications: i) assume gas transportation rates will increase at 5 percent per year above the rate of inflation; ii) base gas commodity forecast on gas forward market pricing transitioning beginning at years three to five to an average of long-term fundamentals forecasts; and iii) calculate separate avoided energy costs for Northern (PG&E) and Southern (SDG&E and SCE) California.
- For avoided generation capacity costs, SEIA proposes that the 2022 Avoided Cost Calculator use the broader set of projected battery storage costs currently in the record of A.19-11-019, the PG&E General Rate Case Phase 2.
- With respect to avoided transmission and distribution costs in the 2022 Avoided Cost Calculator, SEIA supports the use of the marginal transmission cost as proposed by SCE in A.20-11-008, the SCE General Rate Case Phase 2.

- SEIA offers two proposals for avoided greenhouse gas costs: i) use the 2032 greenhouse gas adder in the Avoided Cost Calculator and evaluate whether the discount rate used to discount and escalate the greenhouse gas adder should be adjusted; and ii) omit the portfolio re-balancing greenhouse gas adjustment to evaluate distributed solar, storage, or energy efficiency resources.
- As part of the avoided methane leakage value, SEIA recommends the Commission include the leakage associated with the natural gas produced outside of but used within California.

2. Issues to Be Resolved

Following the service of testimony and evidentiary hearings, parties were directed to file briefs along with comments on the Staff Proposal. Parties were instructed to address two sets of issues. The first set of issues are policy and process issues, as follows:

i. Guiding principles for the Avoided Cost Calculator, including inclusion of environmental (or other) externalities;

ii. Avoided Cost Calculator update schedule;

iii. IRP proceeding and SERVM modeling, coordination, and data review;

iv. Use of the Avoided Cost Calculator to determine increased supply costs;

v. "No New DER" Portfolio;

vi. Methane leakage; and

vii. Need for sensitivity analysis.

The second set of issues are Modeling Issues, as follows:

i. Staff-proposed market equilibrium approach for calculating greenhouse gas, resource adequacy and Renewables Portfolio Standard/Senate Bill 100 avoided costs;

ii. Accuracy of battery storage data used to determine net CONE;

iii. Allocation of generation capacity value using SERVM or RECAP models from the Integrated Resource Planning proceeding;

iv. Non-hourly avoided costs, including secondary distribution and avoided natural gas infrastructure;

v. Transmission and Distribution avoided cost issues;

vi. Natural forecasts and transportation rates;

vii. Production cost modeling issues, including price extrapolation before and beyond 2045 and scarcity pricing approach;

viii. Greenhouse gas adder issues, including rebalancing and the need for a separate natural gas greenhouse gas adder;

ix. Refrigerant calculator;

x. Resource-specific Effective Load Carrying Contribution (ELCC) values; and

xi. Any other issue discussed in testimony or the staff proposal not listed above.

3. Updates to the 2022 Avoided Cost Calculator

Updates to the 2022 Avoided Cost Calculator fall into two categories: Policy/ Procedural Issues and Modeling Issues. This decision addresses the categories separately below.

3.1. Policy and Procedural Issues

In section 3.1, the Commission considers issues related to policies framing the Avoided Cost Calculator and the process by which the review of the calculator is conducted. Our intention behind many of these policies is to improve transparency and due process and provide a thorough review of the Avoided Cost Calculator. Below, the Commission determines that a deeper examination of proposed guiding principles should occur in the successor to this

proceeding to allow for party discussion during workshops and the development of a more robust record. This decision expands and refines the schedule for reviewing the Avoided Cost Calculator, allowing for improved transparency and ensuring proper due process. Coordination between this proceeding and the IRP proceeding is tantamount to ensuring distributed energy resources and supply side resources are treated equally; as such, policies, including those related to the "No New DER" Scenario are refined to reflect this coordination. Other issues considered include the avoided cost of methane leakage and sensitivity analyses.

3.1.1. Guiding Principles

Parties recommend several guiding principles for updating the Avoided Cost Calculator but there is no clear indication of which principles the Commission should adopt because the record of this proceeding does not provide methods to assess whether proposed updates of the calculator meet any of the proposed principles. While this decision determines that the adopted changes in this decision should align with the ultimate purpose of the Avoided Cost Calculator (as described below) for now, it is also reasonable to conduct a thorough discussion of guiding principles and assessment tools. As discussed below, the successor to this proceeding is anticipated to include a workshop discussion and additional comments on a set of guiding principles and tools by which to measure whether the Avoided Cost Calculator meets the principles.

CLECA,[14] Joint Utilities,[15] NRDC, [16] and Public Advocates Office[17] each provide a set of recommended principles. The proposed principles address

[14] CLECA Opening Brief at 3-4.

[15] Joint Utilities Opening Brief at 2.

[16] NRDC Opening Brief at 4.

[17] Public Advocates Office Opening Brief at 3.

valuable characteristics for the Avoided Cost Calculator such as accuracy, incrementality, technology neutrality, and consistency. While no party disagrees that the Avoided Cost Calculator should be accurate,[18] technologically neutral, and consistent, the record does not contain definitions of accuracy or consistency. Nor does the record include assessments of whether the revised Avoided Cost Calculator meets these principles or the methods for such assessments. As noted by SEIA, parties that advanced the adoption of guiding principles did not apply the principles to current or proposed elements of the Avoided Cost Calculator.[19]

In discussing recommendations for guiding principles, parties such as CUE and SEIA speak to the purpose of the Avoided Cost Calculator: to provide guidance across a wide variety of proceedings on the value of distributed energy resources as part of the overall portfolio mix with supply-side solutions.[20] SEIA contends that many proposed principles align with the previously stated purpose of the Avoided Cost Calculator.[21] As such, SEIA suggests that adoption of guiding principles is not necessary if the Avoided Cost Calculator aligns with its purpose. SEIA highlights that the Commission has adopted many iterations of the Avoided Cost Calculator without the use of guiding principles.[22]

While the Commission agrees the lack of guiding principles has not deterred adoption of the Avoided Cost Calculator in the past, a well-designed and defined set of guiding principles will lead to a proper assessment of the valuable characteristics needed in the Avoided Cost Calculator, such as accuracy,

[18] CLECA Reply Brief at 4.

[19] SEIA Opening Brief at 7.

[20] CUE Opening Brief at 3 and SEIA Opening Brief at 6-7.

[21] SEIA at 6 citing D.20-04-010 at 5, which describes the purpose of the Avoided Cost Calculator.

[22] SEIA at 6.

consistency, etc.[23] However, this decision finds that the record warrants additional information to make a determination on not only which guiding principles to adopt but also the methods by which to assess whether proposed changes to the Avoided Cost Calculator meet the principles. Thus, a successor proceeding—where future updates of the Avoided Cost Calculator will be considered—should continue to consider proposed principles and methods by which to assess whether proposed updates to the Avoided Cost Calculator meet the principles. To further develop the record, the successor proceeding should conduct at least one workshop where parties can discuss both proposals for guiding principles as well as assessment tools. Parties will also be provided an opportunity to file comments on workshop discussions. Until then, the Commission should adopt proposals that align with the previously stated purpose of the Avoided Cost Calculator.

3.1.2. Avoided Cost Calculator Update Schedule

To ensure timely adoption of an Avoided Cost Calculator while also allowing for improved due process, this decision adjusts the procedural schedule for future updates of the calculator. This decision eliminates the minor update of the Avoided Cost Calculator and extends and rearranges the procedural timeline for the major update of the Avoided Cost Calculator occurring in even-numbered years. This decision also maintains the dual process of a formal proceeding where policies and modeling changes are addressed followed by the informal resolution process where the technical details of the Avoided Cost Calculator are finalized. This decision improves the resolution process by providing additional time for review of the draft Avoided Cost Calculator and requiring a workshop

[23] NRDC Reply Brief at 2 and SEIA Reply Brief at 3.

and informal comments. These findings and determinations are discussed in detail below.

As indicated in Section 1 above, the Commission currently reviews the Avoided Cost Calculator on an annual basis with a major update occurring in even-numbered years and a minor update occurring in odd-numbered years. Describing both advantages and disadvantages of the annual updates, the Staff Proposal recommends eliminating the minor update to address party and Commission resource limitations and prevent errors from insufficient review and benchmarking.[24] Energy Division also proposes that the Commission authorize them to conduct a minor update in the event that a proceeding delay makes a major update impossible in an even-numbered year.[25]

Public Advocates Office and NRDC support the Staff Proposal to eliminate the minor update cycle. Public Advocates Office highlights the potential for modeling errors due to the current timeline.[26] NRDC agrees that the "disadvantages of annual updates outweigh the advantages."[27] However, SEIA recommends that, instead of eliminating the minor update of the Avoided Cost Calculator, the Commission define what constitutes minor, given that the Staff Proposal still necessitates such a definition.[28] SEIA offers the original definition in D.16-06-007— "updates to inputs in the [Avoided Cost Calculator] model that

[24] Staff Proposal at 16-17

[25] Staff Proposal at 17.

[26] Public Advocates Office Opening Brief at 4-5

[27] NRDC Opening Brief at 10.

[28] SEIA Opening Brief at 3.

are readily verifiable by all parties, such as the natural gas forecast and the cap & trade allowance cost forecast."[29]

CUE opposes the elimination of the minor update cycle asserting it will make the information in the Avoided Cost Calculator out-of-date and delay the opportunity to correct mistakes.[30] While not opposed to the elimination of the minor update of the Avoided Cost Calculator, SoCalGas cautions such elimination may unintentionally prevent the Commission from addressing errors in the Avoided Cost Calculator in a timely manner.[31] Hence, SoCalGas recommends allowing more time for review and baselining in an effort to avoid potential errors and capture corrections that would otherwise occur during the minor update process.[32] Others agree that a revised timeline may resolve the concerns about errors and allow for more transparency.

Joint Utilities assert the current schedule is disjointed and does not provide parties sufficient time to review and respond to the Staff Proposal.[33] CLECA and SEIA agree, contending the current schedule does not allow for additional workshops, discovery, or informal questions on the proposal, nor does it enable parties to present testimony to support or contest the proposal.[34] CLECA, Joint Utilities, NRDC, and SEIA similarly propose that the Staff Proposal be issued early in the procedural scheduled and followed by a technical workshop. [35]

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[29] D.16-06-007 at 6.

[30] CUE Opening Brief at 6.

[31] SoCalGas Opening Brief at 1-2 citing the Staff Proposal that highlighted past errors.

[32] SoCalGas Opening Brief at 2.

[33] Joint Utilities Opening Brief at 4.

[34] CLECA Opening Brief at 7 and SEIA Reply Brief at 4-5.

[35] Joint Utilities Opening Brief at 6, CLECA Opening Brief at 7, NRDC Opening Brief at 10 and SEIA Reply Brief at 4-5.

Joint Utilities offer a revised schedule that would closely mirror the original schedule, but expanded by a few months, with a proposed decision in the second quarter of the even-numbered year and the resolution process in the third quarter.[36]

Lastly, parties recommend changes regarding the timing of activities at the end of the proceeding schedule and for the resolution schedule. NRDC recommends issuance of a draft Avoided Cost Calculator for public comment prior to a Commission decision being issued.[37] Public Advocates Office recommends that, prior to the issuance of the resolution adopting the Avoided Cost Calculator, Energy Division should provide the draft updated Avoided Cost Calculator for party review for demonstrable, functional errors. Public Advocates Office also recommends the future development of an error reporting template to allocate resources more efficiently.[38] In reply briefs, SEIA proposes that party analysis and associated comments of the post-decision Avoided Cost Calculator modeling results be conducted in the formal proceeding and considered in the major update decision.[39]

In response to concerns about transparency, the Commission adopted the current biennial process for making changes to the Avoided Cost Calculator. In the second major update of the Avoided Cost Calculator since the Commission approved D.19-05-019, the record shows that revisions are needed to further improve transparency as well as the efficiency of the Avoided Cost Calculator update process. First, this decision finds that more time is needed to conduct the

[36] Joint Utilities Opening Brief at 6.

[37] NRDC Opening Brief at 10.

[38] Public Advocates Office Opening Brief at 5.

[39] SEIA Reply Brief at 5-6.

formal update of the Avoided Cost Calculator in order to prevent errors. This decision also finds that efficiencies can be made by rearranging certain activities. Parties are correct that the current timing of the staff proposal is misplaced. As such, the Commission should adjust the schedule such that a final staff proposal is provided to parties through a ruling, in the successor proceeding, issued approximately July 15 of odd-numbered years. As recommended by CLECA, Joint Utilities, NRDC, and SEIA, this decision also requires a workshop to discuss the staff proposal shortly after its issuance. Providing the final staff proposal and a workshop early in the proceeding will allow for improved transparency and, ultimately, a more robust record. Further, this decision extends the procedural timeline to ensure full development and consideration of the record. While the assigned Commissioner and Administrative Law Judge are authorized to develop the final schedule for the proceeding, the guidance for that schedule is as indicated in Table 1 below. As asserted by Joint Utilities, extending the schedule by an additional few months should not negatively impact proceedings that rely on the use of the Avoided Cost Calculator.

Table 1
Major Update for the Avoided Cost Calculator

Activity	Approximate Due Date
Ruling Introducing a Staff Proposal and Noticing Workshop and Adopted Schedule for the Update	July 15 (of odd-numbered years)
Workshop	August
Data Requests Conducted on the Staff Proposal	Through September
Opening Testimony Served	October
Rebuttal Testimony Served	November
Evidentiary Hearing Held	January (of even-numbered years)
Opening Brief Due	February (of even-numbered years)

Table 1 **Major Update for the Avoided Cost Calculator**	
Reply Brief Due	March (of even-numbered years)
Proposed Decision Issued	90 days after submission of record

In recognition of party and Commission resource limitations, this decision eliminates the minor update of the Avoided Cost Calculator that occurred in odd-numbered years. This will allow parties and Energy Division more time to concentrate on the biennial update occurring in even-numbered years. The Commission agrees with the assessment of Energy Division and many parties in this proceeding that there is little time between annual cycles and the tight schedule has resulted in insufficient review and benchmarking. CUE contends that elimination of the minor update will result in Avoided Cost Calculators that are not accurate. However, this decision finds that eliminating the minor update will provide improved review and benchmarking leading to improved accuracy.

Additionally, this decision finds it unnecessary to authorize Energy Division to conduct a routine minor update of the Avoided Cost Calculator, if there is a delay in the formal proceeding. In the unlikely event of a delay in the major update, the assigned Commissioner and Administrative Law Judge can work with parties to determine whether a minor update is necessary, what the update would entail, (*i.e.*, the definition of minor) and develop a plan to proceed.

This decision maintains the related but separate resolution process, with modifications. SEIA contends the resolution process should be subsumed into the formal proceeding, asserting that the party analysis and comments on the modeling results should be on the record and addressed in the major update decision. However, the final Avoided Cost Calculator modeling cannot be performed until after a Commission decision on policies and modeling changes

is adopted. SEIA's recommendation would require two decisions: a decision adopting the changes to the Avoided Cost Calculator and a decision adopting the final Avoided Cost Calculator, which could then require additional briefing resulting in a longer regulatory process. This decision finds the use of the resolution process for adopting a final Avoided Cost Calculator to be efficient and effective, while allowing for due process. The dual decision-resolution process is akin to the decision-advice letter process used often by the Commission to adopt tariff changes. With the Avoided Cost Calculator, policies and modeling changes are addressed in a Commission decision, which is followed by the informal resolution process where the technical details of the Avoided Cost Calculator are finalized.

While this decision maintains the current resolution process, the record shows that changes to the process are needed for improved transparency. The Commission agrees with NRDC, Public Advocates Office, and SEIA that the review of the draft Avoided Cost Calculator and the associated SERVM model necessitates additional time, increased transparency, and improved due process. Joint Utilities highlight that prices from the SERVM model are not reviewed as part of the IRP proceeding.[40] As such, this decision directs that a draft Avoided Cost Calculator be provided to parties at least six weeks prior to the issuance of the draft resolution adopting the updated Avoided Cost Calculator. Energy Division is authorized to hold a workshop and allow for informal written comments on the draft Avoided Cost Calculator. The Commission declines to adopt the recommendation by Public Advocates Office to limit written informal comments to demonstrable, functional errors with reference to the specific cell in

[40] Joint Utilities Reply Brief at 20.

which the errors occur. Such limitations could impede the process leading to a less efficient process. Accordingly, this decision also declines to adopt the proposal to development and implement an error reporting template as error reporting can be conducted more efficiently through the workshop discussion and subsequent informal comments. The draft resolution adopting the Avoided Cost Calculator shall include a discussion of the workshop and the informal written comments. Finally, this decision revises the May 1 deadline for issuance of the draft resolution and draft Avoided Cost Calculator and establishes a new deadline of 90 days following the adoption of the decision updating the Avoided Cost Calculator. The successor proceeding will include an in-depth review of the schedule.

3.1.3. Coordination with Integrated Resource Planning Proceeding

In section 3.1.2, the Commission determined that it is reasonable to maintain the current dual process of a decision adopting policies for and updates to the Avoided Cost Calculator followed by a resolution adopting the updated calculator. Previously, this decision described the relationship between the update of the Avoided Cost Calculator and the IRP proceeding, highlighting that IRP modeling provides inputs to the Avoided Cost Calculator. This section addresses the issues related to the inputs from the IRP proceeding and confirms that the Commission will use the most recent adopted capacity expansion plan (either a Reference System Plan, Preferred System Plan, or Transmission Planning Process Plan), including the RESOLVE "No New DER" Scenario outputs, to update the Avoided Cost Calculator. (Proposals regarding the "No New DER" Scenario are addressed in Section 3.1.4 below.) This section also addresses the consideration of results of alternate models as requested by SEIA

and disputes the claim by CALSSA and SEIA that the IRP is not accurate because it does not incorporate the impacts of electrification.

The Staff Proposal recommends that future updates of the Avoided Cost Calculator rely upon the most recently adopted capacity expansion plan, including the "No New DER" Scenario. However, if there is no current adopted plan, Energy Division proposes using the most recent adopted plan or use of more recent RESOLVE results. As discussed in Section 3.1.2, the Commission orders a lengthier review period for the updated Avoided Cost Calculator, prior to issuance of the draft resolution approving the final Avoided Cost Calculator. To further improve transparency, the Staff Proposal recommends providing details of the "No New DER" Scenario with the draft updated Avoided Cost Calculator (if not sooner), along with the proposed data sets provided in Table 2 below.

Table 2[41]
Proposed Data Sets for Review for Avoided Cost Calculator

Category of Data	Proposed Data Set to be Provided
SERVM	IRP resource build by scenario, gas forecast, fossil plant heat rates, and renewable profiles
Modeling Documents	Key changes made to SERVM since last update
Raw Results	SERVM dispatch raw results for a typical week in each season for a subset of years
Post-processed Results	Post-processed scarcity adjusted price results
Benchmarking Results	Month-hour average heatmap of raw energy and ancillary service prices, compare with historical prices for a subset of years
Benchmarking Results	Price duration curve for prices, compared with historical prices for a subset of years

[41] Staff Proposal at Table 7.1.

Parties generally support reliance upon the most recently adopted capacity expansion plan for updating the Avoided Cost Calculator.[42] While the Staff Proposal suggested using recent RESOLVE results if an adopted capacity expansion plan is not available, no party supported this. Joint Utilities and SEIA agree that there is little risk of the use of an out-of-date approved capacity expansion plan.[43] However, SEIA asserts the use of a resource plan that has not been approved by the Commission undermines the transparency of the Avoided Cost Calculator process.[44] SEIA notes the Commission has previously stated the need for the Avoided Cost Calculator use data to be determined by a transparent stakeholder process.[45]

This decision finds that use of an adopted capacity expansion plan in the Avoided Cost Calculator leads to a more transparent process. While the most recent decision in the IRP, D.22-02-004, adopted a Preferred System Plan portfolio, the decision also commits to continuing a two-year IRP planning with the next Preferred System Plan due for adoption at the end of 2023, in time for the next update of the Avoided Cost Calculator in 2024.[46] This should eliminate Energy Division's concern of using an out-of-date capacity expansion plan.

Joint Utilities and SEIA concur that there is need for additional transparency; this overlaps with the need for additional transparency in the resolution process discussed above. In the Staff Proposal, Energy Division

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[42] *See* Joint Utilities Opening Brief at 7, NRDC Opening Brief at 10, and SEIA Opening Brief at 11-13.

[43] Joint Utilities Opening Brief at 7 citing SEI-01 at 16 and SEIA Opening Brief at 11-13.

[44] SEIA Opening Brief at 13.

[45] SEIA Opening Brief at 13 citing Resolution E-5150 (June 24, 2021) at 24.

[46] D.22-02-004 at 2-3, and Ordering Paragraphs 7 and 14.

recommends increasing the review time and the amount of data provided for stakeholder review (as shown in Table 2 above).[47] NRDC supports the expanded list of data sets.[48] Joint Utilities also support the Staff Proposal but recommend that Energy Division provide six weeks to review SERVM results and the draft Avoided Cost Calculator.[49] Further, Joint Utilities request that the review include the opportunity to ask questions and provide technical comments prior to the issuance of the draft resolution adopting the Avoided Cost Calculator.[50] SEIA agrees that parties should be afforded more due process such as the opportunity to submit data requests seeking further explanation, prior to the workshop.[51] As previously discussed above, SEIA considers it "imperative that party comments and analysis of the modeling be on the record of the [formal] proceeding."[52]

As stated above, this decision finds the resolution process is an efficient and effective process for adopting the final Avoided Cost Calculator, following adoption of the policy and modeling changes in this decision. However, the Commission agrees with SEIA and Joint Utilities that additional steps are needed to ensure an appropriate level of due process. The successor proceeding will consider a process to determine which adopted capacity expansion plan from the IRP proceeding will be used for updates of the Avoided Cost Calculator, and determine a schedule for Energy Division to provide the data sets outlined in

[47] Staff Proposal at 26.

[48] NRDC Opening Brief at 10.

[49] Joint Utilities Opening Brief at 8

[50] Joint Utilities Opening Brief at 8.

[51] SEIA Opening Brief at 14.

[52] SEIA Opening Brief at 14.

Table 2 above. If Energy Division encounters modeling complications that will cause a delay in this timeline, they are instructed to send an email to parties describing the delay and providing a new issuance date. Approximately four weeks following the adoption of decisions updating the Avoided Cost Calculator (beginning with this decision), Energy Division will provide the draft revised Avoided Cost Calculator results and notice of a workshop to discuss the draft calculator and the data sets listed in Table 2 above. Additionally, Energy Division will establish a deadline for receiving data requests and will allow for informal stakeholder comments following the workshop but prior to the issuance of the draft resolution adopting a revised Avoided Cost Calculator. The draft resolution will provide an overview of the workshop and stakeholder comments.

There are three other issues raised by parties with respect to the coordination between IRP and updates of the Avoided Cost Calculator. Two issues revolve around the question of whether the IRP accurately reflects electrification, and one issue concerns the consideration of alternatives to the RESOLVE model.

CALSSA asserts that current IRP modeling does not adequately reflect increased load due to electrification and fails to capture the benefits of cost-effective electrification.[53] CALSSA recommends that Avoided Cost Calculator updates should coordinate with the CEC IEPR and IRP processes to ensure that future updates to IEPR and IRP include full electrification loads for incorporation into future Avoided Cost Calculator updates. In response, Public Advocates Office labels CALSSA's premise flawed, maintaining that the purpose of the IEPR is to provide a cohesive approach to identifying and solving the state's

[53] CALSSA Opening Brief at 2-5.

pressing energy needs and issues.[54] Public Advocates Office argues that because of the uncertainty associated with forecasting an economy-wide response to the state's long-term emission reduction goals (as opposed to mandated targets), "what if" forecasts should not be included in the Avoided Cost Calculator. Public Advocates Office submits the CEC's "what if" forecast analysis is geared toward policy compliance and aspirational goal setting.[55] Similarly, SEIA recommends the Avoided Cost Calculator should use a Zero Emission Scenario for 2045 that captures all costs of full decarbonization.[56] SEIA claims the current IRP modeling is incomplete, failing to reduce the electric sectors emissions in 2045 to levels consistent with the goal of decarbonization.[57]

As pointed out by Joint Utilities, the IRP is the proceeding to chart the electric sector's path to decarbonization. The Commission has repeatedly stated that the Avoided Cost Calculator should align with the IRP proceeding, not the other way around. Such alignment ensures "an accurate reflection of current [demand side and supply side] resource planning objectives."[58] Any disagreement with the analysis or outcomes of the modeling in IRP should be conveyed in the IRP proceeding. Accordingly, this decision declines to revise the outputs of the IRP modeling for purposes of updating the Avoided Cost Calculator, in order to address SEIA and CALSSA's disagreement with the modeling results.

[54] Public Advocates Office Opening Brief at 8.

[55] Public Advocates Office Opening Brief at 8 citing PAO-04.

[56] SEIA Opening Brief at 14-15

[57] SEIA Opening Brief at 15-18.

[58] D.20-04-010 at 24.

Relatedly, SEIA recommends the Commission consider alternatives to the RESOLVE and SERVM models, such as Vibrant Clean Energy's WISdom:P model. Similarly, CALSSA contends inputs to the Avoided Cost Calculator do not assume the full amount of electrification to meet statewide clean energy targets and, thus, recommends Energy Division "work with Vibrant Clean Energy to align [Vibrant's] California model inputs with RESOLVE inputs and use the results to inform future Avoided Cost Calculator updates."[59] As discussed above, any disagreement with the inputs and outcomes of the RESOLVE or SERVM model or the selection of the model used should be conveyed in the IRP proceeding. Pursuant to D.20-04-010, the Commission has directed the update of the Avoided Cost Calculator shall align with work in the IRP, use the "No New DER" Scenario from the RESOLVE model, and use the SERVM software for production cost modeling.[60] The validity of the Vibrant Study is discussed in section 3.2.7.

3.1.4. "No New DER" Portfolio

The purpose of the "No New DER" Scenario is to create a hypothetical counterfactual of what the grid would look like if there were no ratepayer-funded distributed energy resources programs.[61] This decision corrects the "No New DER" Portfolio by accounting for all distributed energy resources, both load reducing and load increasing. As described below, transportation and building electrification load are added to the list of distributed energy resources removed from the base case to create the "No New DER" scenario.

[59] CALSSA Opening Brief at 9-10.

[60] D.20-04-010 at Conclusions of Law 2, 5 and 6.

[61] Resolution E-5150 at 27.

Joint Utilities, Public Advocates Office, and NRDC support the Staff Proposal to revise the "No New DER" Scenario by removing distributed energy resources that add load, in addition to those resources that reduce or shift load. NRDC maintains that the "No New DER" Scenario determines the difference in supply-side costs that are consequent to no new distributed energy resources coming onto the grid, as more supply-side resources are needed to meet overall demand.[62] Joint Utilities assert the proposal corrects the current omission of the load growth distributed energy resources, despite the fact that they are statutorily defined as distributed energy resources.[63]

Public Advocates Office also expresses support for revising the "No New DER" Scenario. However, Public Advocates Office's opening brief focuses on rebutting a SEIA proposal to add land-use and build constraints into the Avoided Cost Calculator.[64] Public Advocates Office asserts the SEIA proposal is based on an incorrect premise that the land-use and build constraints are needed to correct what SEIA alleges is volatility of the Avoided Cost Calculator between 2020 and 2021.[65] Public Advocates Office contends there was no volatility but rather a modeling change to correct an error in gas power plant runtime estimates.[66] Hence, Public Advocates Office contends the Commission should

[62] NRDC Opening Brief at 17-18.

[63] Joint Utilities Opening Brief at 10 citing AB 327 and Public Utilities Code Section 769(a) which defines distributed resources as including energy efficiency, energy storage, electric vehicles, and demand response technologies. Joint Utilities also cite FERC Order No. 2222, 86 FR 16511, June 1 2021 at 11 which states that distributed energy resources "may include, but are not limited to, …demand response, energy efficiency, thermal storage, and electric vehicles and their supply equipment."

[64] Public Advocates Office Opening Brief at 9 citing Exhibit SEI-01 at 15.

[65] Public Advocates Office Opening Brief at 9 citing Exhibit SEI-01 at 6.

[66] Public Advocates Office Opening Brief at 9-10.

not modify the "No New DER" scenario to include land-use and build constraints.

While SEIA does not address their proposal (to add land-use and build constraints in the "No New DER" scenario) in opening briefs, they defend this proposal in reply briefs maintaining that there was volatility between the 2020 and 2021 Avoided Cost Calculator results due to changes in modeling methods in SERVM.[67] SEIA also clarifies its proposal: recommending that "the "No New DER" scenario should assume, through 2026, no additional utility-scale resources can be procured beyond those approved in the Commission's mid-term procurement order" and that, after 2026, modeling of these resources should include annual build limits.[68] SEIA contends the annual build limits is a practice the Commission used in the 2020 Reference System Plan.[69] SEIA further clarifies that they propose the Commission "use the same practices in the modeling of the "No New DER" scenario that it applied to the fully-vetted and approved Reference System Plan for the 2020 Avoided Cost Calculator update."[70]

Turning back to SEIA's opening brief, SEIA supports the proposal to remove load-increasing distributed energy resources from the base case, with two caveats: i) careful consideration of hourly load profiles of the load-building distributed energy resources and ii) the elimination of portfolio rebalancing adjustments.[71] SEIA also recommends that Commission allow party review of assumptions for hourly profiles of load-building distributed energy resources.

[67] SEIA Reply Brief at 14.

[68] SEIA Reply Brief at 14.

[69] SEIA Reply Brief at 14.

[70] SEIA Reply Brief at 14.

[71] SEIA Opening Brief at 18.

CALSSA opposes the proposal to remove load growth from electrification, asserting that a separate counterfactual needs to be developed. CALSSA asserts that to evaluate measures that reduce load, the Commission must look at the costs of meeting the full projected load without those measures and compare it to the costs with the measures. Hence, CALSSA contends the counterfactual for load growth resources require the Commission to evaluate load net of all expected generation, including customer generation, and then add the additional load from the measure to determine the cost differential.[72] CALSSA asserts the Staff Proposal is not justified.[73]

The Commission finds the recommendation by Energy Division—to revise the "No New DER" Scenario by removing distributed energy resources that add load--is justified. The Staff Proposal contends this revision is necessary to properly value the avoided costs of distributed energy resources. As underscored by Joint Utilities, distributed energy resources are statutorily defined as including electric vehicles. The Commission agrees that load growth should be removed from the "No New DER" Scenario to accurately portray what the grid would look like if there were no ratepayer-funded distributed energy resource programs.

With respect to SEIA's related proposals, this decision reiterates that practices regarding the Reference System Plan are determined in the IRP proceeding as part of the SERVM modeling and will not be revised in this proceeding.

[72] CALSSA Opening Brief at 8-9.

[73] CALSSA Opening Brief at 8.

3.1.5. Using Avoided Cost Calculator to Determine Increased Supply Costs

This decision formally adopts the practice to use the Avoided Cost Calculator to determine increased supply costs. As discussed below, it has been the practice of the Commission to use the Avoided Cost Calculator to determine the increased supply costs of the fuel substitution measures that are part of the energy efficiency portfolio, but this practice has never been formally adopted by the Commission.

The Staff Proposal asks parties to comment on whether the Avoided Cost Calculator should be used to determine the increased supply costs of electricity resulting from decarbonization efforts. Energy Division points to several examples where the data contained in the Avoided Cost Calculator has been used for other purposes such as estimating greenhouse gas emissions.[74]

Joint Utilities agree that it is logical to use marginal avoided costs from the Avoided Cost Calculator to determine the increased supply costs of electricity that result from decarbonization efforts. Joint Utilities contend the Avoided Cost Calculator contains the most complete account of system-level marginal costs for energy supply and delivery.[75] Further, Joint Utilities assert this would continue to promote consistency in the evaluation of distributed energy resources across various technologies and programs.[76] Public Advocates Office also supports the use of the Avoided Cost Calculator to evaluate increased supply costs, noting the 2020 Avoided Cost Calculator Documentation states that the 2020 Avoided Cost Calculator "has been updated to fully support evaluation of electrification

[74] Staff Proposal at 38.

[75] Joint Utilities Opening Brief at 9.

[76] Joint Utilities Opening Brief at 9.

measures that increase load, but affect total greenhouse gas emissions."[77] No other party commented on the issue.

This decision determines it reasonable to formally adopt, as a policy, the past practice of using the Avoided Cost Calculator to evaluate increased supply costs. The Commission finds that the wealth of data contained in the calculator should be used to its fullest potential.

3.1.6. Methane Leakage Issues

Current modeling policies for estimating the avoided costs of methane leakage are maintained. Parties present arguments for three possible outcomes when addressing the avoided costs of methane leakage: i) continuing to account for the avoided costs of in-state methane leakage; ii) expanding the avoided costs of methane leakage to include out-of-state methane leakage; and iii) elimination from the Avoided Cost Calculator of avoided costs of methane leakage. As discussed below, while this decision maintains current practice of accounting for in-state methane leakage, Energy Division is authorized to continue to monitor research and potential legislation on this issue and provide a status report in the next update of the Avoided Cost Calculator.

As adopted by the Commission in D.20-04-010, the current Avoided Cost Calculator includes an avoided cost of methane leakage associated with the production and transportation of natural gas produced in-state. In the 2020 update of the Avoided Cost Calculator, several parties argued against including methane leakage as an avoided cost.[78] CUE repeats this opposition, contending methane leakage is a societal benefit and not an avoided cost. In D.20-04-010, the

[77] Public Advocates Office Opening Brief at 9 citing 2020 Avoided Cost Calculator Documentation at 1.

[78] *See* D.20-04-010 at 63-64.

Commission found that methane leakage is in the CARB carbon inventory and, therefore, its reduction contributes to ratepayer-funded greenhouse gas emissions reduction efforts, which leads to avoided costs.[79] This remains true today. Accordingly, this decision declines to adopt the proposals by CUE to eliminate all avoided costs of methane leakage from the Avoided Cost Calculator.[80]

SEIA supports inclusion of the methane leakage avoided costs but recommends expanding it to account for both in-state and out-of-state leakage. SEIA contends that "failing to recognize the full costs of methane leakage will artificially decrease the cost-effectiveness of [distributed energy resources] on which the state plans to rely to meet its [greenhouse gas] reduction goals."[81] Joint Utilities oppose expanding the calculation of the avoided cost to account for leakage that occurs outside of California. Joint Utilities assert there is no compliance mechanism that equates to a ratepayer costs, noting that the Commission adopted an avoided cost for in-state methane leakage because it is captured within CARB's emissions database.[82] CARB's greenhouse gas inventory does not include emissions from the combustion of fuels purchased outside of California that are used in-state. SEIA argues there is no basis for restricting the avoided cost of methane emissions to that associated with gas produced in-state, calling it arbitrary and inconsistent with other greenhouse gas regulations. SoCalGas points to D.20-04-010 which states that "reduced out-of-state methane leakage is not strictly an avoided cost to California ratepayers, as

[79] D.20-04-010 at 64.

[80] CUE Opening Brief at 8.

[81] SEIA Reply Brief at 18.

[82] Joint Utilities Opening Brief at 12 citing JUT-02 at 12 which cites the Avoided Cost Calculator Documentation at 81.

defined by the current avoided cost framework."[83] SoCalGas contends inclusion of out-of-state methane leakage values in the Avoided Cost Calculator would arbitrarily draw boundary conditions on costs outside of those avoided by California ratepayers or included in the CARB inventory."[84]

The Commission is mandated to work with CARB in terms of regulating greenhouse gas emissions. It is prudent to ensure Commission measures align with CARB's emissions inventory. Accordingly, this decision declines to adopt the SEIA proposal to include out-of-state methane leakage in the calculation of the avoided costs of methane leakage. The Commission recognizes that greenhouse gas emissions know no state boundary. Hence, this decision authorizes the Energy Division to continue to monitor related activities, including legislation and research, and provide an update during the next update of the Avoided Cost Calculator.

3.1.7. Sensitivity Analyses

At this time, the Commission declines to adopt the SEIA proposal to consider sensitivity cases for the natural gas forecast, the cap-and-trade allowance forecast, and the Greenhouse Gas Adder. As discussed below, this decision finds there is value in a more thorough discussion and analysis to develop the guidelines for its use. To ensure adequate time to develop such a record, this topic should be included in the scope of the successor proceeding that addresses future revisions of the Avoided Cost Calculator and other cost-effectiveness framework matters.

[83] SoCalGas Opening Brief at 4.

[84] SoCalGas Opening Brief at 4 citing SCG-01 at 4.

SEIA proposes the Commission revise the Avoided Cost Calculator to include sensitivity cases showing a range of values for keys inputs for the natural gas forecast, the cap-and-trade allowance forecast, and the Greenhouse Gas Adder. Joint Utilities support the recommendation but contend the record is unclear how the sensitivities should be constructed in the Avoided Cost Calculator or used in demand-side proceedings.[85] SEIA recommends the sensitivity cases be based on existing IRP sensitivity cases, including variations in load forecasts and resource costs.[86] SEIA further recommends that determinations regarding how the sensitivity analyses will be used should be made in "resources specific proceedings in which the [Avoided Cost Calculator] is used."[87]

Public Advocates Office asserts that enabling the use of different Avoided Cost Calculator results conflicts with the Commission directive to create a cost-effective framework that is consistent across all distributed energy resources.[88] SEIA argues the sensitivity analyses "will provide a broader base of knowledge and date to inform those separate proceedings," stating "it is best practice in resource assessment to consider sensitivity cases."[89] Public Advocates Office expresses concern that "parties may advocate for different Avoided Cost Calculator results based on the sensitivities in each resource specific [distributed energy resource] proceeding."[90]

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[85] Joint Utilities Opening Brief at 13.

[86] SEIA Opening Brief at 24 and SEIA Reply Brief at 19.

[87] SEIA Reply Brief at 19.

[88] Public Advocates Office Opening Brief at 11 citing D.16-06-007 and D.15-09-022.

[89] SEIA Reply Brief at 19.

[90] Public Advocates Office Opening Brief at 11.

NRDC agrees that modeling sensitivities to understand how key inputs and assumptions drive avoided costs could provide useful data and recommends exploration in the successor proceeding.[91] However, NRDC cautions that sensitivities have to be carefully defined and be based on specific policy decisions.[92] Joint Utilities agree with NRDC's warning, noting the purpose of the Avoided Cost Calculator is to provide a "single set of avoided costs to use for evaluation of all [distributed energy resources]."[93] Mirroring Public Advocates Office's concern, Joint Utilities agree that allowing different Avoided Cost Calculator results contradicts the policy to create a consistent cost-effectiveness framework for all distributed energy resources.[94]

The Commission agrees that sensitivity analysis is a useful tool, when carefully constructed to make it useful. Without this careful construction and clear guidelines, parties could choose a sensitivity that creates desired outcomes. The record does not currently provide the careful construction or clear guidelines. Hence, this decision adopts NRDC's recommendation to continue to explore sensitivity analysis in the successor proceeding that addresses future revisions of the Avoided Cost Calculator and other cost-effectiveness framework matters.

3.2. Modeling Issues

In section 3.2, proposals to modify modeling in the Avoided Cost Calculator are discussed. These proposals range from minor changes that correct known errors in the Avoided Cost Calculator to a comprehensive revision in the

[91] NRDC Opening Brief at 11.

[92] NRDC Opening Brief at 11.

[93] Joint Utilities Reply Brief at 9.

[94] Joint Utilities Reply Brief at 8-9

approach to alignment between modeling conducted in the Avoided Cost Calculator and modeling in the IRP proceeding.

3.2.1. Market Equilibrium Approach

The Commission finds value in continuing exploration of the Staff Proposal's Market Equilibrium Approach. However, as noted by several parties, there are questions and concerns that should be addressed prior to adoption and implementation of this proposal. As further discussed below, this decision authorizes Energy Division to develop a full application example of the Market Equilibrium approach—using the most recently adopted IRP modeling—for discussion in the successor to this proceeding and in preparation for the 2024 Avoided Cost Calculator update.

In the Staff Proposal, Energy Division contends the Market Equilibrium Approach will improve alignment of the Avoided Cost Calculator with IRP modeling by calculating prices for greenhouse gas emissions, resource adequacy, and Renewables Portfolio Standard based on the portfolio of resources in the IRP, as opposed to the current approach of calculating prices based on a four-hour utility scale battery storage plant. Energy Division asserts this approach is more consistent with current market practices, provides transparent accounting, accounts for multiple revenue streams, and does not require multiple runs of RESOLVE and SERVM models.[95]

NRDC is the sole supporter of adoption of the Market Equilibrium Approach in this update of the Avoided Cost Calculator. NRDC agrees that the approach better reflects market practice, better accounts for multiple services

[95] Staff Proposal at 4.

provided by resources, and is a simpler method than is currently used.[96] However, NRDC also recommends improving the approach by setting greenhouse gas emissions costs at the cap-and-trade forecast, to simplify the approach.[97]

While other parties see value in the Market Equilibrium Approach, these parties caution that adoption is premature and additional technical review is necessary. For example, Joint Utilities requests to perform a detailed technical review using the IRP portfolio, as the Staff Proposal uses a simple conceptual example with illustrative resources that do not include a storage resource.[98] Joint Utilities contend a robust record is needed, noting, for example, that the documentation and example provided in the Staff Proposal "fail to address how the adder component of the [greenhouse gas} planning value is distinct from the SB 100 avoided cost."[99] Joint Utilities recommend, and Public Advocates Office agrees, that consideration of the Market Equilibrium Approach be deferred to the 2024 update of the Avoided Cost Calculator so that staff can develop and share detailed modeling of the approach using the adopted Preferred System Plan "No New DER" Scenario from the IRP.[100]

Similarly, CLECA asserts that the Market Equilibrium Approach needs more development and proof that it will produce the correct economic signals.[101] CLECA contends the proposal makes statements that appear to be contrary to

[96] NRDC Opening Brief at 12.

[97] NRDC Opening Brief at 12.

[98] Joint Utilities Opening Brief at 13 citing Staff Proposal at 4.

[99] Joint Utilities Opening Brief at 14.

[100] Joint Utilities Opening Brief at 14 and Public Advocates Office Reply Brief at 3.

[101] CLECA Opening Brief at 13.

economic theory by basing economic decisions on average price signals rather than marginal price signals.[102]

Taking a different viewpoint, SEIA argues the Market Equilibrium Approach is not necessary as SEIA disagrees that there is a problem with "double counting of avoided costs in the Avoided Cost Calculator compared to the shadow prices from the IRP."[103] SEIA contends no analysis or testimony has been submitted quantifying this alleged doublecounting.[104] SEIA maintains the avoided cost for generation capacity has been significantly lower than the generation capacity shadow price from the IRP – thus there has been no double counting but possible undercounting.[105] Instead, SEIA proposes the Commission develop a method to use all three shadow prices from RESOLVE as opposed to the entirely new Market Equilibrium Approach.[106] SEIA recommends the Commission instruct Energy Division to further develop the Market Equilibrium Approach and provide stakeholders time and due process to review, including allowing for discovery and formal comments.

The Commission agrees with the majority of parties that additional study of the Market Equilibrium Approach needs to be conducted prior to consideration of adoption. This decision finds that the single example provided in the Staff Proposal is not sufficient for ensuring to the Commission that the approach will produce the correct economic signals it promises. However, this decision finds it prudent to continue to explore this approach given its potential

[102] CLECA Opening Brief at 8.

[103] SEIA Opening Brief at 26.

[104] SEIA Opening Brief at 26.

[105] SEIA Opening Brief at 26-28.

[106] SEIA Opening Brief at 28-29.

benefit of creating a technology-agnostic approach to avoided costs that better aligns with the IRP.

Accordingly, this decision instructs Energy Division to begin to develop a full application example of the Market Equilibrium approach—using the most recently adopted IRP modeling—for discussion in the successor to this proceeding and in preparation for the 2024 Avoided Cost Calculator update. The scope of the successor to this proceeding should address whether the Commission should adopt the Market Equilibrium Approach, in which the parties will be provided an opportunity to discuss the staff proposal and the additional modeling during a workshop and subsequent formal comments. This work should be conducted prior to the commencement of and in preparation for the 2024 Avoided Cost Calculator update.

3.2.2. Battery Storage Data

CLECA and SEIA submit that certain battery storage data used in the IRP, the Avoided Cost Calculator, and several general rate cases are inaccurate: i) battery storage costs, ii) battery contract assumption, iii) the real discount rate to annualize the capital investment, and iv) use of a discount rate instead of a deferral calculation. These are each addressed separately below.

First, CLECA and SEIA contend that battery storage costs do not reflect recent market data. CLECA compares the Avoided Cost Calculator's installed capital costs of $268 per kilowatt for a one-hour battery with market installed capital costs ranging from $374/kWh for a Commission-approved SCE battery storage project to $395/kWh for a utility scale battery storage indicated in a market survey conducted by the National Renewable Energy Laboratory

(NREL).[107] SEIA similarly contends battery storage costs used in the Avoided Cost Calculator should be replaced with more accurate and comprehensive data from the NREL survey, which synthesizes battery cost data from 19 sources.[108]

Joint Utilities and Public Advocates Office argue that using different costs and financial assumptions in the IRP and Avoided Cost Calculator update would be contrary to the Commission directive to align the two and would lead to inconsistent results.[109] Public Advocates Office further assert that a misalignment would create inequities between demand- and supply-side valuation.[110] Noting that the Joint Utilities never rebut the comparison of costs, CLECA recommends the Commission ignore calls from the Joint Utilities to maintain alignment between the Avoided Cost Calculator and IRP. CLECA asserts alignment can be maintained by directing the same corrections be made to the IRP model.[111]

This decision declines to adopt the requested "corrections" claimed by CLECA, without prejudice. The battery storage data are inputs to the IRP modeling. Alignment between the IRP and the Avoided Cost Calculator is not simply about a commitment to consistency, as asserted by CLECA and SEIA. Rather, because utility planning is guided by the IRP modeling, the value of distributed energy resources depends on the extent to which the costs of that planning can be avoided. If CLECA and SEIA consider IRP inputs to be

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[107] CLECA Opening Brief at 14-15 and Table 1 citing SEI-01 at 48, CLE-03, supra, note 34, and TR Vol 2.

[108] SEIA Opening Brief at 32 citing SEI-01 at 48-49.

[109] Joint Utilities Opening Brief at 16-17 and Public Advocates Office Opening Brief at 12.

[110] Public Advocates Office Opening Brief at 12.

[111] CLECA Reply Brief at 11.

incorrect, the appropriate regulatory procedure is to have made these arguments in the IRP proceeding. SEIA asserts that it recognizes the importance of consistency across proceedings, but "the Commission has not provided an opportunity in the IRP proceeding to address this issue through a detailed evaluation of expert testimony and hearings."[112] The Commission is not persuaded by SEIA's reasoning. The Commission provides parties an opportunity to file comments in the IRP; SEIA and CLECA should have presented their arguments at that time. While the regulatory procedure is different – comments instead of testimony—the opportunity to be heard is available. Furthermore, the Commission discourages parties from using alternate proceedings in an attempt to get a desired outcome previously denied by the Commission, i.e., "venue shopping." Equally important, making a change to an IRP input in this proceeding would be a violation of the due process rights of parties in the IRP, because a party in the IRP proceeding may not be a party in this proceeding.

Turning to the second issue regarding battery storage data, CLECA asserts the battery contract assumption in the Avoided Cost Calculator should be 15 years, not the current 20-year value. CLECA contends that "the majority of battery contracts are either 10 or 15 years" with an average of 14 years.[113] Maintaining that the discrepancy between the Avoided Cost Calculator (20 years) and the market (10-15 years) allows the utility to recover its costs over an additional five years, CLECA claims this leads to an understatement of the annualized cost of the battery.[114] Joint Utilities assert that CLECA conflates

[112] SEIA Reply Brief at 20.

[113] CLECA Opening Brief at 20.

[114] CLECA Opening Brief at 20.

contract duration with battery lifetime, arguing that CLECA's correction would require a reduction in the augmentation cost and lead to an over-estimate of the cost of capacity by not subtracting for the end-of-life value of the battery.[115] CLECA rebuts this assertion by referencing the Lazard studies relied upon for IRP inputs, which CLECA maintains "makes clear that the 20 year figure is the contract term not the life of the battery.[116]

This decision declines to adopt CLECA's requested correction to the battery contract assumption, without prejudice. As noted by CLECA, the contract term obtained by the Lazard study is an input to the IRP. As such, this is not the correct procedural venue to request this change. As previously discussed, because utility planning is guided by IRP modeling, the value of distributed energy resources depends on the extent to which the costs of that planning can be avoided. Alignment between the IRP and the Avoided Cost Calculator is not simply about consistency. Here again, making a change to this input in this proceeding would not only create an unfair misalignment between distributed energy resources and supply side resources; it would also be a violation of the due process rights of parties in the IRP proceeding.

The last two battery storage proposed corrections allege annualization errors in the Avoided Cost Calculator calculations: iii) the real discount rate to annualize the capital investment, and iv) use of a discount rate instead of a deferral calculation. CLECA submits these two errors "result in a systematic understatement of avoided generation capacity annual cost."[117]

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[115] JUT-02 at 4.

[116] CLECA Reply Brief at 17.

[117] CLECA Opening Brief at 21.

CLECA contends that by assuming a 2 percent general price inflation and ignoring the decline in nominal dollars of battery cost, the Avoided Cost Calculator uses the wrong real discount rate to annualize the capital investment. CLECA asserts the avoided value should include the cost of the deferred investment and the value of acquiring a battery at a lower cost.[118] To correct this error, CLECA recommends use of a method developed by the National Economic Research Associates (NERA), which takes the difference between the cost of investment this year versus an investment delayed by one year to obtain the annual avoided cost of the investment. CLECA notes this formula is the foundation for the real economic carrying charge or RECC, used by the Commission in past cost allocation decisions.

With respect to the second related annualization error, CLECA asserts that the Avoided Cost Calculator's annualization method does not properly calculate the annualized cost because the net present value fails to match the value of the investment, which leads to increasing value when battery costs are declining over time.[119] CLECA recommends modifying the real discount rate and adjusting for the end-of-year value in the Avoided Cost Calculator Net CONE model.

Joint Utilities oppose adoption of these two proposals, asserting that to make such a change would create misalignment with the IRP. The Commission agrees that alignment with IRP on technology costs and cost forecasts is important, but disagrees that alignment with IRP on how those costs are annualized is required.

[118] CLECA Opening Brief at 22.

[119] CLECA Opening Brief at 23.

The Commission agrees that the annualized avoided cost value for generation capacity should reflect the value of deferring the investment to a later year when technology costs are lower. The NERA approach proposed by CLECA accomplishes this reflection. Further, this approach, the foundation of the RECC, has proven itself in past cost allocation proceedings at the Commission. Accordingly, this decision adopts the NERA method to take the difference between the cost of investment this year versus an investment delayed by one year to obtain the annual avoided cost of the investment. Further, this decision modifies the real discount rate and adjusts for the end-of-year value in the Avoided Cost Calculator Net CONE model. The application of the NERA method and specific values used in the Avoided Cost Calculator should be determined by Energy Division and its consultants, and will be included in the draft Avoided Cost Calculator for discussion and comment by parties.

3.2.3. Allocation of Generation Capacity Value

In the Staff Proposal, Energy Division describes a concern by stakeholders that the allocation of capacity value, which is based on RECAP modeling of Expected Unserved Energy, is predominantly found in the month of September, whereas the SERVM model allocates capacity value across the months of July, August and September. Energy Division investigated and could not determine "clear explanations for the differences with sufficient justification to recommend one model over the other."[120] As previously described above, the Staff Proposal made two recommendations: i) use RECAP with 24 hours in 10 years in place of 1 day in 10 years, or ii) use SERVM and remove Expected Unserved Energy in

[120] Staff Proposal at 11.

early morning spring hours that are driven by ramping rather than peak capacity constraints.

Only Joint Utilities and SEIA commented on this issue, and both support the Staff Proposal alternative that uses SERVM. Joint Utilities contend this proposal is "reasonable, justifiable, implementable, and accurate" and "should eliminate the apparently spurious morning ramp hours in the spring."[121] In testimony, Joint Utilities explain that use of SERVM yields capacity allocations using 8760 hours per year, rather than the 576 month-hour-day type bins used in the RECAP model; thus elimination the problematic step of assignment weights to individual hours based on a temperature threshold.[122] Noting that the SERVM Expected Unserved Energy results concentrate capacity shortfalls in few hours, Joint Utilities propose to add "a weighting on loss of upward reserves to correspond to stressed grid conditions that do not result in actual outages."[123]

The Commission agrees that grid conditions should not result in outages. However, a weighting on loss of upward reserves implies the use of a less stringent reliability target, which would conflict with the current loss of load expectation (LOLE) reliability target of 0.1 used to calculate the ELCC of supply-side resources. Furthermore, the SERVM modeling already accounts for operating reserves amounting to six percent of load. Because a loss of load event is triggered in SERVM when three percent spinning reserve and three percent regulation up reserves are not met, any loss of load that appears in the SERVM heatmap has already accounted for the loss of critical reserves in the current modeling framework.

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[121] Joint Utilities Opening Brief at 17-18.

[122] JUT-01 at 15.

[123] Joint Utilities Opening Brief at 18 citing JUT-01 at 15.

This decision adopts the Staff Proposal SERVM alternative to allocate generation capacity value but declines to adopt the Joint Utilities recommendation to add a weighting on loss of upward reserves. The Commission agrees that given the current conundrum of too many hours being unreasonably allocated to the month of September, the use of SERVM will provide a reasonable solution and outcome to allocation.

3.2.4. Non-hourly Avoided Costs

The Staff Proposal discusses whether and how to include three types of non-hourly avoided costs (secondary distribution costs, natural gas infrastructure costs, and refrigerant costs) in the Avoided Cost Calculator. This decision addresses the three types separately. Refrigerant costs are addressed in Section 3.2.9 below.

3.2.5. Secondary Distribution Costs

This decision adopts, on an interim basis, the proposal to continue to include secondary distribution costs in the Avoided Cost Calculator. As discussed below, in preparation for the 2024 update of the Avoided Cost Calculator, Joint Utilities shall work together to conduct a study of the distribution of customer final line transformer peaks across the year. This study will be reviewed in consideration of improving the method for quantifying and allocating secondary distribution costs in the 2024 update of the Avoided Cost Calculator.

The Staff Proposal contends that building and transportation electrification will significantly increase non-coincident individual loads connecting to the distribution system (which drives secondary distribution costs). Hence, Energy Division asserts it is necessary for the Commission to develop approaches to analyze the costs and benefits of increased electrification load on

the secondary system and evaluate strategies to reduce the associated primary and secondary distribution costs. In previous updates to the Avoided Cost Calculator, only PG&E provided general rate case data on secondary costs at a sufficient level of detail to include in the Avoided Cost Calculator; SDG&E and SCE have not segregated secondary distribution costs in their general rate cases in sufficient detail to be included in the Avoided Cost Calculator.[124]

The Staff Proposal recommends (for the 2022 update only) that the Avoided Cost Calculator continue to include secondary costs (where available) with primary distribution costs, and apply the allocation approach of peak diversified load, currently used for allocating primary distribution costs.[125] Energy Division recommends this as an interim solution until the Commission can develop alternative methods for quantifying and allocation secondary distribution costs in the Avoided Cost Calculator, including consideration of the PG&E final line transformer method recently adopted in D.21-11-016.[126]

In opposition, Joint Utilities propose that secondary distribution costs be eliminated from the Avoided Cost Calculator until an appropriate allocation method can be implemented.[127] While both Energy Division and Joint Utilities agree that secondary distribution costs are modest, Energy Division contends continuing to allocate these costs in the Avoided Cost Calculator until a better method is adopted is not consequential to the overall model.[128] However, Joint Utilities caution "continuing to inaccurately allocate secondary distribution costs

[124] Staff Proposal at 14-15.

[125] Staff Proposal at 14-15.

[126] Staff Proposal at 14-15.

[127] Joint Utilities Opening Brief at 18

[128] Staff Proposal at 14-15.

on an hourly basis sets a precedent [that] is inconsistent with D.21-11-016."[129] Joint Utilities also submit that removing secondary distribution costs from the calculator will align the three utilities' avoided distribution costs and allow them to work together to develop an appropriate allocation method.[130]

SEIA asserts the Joint Utilities' proposal to exclude secondary distribution costs from the Avoided Cost Calculator has been rejected previously by the Commission in Resolution E-5150.[131] SEIA states that, in that resolution, the Commission found that the lack of time dependence simply means that the marginal cost is the same in all hours; it does not mean the change is zero in all hours.[132]

This decision declines to adopt the proposal of Joint Utilities to eliminate secondary distribution costs from the Avoided Cost Calculator until an appropriate solution can be implemented. While Joint Utilities submit that removing the secondary distribution costs will align the three utilities and allow them to work together to develop an appropriate allocation method, Joint Utilities have not shown that its recommendation to move the secondary distribution costs would be a practicable option. As the Commission has already determined in Resolution E-5150, while secondary costs are not time-differentiated costs, this does not mean the cost is zero. Eliminating or zeroing out the secondary distribution costs would make it difficult if not impossible for third parties to determine the secondary distribution value for which their resources would be credited. This decision finds such removal

[129] Joint Utilities Opening Brief at 19.

[130] Joint Utilities Opening Brief at 19.

[131] SEIA Opening Brief at 33.

[132] SEIA Opening Brief at 33 citing E-5150 at 30-31.

would decrease the transparency of the Avoided Cost Calculator. Furthermore, including the secondary costs in the Avoided Cost Calculator would not prevent the three utilities from working with all stakeholders to develop an improved solution.

Accordingly, this decision adopts the interim two-year solution where secondary distribution costs are included in the Avoided Cost Calculator and allocated using peak diversified load, as is currently used for allocating primary distribution costs. The Commission declines to adopt the SEIA proposal to use the allocation approach of equal cents per kilowatt-hour. The Commission agrees with Joint Utilities that SEIA has conflated revenue allocation and rate design calculations. SEIA contends that PG&E already allocates marginal secondary distribution costs on an equal cents per kilowatt-hour basis to every hour of the year and that this allocation approach "has been used in the Avoided Cost Calculator to date and should continue to be used in the future."[133] Joint Utilities submit that SEIA is referring to PG&E's method for determining the forecast marginal cost revenue collected by rates but "this does not mean that the actual secondary cost is equal across all hours." PG&E cautions that revenue allocation and rate design calculations should not be construed as costs in the Avoided Cost Calculator "because rates often do not recover cost using the direct drivers of the cost," *e.g.*, recovery of demand-based costs through volumetric energy charges.[134]

The Commission agrees with Energy Division that it is necessary to develop approaches to analyze the costs and benefits of increased electrification

[133] SEIA Reply Brief at 35.

[134] Joint Utilities Reply Brief at 15.

load on the secondary system and evaluate strategies to reduce the associated primary and secondary distribution costs. Joint Utilities are directed to work together to develop alternative methods for quantifying and allocating secondary distribution costs in the Avoided Cost Calculator with a focus on using the PG&E distribution final line transformer calculations approach approved by the Commission in D.21-11-016. Joint Utilities shall file a report on their findings in the successor to this proceeding, no later than nine months from the adoption of this decision.

3.2.6. Natural Gas Infrastructure Costs

The Staff Proposal recommends the Commission adopt, for use in the Avoided Cost Calculator, a mechanism used for all-electric new construction energy efficiency measures, so that the avoided costs of natural gas distribution infrastructure can be used by all distributed energy resource programs.[135] Energy Division proposes using data from utilities' general rate case and marginal cost filing data and suggests this could be input on a separate tab in the Avoided Cost Calculator but would not be included in the hourly marginal costs. The Staff Proposal recommends the calculations be "added separately to the benefits used in cost-effectiveness tests, [and only for] new construction projects, measures, and programs that have this benefit."[136]

Utilities present differing positions on the Staff Proposal. Sempra Utilities consider the development of an Avoided Gas Infrastructure Costs (AGIC) in the Avoided Cost Calculator to be premature. Sempra Utilities assert the AGIC should, first, be informed by policy considerations (*e.g.*, existing statutory

[135] Staff Proposal at 15 citing Advice Letters 4386-G/6094-E and 4387-G/6095-E.

[136] Staff Proposal at 16.

parameters and associated activities) made in – what Sempra Utilities consider – the more appropriate venue of the Long-Term Gas Planning rulemaking and, second, consider related activities in the Building Decarbonization proceeding.[137] Sempra Utilities purport these policy considerations and activities may impact values that are incorporated in the Avoided Cost Calculator.[138] PG&E supports the proposed AGIC and agrees with the Staff Proposal that AGIC calculations should be placed on a separate tab in the Avoided Cost Calculator.[139]

PG&E requests the Commission improve the Staff Proposal by ensuring the five categories of costs currently used in the energy efficiency proceeding are included in the AGIC: i) mainline extension; ii) service extension; iii) meter; iv) in-house infrastructure; and v) plan reviews.[140] Sempra Utilities express concern about including customer costs because such inclusion would run contrary to the current framework and values typically incorporated in the Avoided Cost Calculator.[141] Agreeing with PG&E that further review of the cost data may be needed, Sempra Utilities maintain that customer/participant costs are inappropriate for the Avoided Cost Calculator.[142] PG&E clarifies that the cost data would not be included as traditional, marginal avoided cost components in the Avoided Cost Calculator but used in all-electric new construction proceedings only.[143]

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[137] Sempra Utilities Opening Brief at 2-4.

[138] Sempra Utilities Opening Brief at 2.

[139] PG&E Opening Brief at 1-2.

[140] PG&E Opening Brief at 2 citing PGE-01 at 1-2 and Staff Proposal at 15 at footnote 3.

[141] Sempra Utilities Reply Brief at 3.

[142] Sempra Utilities Reply Brief at 4.

[143] PG&E Reply Brief at 3.

This decision adopts the Staff Proposal recommendation to include an AGIC in the Avoided Cost Calculator. The Commission disagrees with the characterization that the AGIC is premature and should be addressed in a different proceeding. As noted in the Staff Proposal, new construction of all electric buildings avoids investment in new natural gas distribution infrastructure.[144] This decision finds the time is right to incorporate such a calculation into the Avoided Cost Calculator, given the electrification policies embraced by this Commission and that a similar mechanism is being used already for new-construction energy efficiency measures. The Commission agrees that while there is overlap with the Building Decarbonization and the Long-Term Gas rulemakings, neither address the specifics of the Avoided Cost Calculator or, as PG&E highlights, the nuances of the Avoided Cost Calculator. Hence, this decision finds R.14-10-003 is the appropriate venue to address the incorporation of an AGIC in the Avoided Cost Calculator.

For the 2022 update of the Avoided Cost Calculator, the Commission adopts three categories of costs: i) mainline extension; ii) service extension; and iii) meter. This decision adopts the values contained in each of the utilities' general rate cases, as adopted values for each of these categories. If this data is not readily available in utilities' general rate cases, utilities may use a data source that aligns with the AGIC categories of costs, subject to review and approval by Energy Division. As the Staff Proposal explains, these values will be placed on a separate tab in the Avoided Cost Calculator but not included in the hourly marginal costs. Separately (and only for new construction projects, measures, and programs that have this benefit), the values will be added to the benefits

[144] Staff Proposal at 15

used in cost-effectiveness tests. With respect to the other two categories of in-house infrastructure and plan reviews, these are avoided participant costs and the data for these categories is not available. The values for these categories will be determined through a Commission decision in individual proceedings for the programs and measures that have this benefit.

3.2.7. Transmission and Distribution Avoided Costs

Transmission and distribution avoided costs are discussed separately below. As the Staff Proposal addresses only distribution avoided costs, this decision considers these costs first.

3.2.7.1. Distribution Avoided Costs

Energy Division conducted a comparison of the utilities' general rate case and grid needs assessment (GNA) (including Distribution Deferral Opportunity Report (DDOR) data) forecast costs and found that the near-term distribution capacity costs calculated from GNA and DDOR are substantially lower than the general rate case based long-term distribution capacity costs.[145] Energy Division submits "the magnitude of these initial differences does raise questions about whether the marginal costs derived from the GNA data are overly low, or conversely, whether the [general rate case] based values are overly high."[146] The Staff Proposal recommends the Commission continue to investigate whether modifications to the methods for developing short- and long-term distribution avoided costs can and should be implemented.

Joint Utilities contend the current method to develop distribution avoided costs is appropriate. As described below, Joint Utilities submit that there are

[145] Staff Proposal at 17.

[146] Staff Proposal at 21.

explanations to address the concern expressed by Energy Division regarding the disparity between general rate case based long-term costs and GNA near-term distribution capacity costs.

With respect to PG&E's calculations, Joint Utilities contend the disparity is due to several factors. Joint Utilities assert the GNA provides a more accurate estimate for calculating near-term distribution deferrable capacity costs, in comparison to utility general rate case long-term costs.[147] Joint Utilities maintain that near-term avoided distribution cost is low for distributed energy resources due to the expectation that a majority of distributed energy resources occur in areas that have decreasing or flat load.[148] Regarding the discrepancy of the annual capacity investment forecast, Joint Utilities assert that annual distribution investments underlying PG&E's marginal distribution costs currently in the Avoided Cost Calculator are lower than what is indicated in the general rate case because PG&E excludes the cost of distribution upgrades unrelated to customer demand growth.[149] Joint Utilities add that discrepancy can also be attributed to the inclusion of forecasts for unknown but anticipated investments in the general rate case that are not included in the GNA.[150]

In the case of SCE, Joint Utilities contend the discrepancy can be attributed to two differences between general rate case data and the GNA: i) the general rate case includes more capacity project and expenditures versus the GNA because not all projects and expenditures can be deferred by distributed energy resources; and ii) the general rate case uses a blend of known projects and costs

[147] Joint Utilities Opening Brief at 20.

[148] Joint Utilities Opening Brief at 20.

[149] Joint Utilities Opening Brief at 20-21 citing Workpapers supporting A.19-11-019, Ex 2, Ch.7.

[150] Joint Utilities Opening Brief at 21.

trends to estimate expenditures while the GNA only uses specific scoped and approved projects.[151]

For SDG&E, Joint Utilities assert that the discrepancy is attributable to the idea that distributed energy resources "predominantly impact specified, deferrable distribution project work in the near-term, but can potentially impact broader types of distribution costs in the long term, including unknown but anticipated investments."[152]

Public Advocates Office recommends the Commission maintain the current distribution (and transmission) avoided costs until accurate avoided costs are discussed and adopted in R.21-06-017, the *Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future*.[153] Further, Public Advocates Office contends that questions regarding alleged underestimates of capacity deficiencies identified in the GNA should also be addressed in R.21-06-017.[154] CLECA disagrees, stating that the Commission should attempt to limit the adverse impact on ratepayers by applying an adjustment to the general rate case marginal costs.[155]

SEIA recommends the Commission address the discrepancy between the general rate case distribution capacity costs and the GNA distributed capacity costs by returning to prior practice of using long-term marginal distribution costs from general rate cases for avoided distribution costs in the Avoided Cost

[151] Joint Utilities Opening Brief at 21.

[152] Joint Utilities Opening Brief at 23.

[153] Public Advocates Office Opening Brief at 21.

[154] Public Advocates Office Opening Brief at 22.

[155] CLECA Reply Brief at 26.

Calculator.[156] SEIA contends that by looking at how all of a utility's distribution investments over time vary with the peak demands served from the distribution system, use of long-run marginal distribution costs can address several concerns described in the Staff Proposal including, for example, correctly estimating the number of upgrades distributed energy resources can displace.[157] Joint Utilities disagree with SEIA's proposal to use long-term marginal distribution costs to estimate avoided costs, noting that using the GNA data provides more granular near-term project data.[158]

CLECA also disagrees with SEIA and asserts that marginal costs generally overstate avoided costs to existing customers, which CLECA claims is supported by an Energy Division White Paper on avoided costs.[159] With respect to the Avoided Cost Calculator, CLECA asserts that reliance on marginal distribution (and transmission) costs from the utilities' general rate case filings overstates avoided distribution (and transmission) costs. CLECA contends that marginal costs are not the same as avoided costs and, thus, applying the full amount of marginal distribution (and transmission) costs from the marginal cost studies developed in general rate cases "necessarily overstates avoided cost."[160] Further, CLECA argues that while distributed energy resources can defer an upgrade of equipment, these resources cannot avoid the costs of the minimum-sized distribution system.[161] CLECA recommends reducing the avoided cost of

[156] SEIA Opening Brief at 40.

[157] SEIA Opening Brief at 40.

[158] Joint Utilities Reply Brief at 16.

[159] CLECA Reply Brief at 23 citing D.20-03-005 at 21.

[160] CLECA Opening Brief at 29-30.

[161] CLECA Opening Brief at 31-32.

distribution (and transmission) by 50 percent, because about half the Federal Energy Regulatory Commission (FERC) accounts are associated with minimum grid connections costs.[162] CLECA asserts the 50 percent decrease reflects the split between load and grid connection costs.[163]

SEIA opposes the CLECA proposal to reduce the avoided cost of distribution (and transmission) by 50 percent. SEIA contends CLECA provides no studies to support its assertions of overstated avoided costs.[164] However, CLECA points to the Staff Proposal, which approximates the discrepancy between avoided costs in the general rate case and the GNA at 50 percent.[165] Alleging that CLECA's analysis looked at embedded not marginal costs, SEIA calls CLECA's proposal arbitrary.[166] CLECA objects, however, stating that the identification of the FERC accounts related to unavoidable equipment, "indicates the marginal cost studies include components of a minimum distribution system" and asserts it is not an analysis of embedded costs.[167]

CUE supports CLECA's proposed reduction in distribution avoided costs and disagrees with Energy Division's recommendation to make no change to the avoided cost of distribution. CUE asserts there are three significant problems with the way distribution avoided costs are calculated: i) use of marginal costs from utilities' general rate case filings include costs unavoidable by distributed

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[162] CLECA Opening Brief at 32 citing TR Volume 2 at 195-196 and CLE-01 at 13:7 to 15:4.

[163] CLECA Opening Brief at 33 citing CLE-01 at 15:12-14.

[164] SEIA Opening Brief at 37.

[165] CLECA Reply Brief at 25 citing Staff Proposal at footnote 85, which notes the difference between PG&E's general rate case and GNA avoided costs is 54 percent and 69 percent for SCE.

[166] SEIA Opening Brief at 37-38.

[167] CLECA Reply Brief at 24-25.

energy resources;[168] ii) short-term avoided distribution values should be adjusted downwards; and iii) long-term avoided distribution costs should be adjusted downwards.[169]

This decision finds there are clear differences between the near-term distribution capacity costs calculated from GNA and DDOR and the general rate case based long-term distribution capacity costs. The Commission agrees that some of these differences can be explained by the use of the more accurate GNA costs versus the forecasted general rate case costs; the inclusion in the general rate case of costs of unknown but anticipated investments; and the specificity of the GNA versus the inclusion of both known projects and cost trends in the general rate case. However, it is unclear the extent to which the differences can be explained. Further, the testimony of CLECA, CUE, and SEIA is also largely unsubstantiated and somewhat arbitrary. The Commission believes a thorough and dedicated investigation is needed to improve the record and ensure better preparation for the next update of the Avoided Cost Calculator. Much of this work should be done prior to the commencement of the 2024 Avoided Cost Calculator update to ensure a better record. Accordingly, this decision maintains the current process of using the utilities' GNA and general rate case distribution capacity costs to determine distribution avoided costs in the 2022 Avoided Cost Calculator.

Relatedly, CLECA proposes the Commission conduct a study on avoided distribution (and transmission) costs, noting the Joint Utilities statement regarding a lack of new analysis to justify updating the distribution avoided cost

[168] CUE Opening Brief at 10-11. See also CLE-01 at 2, 13 and CUE-02 at 3-4.

[169] CUE Opening Brief at 10-13

method.[170] The Commission agrees that additional analysis is needed in terms of the distribution avoided cost and finds that the continued investigation of utilities' distribution capacity costs will provide this new analysis. The matter of a study on avoided transmission costs is discussed below.

3.2.7.2. Transmission Avoided Costs

Noting past discussion of transmission values in R.14-08-013, 350 Bay Area suggests the Commission move forward and adopt a "reasonable best estimated value now" and update the value to reflect "refinements whenever they are available from any venue, incorporating both short-term avoided costs and long-term (unspecified project) avoided costs."[171] Additionally, 350 Bay Area recommends the inclusion of "unspecified" transmission projects in the avoided cost of transmission for use in the Avoided Cost Calculator.

CALSSA recommends use of the Vibrant Clean Energy Study inputs to inform future Avoided Cost Calculator updates, contending "a majority of the savings identified in the study are in avoided distribution."[172] In section 3.1.3 above, this decision declined to adopt use of the Vibrant Clean Energy Study. Further discussion as to the validity of the Vibrant Clean Energy Study is discussed below in section 3.2.7.

SEIA supports continued use of past approaches to determining transmission avoided costs, including guidance from D.20-04-010. SEIA recommends the Commission adopt a value of $52.45 per kilowatt (kW)-year as the avoided transmission cost for PG&E and $54.93 per kW-year for SCE.[173] SCE

[170] CLECA Opening Brief at 32-33.

[171] 350 Bay Area Opening Brief at 4.

[172] CALSSA Opening Brief at 9-10.

[173] SEIA Opening Brief at 36.

explains that the value for PG&E is from the latest general rate case phase 2 adopted in D.21-11-016 and thus aligns with the guidance in D.20-04-010 in that this value is the latest revenue allocation value adopted.[174] PG&E does not oppose using the adopted value but cautions there is a concern the value reflects a large number of transmission projects that are not demand related and calls it an extreme overestimation that will have a significant impact on the Avoided Cost Calculator results.[175] SCE opposes SEIA's proposal to use the marginal transmission cost included in SCE's pending general rate case Phase 2, as the basis for SCE's avoided transmission cost. SCE contends this value, which SEIA portrays as unopposed, is unopposed because it is being used for illustrative purposes only and not for ratesetting.[176] SCE requests the Commission direct that the same analysis performed for the 2020 Avoided Cost Calculator be performed for 2022 but updated.[177]

With respect to the calls for improved transmission avoided costs in the 2022 Avoided Cost Calculator, here again, additional studies are needed to ensure the Commission is accurately measuring avoided transmission costs. For the purposes of the 2022 Avoided Cost Calculator, the Commission adopts the value of $52.45 per kW-year proposed by SEIA as the avoided transmission cost for PG&E. The value of $52.45 per kW-year aligns with the guidance of D.20-04-010. The value of $54.93 per kW-year proposed by SEIA for SCE is not an uncontested value in the true sense of that term. This value was considered illustrative by SCE and was not adopted by the Commission. Hence, the

[174] SEIA Opening Brief at 35-36.

[175] Joint Utilities Reply Brief at 17.

[176] Joint Utilities Reply Brief at 17-18.

[177] Joint Utilities Reply Brief at 17-18.

Commission cannot consider this value appropriate for use in the Avoided Cost Calculator. As such, this decision adopts the SCE proposal to perform the same analysis as that performed for the 2020 Avoided Cost Calculator but updated for 2022. This aligns with the instructions in D.20-04-010 that called for the continued use of "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," refine, and then apply to SCE and SDG&E.[178]

With respect to requests to improve the accuracy of the transmission avoided costs in the Avoided Cost Calculator, this decision determines it is prudent to conduct a study on the avoided cost of transmission and to begin that study as soon as practicable. As such, Energy Division is authorized to initiate review and analysis of avoided transmission and distribution costs to aid in the development, during the successor proceeding, of improved methods to calculate these values. The Commission anticipates the successor proceeding will include additional instruction for the study and allow for party feedback and participation.

3.2.8. Natural Gas Forecasts and Transportation Rates

The Staff Proposal recommends the Commission use the IEPR gas price forecast for short and long-term gas prices in the electric and gas Avoided Cost Calculators. Energy Division contends that because the IEPR gas price forecast is used in IRP modeling, using it in the Avoided Cost Calculator will promote consistency and reduce unnecessary complexity.[179] Similarly, the Staff Proposal

[178] D.20-04-010 at 60.

[179] Staff Proposal at 22.

recommends use of the IEPR projections of natural gas transportation rates in the Avoided Cost Calculator, which are also used in IRP modeling.[180]

Joint Utilities and Public Advocates Office support the Staff Proposal recommendation to rely on the IEPR gas price forecast and the IEPR projections of natural gas transportation rates. Joint Utilities and Public Advocates Office agree with Energy Division that using the same natural gas forecast and transportation rates as used in the IRP will improve consistency between the two proceedings and reduce complexity.[181] Joint Utilities recommend that if the IRP should change data sources, the Avoided Cost Calculator should mirror that change.

SEIA finds several faults with the natural gas forecasts and transportation rates proposals. Recognizing the importance of alignment between the Avoided Cost Calculator and the IRP, SEIA contends "this alignment should not come at the expense of the accuracy of the resulting avoided costs."[182] The following is a summary of the faults SEIA claims.

First, SEIA contends the IEPR gas price forecast does not accurately reflect near term changes in market and recommends the Commission retain the Market Price Reference approach currently employed in the Avoided Cost Calculator.[183] SEIA argues that the IEPR gas forecast does not respond to rapid near-term changes in the gas market, and instead relies far too long on forward prices. SEIA contends relying on forward price data results in a less accurate forecast.[184]

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[180] Staff Proposal at 26.

[181] Joint Utilities Opening Brief at 23 and Public Advocates Office Opening Brief at 15.

[182] SEIA Opening Brief at 45.

[183] SEIA Opening Brief at 40.

[184] SEIA Opening Brief at 42.

SEIA recommends the Commission rely on a balanced forecast that uses forward market prices for the first two years and transitions to the IEPR long-term forecast at the PG&E and SoCalGas city-gate markets, over the following five years. SEIA suggests using the Henry Hub - California city-gate basis differentials from the forward market for the first two years, then transition over five years to the basis differentials from the CEC IEPR forecast.[185]

Relatedly, SEIA recommends the Commission use different burnertip gas costs and avoided energy costs for northern and southern California, noting significant differences between costs resulting in different economics.[186] SEIA notes the Commission agreed that "the Northern and Southern California values used for gas transportation differs from the weighting of the Northern and Southern California values used for gas commodity prices in the Natural Gas Avoided Cost Calculator."[187]

As the Commission previously stated, alignment between the IRP and the Avoided Cost Calculator is not simply about consistency. Using a different natural gas forecast or splitting values between Northern and Southern California would create an unfair misalignment between distributed energy resources and supply side resources. Furthermore, the Commission agrees with SEIA that natural gas prices can change very quickly, which increases forecasting challenges. Hence, it is difficult to state with any certainty that using a forecast based on recent market prices is any more accurate than the IEPR forecast. This decision declines to adopt the natural gas forecast proposals recommended by SEIA. The Avoided Cost Calculator will use the IEPR natural gas forecast to be

[185] SEIA Opening Brief at 43.

[186] SEIA Opening Brief at 44 citing SEI-01 at 45.

[187] SEIA Opening Brief at 44 citing Resolution E-5150 at 31.

consistent with IRP modeling but, more importantly, to ensure that distributed energy resources are treated evenly with supply side resources.

With respect to natural gas transportation rates, SEIA asserts that the assumed 2.2 percent long-term escalation in these rates, which are embedded in the IEPR gas forecast and, thus, in the Avoided Cost Calculator is unsupportable. SEIA points to the increasing costs of meeting new safety concerns and the declining throughput to meet carbon constraints as the factors that should be taken into consideration when reviewing the escalation rate.[188] SEIA references studies by E3 and Gridworks that it alleges "supports an assumption that intrastate transportation rates will increase at a real escalation rate of at least 5% per year through 2050."[189] SEIA states that the CEC "appears to have agreed" as the recent draft IEPR burnertip gas model assumes a real escalation in gas transportation rates of 5.3 percent per year.[190] SEIA urges the Commission to adopt this element of the IEPR gas forecast. In response, Joint Utilities and Public Advocates Office recommend the Commission reject SEIA's proposal. Public Advocates Office states that the Commission previously declined to adopt this proposal and "noted its preference for this issue to be resolved in the CEC IEPR proceeding."[191]

In comments to the proposed decision, SEIA states that the CEC has approved a new IEPR gas forecast (2021 IEPR) that better incorporates the reality of rapidly-rising gas transportation rates in California and recommends the

[188] SEIA Opening Brief at 41.

[189] SEIA Opening Brief at 41,

[190] SEIA Opening Brief at 41-42 citing https://www.energy.ca.gov/programs-and-topics/topics/energy-assessment/natural-gas-burner-tip-prices-california-and-western

[191] Public Advocates Office Opening Brief at 14-15 citing D.20-04-010 at 66.

Commission use this forecast.[192] Joint Utilities oppose this proposed inconsistent treatment between IRP modeling and the Avoided Cost Calculator noting that SEIA argues the choice of gas price forecast in IRP modeling is irrelevant to the selection of resources in the portfolio and that SERVM prices are used to compensate supply-side resources.[193] Joint Utilities contend the gas price forecast in SERVM modeling impacts the dispatch of resources in the "No New DER" portfolio, which directly impacts the hourly energy market price outputs.[194] Joint Utilities assert that using different gas price forecasts "implies the supply side portfolio reacts to a difference set of economic signals that the demand side resources that may be selected to avoid supply side costs at the margin."[195] Joint Utilities maintain this leads to an unlevel playing field for valuing resources.

This decision maintains the policy that the IRP and the Avoided Cost Calculator will use the same use the same gas price forecast to inform both supply and demand-side planning . Accordingly, the Avoided Cost Calculator will use the 2020 IEPR natural gas price forecast and the natural gas transportation rates contained in this forecast.

3.2.9. Production Cost Modeling

As explained in section 1.1 above, the Commission has adopted the use of the SERVM model to conduct production cost modeling. The Staff Proposal recommends that, for the 2022 Avoided Cost Calculator update, the Commission run a price simulation for the year 2045, in addition to the years 2023 through

[192] SEIA Opening Comments on Proposed Decision at 6.

[193] Joint Utilities Reply Comments on Proposed Decision at 1.

[194] Joint Utilities Reply Comments on Proposed Decision at 1-2.

[195] Joint Utilities Reply Comments on Proposed Decision at 2.

2032, and have future price forecasts reflect future system portfolios.[196] Energy Division contends this would be consistent with IRP. Further, the Staff Proposal recommends: i) for years 2022 through 2032, use direct outputs from SERVM; ii) for years 2032 through 2045, linearly extrapolate prices after aligning the prices with the Avoided Cost Calculator calendar; and iii) for years 2045 through 2050, use prices from 2045 and inflate prices for future years.

The Staff Proposal explains that the Commission uses scarcity pricing adjustment to capture systemic differences within the forecasted prices. For the 2022 update of the Avoided Cost Calculator, the Staff Proposal recommends developing one set of scarcity factors, applied to all price regions modeled. To coordinate scarcity adjustments, the Staff Proposal suggests benchmarking SERVM prices (before the scarcity adjustments) against 2020 versus 2021 data. Energy Division proposes developing implied heat rates from the benchmark year prices in order to identify hours in which scarcity exists in the historical benchmark year but not reflected by forecasted prices.[197] The Staff Proposal states these hours will be scaled up to align with historical patterns and then applied to each year of the SERVM forecast.[198]

Both Joint Utilities and SEIA repeat earlier concerns regarding the transparency of the review process for the production cost modeling and, relatedly, SERVM.[199] These arguments are not repeated here and have been addressed in Section 3.1.2.

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[196] The details of the proposals for Production Cost Modeling can be found in the Staff Proposal at 27-28.

[197] The Staff Proposal contends that working with implied heat rates factors out differences in gas and carbon prices. (Staff Proposal at 28.)

[198] Price extrapolation and pricing scarcity are presented on pages 27 to 28 of the Staff Proposal.

[199] SEIA Opening Brief at 50 and Joint Utilities Reply Brief at 20.

Joint Utilities support the running of a price simulation for 2045, which they contend "represents an improvement over the current methodology" of keeping heat rates constant after ten years.[200] While supporting the proposal, Joint Utilities have two concerns. First, because this would be the first time SERVM results have been extended past 2030, Joint Utilities are concerned about the potential for unrealistic prices and request the Energy Division run a price simulation for 2035 and 2040, in addition to 2045.[201] Second, Joint Utilities point to past occurrences of price variability and volatility and present improvements to the proposal to address these occurrences.[202] Joint Utilities request that benchmarking use heat rates rather than actual energy prices and 2021 plus 2020 data for both use cases. Joint Utilities contend that "properly calculated heat rates are likely to be a more consistent indicator of grid conditions than raw prices," noting the variability of gas prices over the past two years.[203] Asserting that average heat rates or prices are not the primary driver for four-hour energy storage, Joint Utilities also recommend benchmarking the within-day volatility in heat rates to ensure energy margins are reasonable.[204] Lastly, Joint Utilities recommend the selection of a weather year with similar hydrologic conditions to 2020 and 2021 alleging an impact of hydro conditions on energy prices.[205]

[200] Joint Utilities Opening Brief at 24.

[201] Joint Utilities Opening Brief at 24.

[202] Joint Utilities Opening Brief at 24.

[203] Joint Utilities Opening Brief at 24.

[204] Joint Utilities Opening Brief at 25.

[205] Joint Utilities Opening Brief at 25.

SEIA supports the Joint Utilities proposals, stating that they are "important given the variability of natural gas prices in 2020 and 2021."[206] SEIA also expresses support for the current practice of calculating the future profiles of energy prices using heat rates.[207] Additionally, SEIA calls for benchmarking SERVM to actual CAISO market prices and contends an alleged double removal of cap-and-trade allowance costs in the 2021 Avoided Cost Calculator needs to be corrected.[208]

SEIA further recommends using production cost modeling results produced by SCE in the IRP proceeding. SEIA states the SCE modeling results show a midday peak almost as large in magnitude as the evening net load peak, which, SEIA asserts, conflicts with the decrease shown in the 2021 Avoided Cost Calculator modeling.[209] Responding to this recommendation, Joint Utilities assert SEIA "mis-characterizes the results shown in their own figure." Joint Utilities clarify that the figure contained in SEIA's Opening Brief, and the referenced SCE filing indicates that "exports would increase mid-day, and imports, hydro and thermal generation decrease mid-day precisely because prices are decreasing mid-day in CAISO."[210] Joint Utilities contend this "illustrates why SEIA's proposal to use 2021 price shapes for the next 25 years would be incompatible with the IRP and lead to inaccurate valuations."[211] Joint Utilities include a footnote from the 2021 Avoided Cost Calculator Model

[206] SEIA Reply Brief at 25.

[207] SEIA Reply Brief at 25.

[208] SEIA Opening Brief at 48.

[209] SEIA Opening Brief at 49.

[210] Joint Utilities Reply Brief at 20.

[211] Joint Utilities Reply Brief at 20-21.

Documentation that states: "As California's electricity grid is rapidly evolving with the integration of renewable energy generation and energy storage, wholesale electricity market price shapes may depart from historical trends."[212]

This decision adopts the recommendations from the Staff Proposal to use SERVM outputs for years 2022-2032, the year 2045 modeling run to linearly interpolate prices for years 2032-2045, and inflate prices for 2045 for future years, as well as the associated method for scarcity price adjustment. The Commission agrees that additional simulation runs proposed by Joint Utilities are prudent to address a potential for unrealistic prices, given this is the first time SERVM results have been extended beyond the year 2030. However, Commission resources are limited, and are not available for the 2022 Avoided Cost Calculator update. To address the concern about unrealistic prices, the Commission can commit to one additional price simulation for the 2022 Avoided Cost Calculator update. Energy Division is instructed to run a price simulation for the year 2040, in addition to 2045. The Commission also finds that while the improvements (use of heat rates instead of actual energy prices using both 2020 and 2021 date, benchmarking the within-day volatility in heat rates, and selection of a weather year with similar hydrologic conditions to 2020 and 2021) recommended by Joint Utilities could be useful given the variability and volatility of prices, the limited Commission resources do not allow us to adopt these changes in this update. The Commission will reconsider these improvements in the 2024 Avoided Cost Calculator update process.

[212] 2021 Avoided Cost Calculator Model Documentation at 14.

In comments to the proposed decision, Joint Utilities recommend a methodology for avoided energy prices.[213] The methodology will be discussed during the post-decision workshop and addressed in the resolution adopting the final Avoided Cost Calculator.

Turning to the recommendations by SEIA, this decision declines to adopt the proposal to benchmark SERVM to actual CAISO market prices. Joint Utilities have shown that given the evolution of the grid, relying on 2021 market prices for the next 25 years would most likely lead to inaccurate valuations. Relatedly, Joint Utilities have also shown that SEIA has misinterpreted the SCE production cost modeling results conducted and filed in the IRP proceeding. The request to include the details of these results is, therefore, moot.

Throughout this proceeding, SEIA has made several references to a study conducted by Vibrant Clean Energy. SEIA has requested that the Commission replace the RESOLVE and SERVM models with the Vibrant model, contending use of RESOLVE and SERVM undervalues avoided costs for distributed solar-plus-storage in California.[214] In section 3.1.3, this decision declines to adopt the use of the Vibrant Study in this update of the Avoided Cost Calculator, stating that disagreement with inputs and outcomes of the SERVM model or the selection of the model used should be conveyed in the IRP proceeding, as the Commission has directed the use of SERVM in the Avoided Cost Calculator update. However, the Commission finds it prudent to formally address in this decision, the validity of the Vibrant Study for use in the evaluation of avoided costs.

[213] Joint Utilities Opening Comments on the Proposed Decision at 8.

[214] SEIA Opening Brief at 49.

SEIA and CALSSA advocate for the use of the Vibrant Study to measure avoided costs, describing it as an integrated modeling platform that combines resource optimization and production cost modeling, but also assesses transmission and distribution avoided costs.[215] In testimony, SEIA asserts the Vibrant Study uses its platform "to calculate the costs that California would avoid if the state were to rely on a consistent level of distributed solar and community solar deployment over the next 30 years."[216] Further, SEIA states the model combines capacity expansion and production costs models and asserts it optimizes the addition of utility-scale generation, storage, transmission, and distributed energy resources.[217] Contending the model's case studies meet the state's 2045 clean energy goals, SEIA states the two case studies look at i) utility-scale generation (equivalent to the "No New DER" scenario) and ii) 2 gigawatts per year of distributed rooftop and community solar generation plus additional distributed solar.[218]

Joint Utilities, NRDC, and Public Advocates Office oppose the use of the Vibrant Study and agree it is not an appropriate comparison to the Avoided Cost Calculator.

Public Advocates Office argues the model does not align with the purpose of the Avoided Cost Calculator. Public Advocates Office submits the Avoided Cost Calculator estimates the value to the grid of unplanned and untargeted distributed energy resources adoption. Public Advocates Office asserts the Vibrant model coordinates distributed energy resources with the utility scale

[215] SEIA Opening Brief at 48-49. See also CALSSA Opening Brief at 9-10.

[216] SEI-01 at 19-20.

[217] SEI-01 at 20.

[218] SEI-01 at 20.

grid to minimize distribution spending and maximize distribution system benefits. Public Advocates Office maintains that because the Vibrant model optimizes distributed energy resources' location and performance, the resulting avoided costs are not workable for the purpose of the Commission.[219] Joint Utilities highlight that programs informed by Avoided Cost Calculator valuation result in distributed energy resources anywhere on the distribution system and are not targeted to capacity-constrained areas. Joint Utilities assert, in the Vibrant Study "distributed resources are not necessary behind the meter but are front of the meter investments made to reduce grid costs.[220] NRDC considers the Vibrant Study a best-case scenario for the value of solar paired with storage if deployed in a targeted manner. [221]

The Commission finds the Vibrant Study not to be a study in reality but, rather, a study to locate distributed energy resources where they best suit the grid. In reality, the Commission does not prescreen customers installing distributed energy resources to ensure optimal location and maximized performance. Instead, customers who install distributed energy resources are provided an incentive no matter where that resource is located and no matter the value that resource provides to the grid. As stated by Public Advocates Office, the Avoided Cost Calculator estimates the value to the grid of unplanned and untargeted distributed energy resources adoption; this is the Commission's reality. This decision finds the Vibrant study to be of little value to helping the Commission determine the most cost-effective resource, be it a distributed energy resource or supply side resource. Accordingly, the Commission declines

[219] Public Advocates Office Opening Brief at 6-7

[220] Joint Utilities Reply Brief at 24.

[221] NRDC Opening Brief at 22-23.

to adopt the use of the Vibrant Study to assist the Commission in assessing the avoided costs of distributed energy resources.

3.2.10. Greenhouse Gas Issues

There are three issues for the Commission to consider in this decision: i) whether to revise the current greenhouse gas adder, adopted in D.20-04-010; ii) whether to revise the greenhouse gas rebalancing method used in the Avoided Cost Calculator; and iii) whether to develop and include a natural gas-specific greenhouse gas adder in the Avoided Cost Calculator. This decision addresses these issues separately below.

3.2.10.1. Greenhouse Gas Adder

Earlier in this decision, the Commission determined the Market Equilibrium approach proposed by Energy Division has value but requires additional review and discussion. As part of the Market Equilibrium approach, Energy Division proposed to establish a new method for setting avoided greenhouse gas costs. Given that the Commission has determined it premature to adopt the approach, this decision finds it prudent to maintain the current method while the Market Equilibrium approach is being reviewed. Parties offer alternatives to the proposed approach, which are briefly described here for the record.

In the proposed Market Equilibrium approach, Energy Division proposes setting the greenhouse gas compliance price at the combination of the cap-and-trade floor price and a greenhouse gas adder. Public Advocates Office recommends setting the greenhouse gas compliance costs at the cap-and-trade values, as Joint Utilities contend these values are known costs the distributed energy resources can help utilities avoid. Public Advocates Office asserts no additional greenhouse gas adder is needed to derive an accurate estimation of

greenhouse gas emissions avoided costs.[222] Joint Utilities proposed that greenhouse gas emissions values for all years in the Avoided Cost Calculator be based directly on the annual shadow price of greenhouse gas emissions reductions from the RESOLVE model.[223] Joint Utilities assert this method is far superior to continuing to use the 2030 straight-line method, contending using the RESOLVE shadow prices "considers i) the system's annual progress towards electric sector greenhouse gas emissions targets, and ii) changes to the resource mix over the modeling horizon."[224] SEIA also recommends use of the greenhouse gas shadow price from year 2032 of the "No New DER" scenario to set the greenhouse gas emissions avoided costs for all years modeled in the Avoided Cost Calculator.[225]

This decision does not opine on the alternatives to the Energy Division proposed changes to the greenhouse gas adder, as the Commission has determined it premature to consider the Market Equilibrium approach. It is reasonable to defer discussion of changes to the greenhouse gas adder as it is part of the Market Equilibrium approach. Accordingly, this decision maintains the current greenhouse gas adder for use in the 2022 Avoided Cost Calculator.

3.2.10.2. Greenhouse Gas Rebalancing

This decision makes no changes to the greenhouse gas rebalancing method. The Commission finds that additional research is needed to determine how to properly value greenhouse gas emissions avoided costs. As discussed below, while parties have recommended modifications to the rebalancing

[222] Public Advocates Office Opening Brief at 17.

[223] Joint Utilities Opening Brief at 25.

[224] Joint Utilities Opening Brief at 26 citing to JUT-01 at 13 and JUT-02 at 11.

[225] SEIA Opening Brief at 15-18.

method, the justification for these modifications are based on a portfolio of distributed energy resources providing non-marginal impacts reflecting the greenhouse gas impact of the full portfolio of distributed energy resources. This decision finds the issue of whether to value the marginal distributed energy resources or the portfolio of distributed energy resources with the Avoided Cost Calculator is an issue to be addressed for all value categories, not just greenhouse gas avoided costs. This issue is complex and should be discussed and studied in the successor proceeding prior to the 2024 update of the Avoided Cost Calculator.

Energy Division states that the greenhouse gas rebalancing is a step to accurately reflect the energy sector emissions cost of adding or reducing system load under a required annual intensity target.[226] The Staff Proposal described the reasons for rebalancing and the process but does not propose any changes to the greenhouse gas rebalancing process.

SEIA questions the need for the rebalancing step and questions why the rebalancing adjustment is applied to solar plus storage since solar plus storage neither adds nor reduces load. SEIA criticizes the lack of justification in the Staff Proposal, noting that the discussion only cites one type of distributed energy resources, those that result in increased electric load and fuel substitution.[227] SEIA contends there is no need for adjustment as the portfolio is rebalanced every time the Commission runs a new IRP scenario.[228]

While supporting the need for the rebalancing step, Public Advocates Office asserts the Avoided Cost Calculator documentation should include a more

[226] Staff Proposal at 31.

[227] SEIA Opening Brief at 52.

[228] SEIA Opening Brief at 54.

detailed explanation of why rebalancing is needed and what the process is. Public Advocates Office recommends a description consistent with what was put forth in the Staff Proposal "will better inform stakeholders on the purpose and necessity of the rebalancing adjustment."[229] Public Advocates Office expresses concern that the current approach "could be overly simplistic and result in skewed [greenhouse gas] avoided cost values because the average grid intensity metric is utilized to rebalance each hourly marginal value hour irrespective of the total [distributed energy resources] that is expected in that hour or the total load in that hour."[230] Public Advocates Office recommends the consideration of a revised approach that is i) time variant on an hourly dimension to account for a distributed energy resource portfolio's load shape and ii) accounts for the non-marginal impact of those distributed energy resources baked into the utility planning forecasts."[231] Public Advocates Office asserts these modifications should better substantiate the underlying theory of proportionality and result in improved accuracy of avoided cost values.[232]

NRDC agrees that the rebalancing step is needed but that the Commission "accounts for this in an oversimplified manner" that "introduces inaccuracies."[233] NRDC asserts that if California had an emissions intensity target, as the current rebalancing approach implies, "absolute emissions reduction targets would change proportionally with future electric demand."[234] While the current

[229] Public Advocates Office Opening Brief at 16.

[230] Public Advocates Office Opening Brief at 16.

[231] Public Advocates Office Opening Brief at 16.

[232] Public Advocates Office Opening Brief at 16-17.

[233] NRDC Opening Brief at 16.

[234] NRDC Opening Brief at 16-17.

rebalancing method adjusts marginal distributed energy resources impact for a portfolio effect by the same value, average emissions intensity in each hour, NRDC asserts future planned distributed energy resources impacts will vary greatly by time of day and year.[235] NRDC recommends the Avoided Cost Calculator estimate the portion of future distributed energy resources impacts that will be marginal versus non-marginal and conduct an hourly rebalancing to account for aggregate distributed energy resources load-shapes of a total portfolio of distributed energy resources.

Joint Utilities do not oppose the Energy Division recommendation to maintain the current greenhouse gas rebalancing process.[236] However, Joint Utilities support the refinements suggested by NRDC to accurately value the marginal and average greenhouse gas impacts of distributed energy resources.[237]

This decision finds that the rebalancing step is necessary. SEIA's arguments against rebalancing are not persuasive. SEIA contends that demand side solar plus storage do not reduce load because customers use the same amount of electricity through self-generation. However, self-generation is not considered part of system load. If system load decreases due to the increase of rooftop solar, reaching greenhouse gas goals is easier for utilities. The rebalancing step takes this into account.

The Commission agrees with Joint Utilities that it is important to accurately assess the greenhouse gas emissions contributions or reductions of

[235] NRDC Opening Brief at 17.

[236] Joint Utilities Opening Brief at 28.

[237] Joint Utilities Reply Brief at 23.

distributed energy resources.[238] While the Commission agrees that the current rebalancing method may not be as accurate as it could be, making changes in this decision without further investigation could lead to less accuracy. NRDC admits that there is no perfect way to determine what portion of future expected distributed energy resources will have a marginal versus non-marginal effect.[239] Furthermore, there are broader policy questions that should be answered before revising the rebalancing method, such as the issue of whether to value the marginal distributed energy resources or the portfolio of distributed energy resources with the Avoided Cost Calculator. This is an issue that needs to be addressed for all value categories, not just greenhouse gas avoided costs. This issue is complex and should be discussed and studied in the successor proceeding prior to the 2024 update of the Avoided Cost Calculator. Accordingly, this decision maintains the current greenhouse gas rebalancing method for the 2022 Avoided Cost Calculator update.

3.2.10.3. Natural Gas-Specific Greenhouse Gas Adder

As discussed in the Staff Proposal, the current Avoided Cost Calculator calculates the avoided cost of greenhouse gas by using IRP modeling of the electric sector resource portfolio required to meet electric sector greenhouse gas targets. This same process is currently used to calculate avoided greenhouse gas emissions from the natural gas sector. As discussed below, this decision finds it prudent to adopt an interim natural gas-specific greenhouse gas adder while additional study and discussion can occur, in conjunction with the natural gas team, to develop a permanent natural gas-specific greenhouse gas adder.

[238] Joint Utilities Reply Brief at 23.

[239] NRDC Opening Brief at 17.

In the Staff Proposal, Energy Division recommends maintaining the current practice of using the greenhouse gas adder for both the electric and natural gas Avoided Cost Calculator, while exploring the development of natural gas avoided greenhouse gas costs. Joint Utilities support these recommendations but contend that "addressing the nuances of renewable natural gas costs and supply will be challenging."[240] Further, Joint Utilities recommend a coordinated effort with the California Energy Commission and the California Air Resources Board, given these agencies are faced with similar questions and related forecasting challenges.[241]

NRDC asserts the current assumption of using the same greenhouse gas adder for distributed energy resources and natural gas avoided costs is inaccurate and results in over or under valuing greenhouse gas reductions from the gas sector.[242] NRDC recommends that because the natural gas sector does not have a similar planning process as the IRP, the Long Term Gas Planning Proceeding would be the appropriate regulatory venue for developing a renewable natural gas supply curve and portfolio model similar to that of the IRP.[243] In the interim, NRDC recommends the Commission develop a greenhouse gas adder using the best available data: either based on the cost of building electrification[244] or the CEC's costs of carbon abatement referenced in the Staff Proposal.[245]

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[240] Joint Utilities Opening Brief at 28

[241] Joint Utilities Opening Brief at 28-29.

[242] NRDC Opening Brief at 19.

[243] NRDC Opening Brief at 19.

[244] NRD-01 at 6.

[245] NRDC Opening Brief at 19-20. *See* Staff Proposal at 53.

Sierra Club supports the development of a greenhouse gas adder that reflects the cost of long-term carbon abatement costs for pipeline gas.[246] Sierra Club also recommends assessing the long-term greenhouse gas benefits of beneficial electrification measures.[247] Sierra Club suggests that if the adder is not corrected, the Commission could take other corrective action by waiving cost-effectiveness requirements for programs serving additional categories of hard-to-reach customers.[248]

Public Advocates Office also supports the use of an interim value derived from building electrification measure as an interim natural gas specific greenhouse gas adder until a more robust value can be developed through a renewable gas supply curve and portfolio model akin to the modeling in the IRP proceeding.[249]

This decision recognizes the concerns of using the electric sector greenhouse gas adder for the natural gas sector. The Commission agrees that it is prudent to adopt an interim natural gas-specific greenhouse gas adder, while additional study and discussion can occur regarding the development of a permanent natural gas-specific greenhouse gas adder. Further, while the Long Term Gas Planning proceeding could be the appropriate venue for developing the necessary renewable gas supply curve and portfolio model, such activity may not be in the scope of that proceeding. Hence, the Commission will continue to explore other proceedings to find the appropriate venue for developing the permanent natural gas-specific greenhouse gas adder.

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[246] Sierra Club Opening Brief at 3.

[247] Sierra Club Opening Brief at 3.

[248] Sierra Club Opening Brief at 3.

[249] Public Advocates Office Reply Brief at 4.

In terms of the interim adder to be used beginning this year, Energy Division is instructed to develop the interim adder based on building electrification, as supported by NRDC, Public Advocates Office, and Sierra Club, and provide it simultaneously with the draft Avoided Cost Calculator to allow for informal comments from parties. The Commission agrees with NRDC's assertion that the CEC analysis on gas sector decarbonization, discussed in the Staff Proposal, may be the best available data source.[250] However, the record on this is limited. Hence, this decision authorizes Energy Division to investigate possible data sources and make a recommendation to parties during the post-decision workshop. The final interim natural gas specific greenhouse gas adder proposed by Energy Division will be discussed during the post-decision workshop and considered by the Commission in the resolution adopting the final updated Avoided Cost Calculator.

3.2.11. Refrigerant Calculator

The Staff Proposal discusses three proposals for revisions to the Refrigerant Avoided Cost Calculator (RACC): i) discounting the annual refrigerant leakage at the mid-year instead of the end of each year to be more consistent with continuous leakage occurring throughout each year during the device lifetime,[251] ii) accounting for the avoided cost of a measure type versus an individual device in the inputs to the calculator, to address the "spikey" nature of end-of-life leakage and greater leakage with the practice of accelerated replacement,[252] and iii) allowing users to input additional refrigerant values to enable non-listed refrigerants to be used, which will allow for improved accuracy

[250] NRDC Opening Brief at 20.

[251] Staff Proposal at 35.

[252] Staff Proposal at 35-36.

and, eventually, a more comprehensive database of refrigerants.[253] Only Joint Utilities commented on these proposals.

Joint Utilities support these proposed changes asserting they address present challenges.[254] As no party objected to the proposals and the proposals address challenges and improve the efficiency and ease of use of the RACC, this decision finds it reasonable to adopt the proposed revisions to the RACC.

Joint Utilities request additional details "when the 2022 Avoided Cost Calculator deliverables are drafted."[255] A brief overview of these requests is provided here; Energy Division is instructed to provide this information as part of the draft updated 2022 Avoided Cost Calculator. First, Joint Utilities request additional details on the timing and discounting of end-of-life leakage.[256] Second, Joint Utilities request the new refrigerant calculator include the time series and net present costs for the counterfactual baseline and a net measure cost.[257] Joint Utilities also request Energy Division to clarify the location of the latest sources of data and repository site where the latest updates to the RACC are available.

CUE commented on the broader issue of refrigerant leakage avoided costs. CUE contends the RACC should be separated from the Avoided Cost Calculator because it does not reflect costs incurred by the utility and asserts it should be a societal benefit.[258] In D.20-04-010, the Commission found that both methane and

[253] Staff Proposal at 38.

[254] Joint Utilities Opening Brief at 29.

[255] Joint Utilities Opening Brief at 29.

[256] Joint Utilities Opening Brief at 29.

[257] Joint Utilities Opening Brief at 30.

[258] CUE Opening Brief at 15.

refrigerant leakage are in the CARB carbon inventory and, therefore, their reduction contribute to ratepayer funded greenhouse gas emissions reduction efforts, which leads to avoided costs.[259] This remains true today. Accordingly, this decision declines to adopt the proposal by CUE to eliminate avoided costs of refrigerant leakage from the Avoided Cost Calculator.

3.2.12. Resource-Specific Effective Load Carrying Contribution Values

The Staff Proposal recommends using ELCC values to measure the effective capacity of a resource. ELCC values measure the reliability contribution of a resource type by considering that resource's technology type, availability, and penetration.[260] Apart from NRDC, parties generally oppose the expanded use of resource-specific ELCC values in the Avoided Cost Calculator.

Joint Utilities support "the general concept of developing different ELCC calculations for different [distributed energy resources]" but recommend the values be reflected in resource-specific calculators and not in the Avoided Cost Calculator.[261] Joint Utilities assert that because the current cost-effectiveness framework does not account for a resources' reliability contributions, relying on ELCC values may result in an overstatement of avoided generation capacity costs.[262]

SEIA contends there is no need to develop resource-specific ELCC values for use in the Avoided Cost Calculator. SEIA submits the Avoided Cost Calculator develops avoided generation capacity which are eventually calculated

[259] D.20-04-010 at 64.

[260] Joint Utilities Opening Brief at 30.

[261] Joint Utilities Opening Brief at 30.

[262] Joint Utilities Opening Brief at 30.

for any type of distributed energy resources.[263] SEIA concludes the hourly profile of each type of resources determines the resource's avoided generation capacity cost without the need to apply an ELCC.[264]

CLECA cautions against the expanded use of the ELCC in the Avoided Cost Calculator, as CLECA contends it will not be compatible with the proposed Slide of Day approach being discussed in the Resource Adequacy proceeding.[265] SEIA agrees, stating that the Resource Adequacy program relies upon average ELCC values while the ELCC values from IRP modeling are marginal values.[266] SEIA submits "there can be substantial differences between average and marginal ELCC values, and it is not clear which type of ELCC Staff proposes to use, and why."[267] SEIA recommends the Commission not rush to adopt this proposal.

NRDC submits that the Avoided Cost Calculator should not direct alternative calculations of the capacity value of dispatchable distributed energy resources. NRDC submits the avoided capacity cost in the Avoided Cost Calculator should represent the total net qualifying capacity procurement costs avoided by marginal reduction of energy demand due to distributed energy resources deployment, and that the ELCC of resources should be accounted for when applying the Avoided Cost Calculator to determine the capacity impact

[263] SEIA Reply Brief at 27.

[264] SEIA Reply Brief at 27.

[265] CLECA Opening Brief at 34-35.

[266] SEIA Reply Brief at 56.

[267] SEIA Reply Brief at 56.

from the application of a specific distributed energy resource, *i.e.*, in the post Avoided Cost Calculator cost-effectiveness process.[268]

Parties express a number of questions and concerns with developing resource-specific ELCC values in the Avoided Cost Calculator. This decision determines it is prudent to continue to study the use of resource-specific ELCC values either for possible use in the Avoided Cost Calculator or in the post Avoided Cost Calculator part of the cost-effectiveness process. Hence, this decision declines to adopt the proposed implementation of resource-specific ELCC values at this time.

4. Comments on Proposed Decision

The proposed decision of Administrative Law Judge Kelly A. Hymes in this matter was mailed to the 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 by CLECA, CUE, Clean Coalition, NRDC, Joint Utilities, Public Advocates Office, Sempra Utilities, SEIA, and SoCalGas on April 19, 2022, and reply comments were filed on April 25, 2022 by 350 Bay Area, CLECA, Clean Coalition, Coalition for Community Solar, NRDC, Joint Utilities, Public Advocates Office, Sempra Utilities, Sierra Club, and SEIA. Clarifications and corrections were made to the proposed decision in response to these comments. This section does not address arguments previously stated in briefs. However, certain clarifications and revisions made to the decision are discussed below.

In support of incorporation of the AGIC into the Avoided Cost Calculator, PG&E highlights the need for flexibility regarding the source of the data used to

[268] NRDC Opening Brief at 20-21.

arrive at the AGIC categories.[269] PG&E asserts the data may not be available in each utilities' general rate case.[270] PG&E requested flexibility in the decision to allow utilities to provide data that aligns with the AGIC categories but not necessarily from general rate cases.[271] This decision has been revised to adopt this flexibility with the caveat that the data shall be reviewed and approved by Energy Division.

To address SEIA's concern regarding the implementation timing of certain policies, Ordering Paragraph 2 is now divided into two ordering paragraphs. [272] This distinguishes those policies that are adopted beginning with this update of the Avoided Cost Calculator and those policies adopted for future updates.

Public Advocates Office requests a correction and clarification regarding their proposal for an error reporting template.[273] Public Advocates Office contends the proposed decision is unclear in its reference to an error tracking device and error tracking template. Public Advocates Office recommends the Commission correct factual errors related to the characterization of the error reporting template. The decision has been revised to eliminate these errors. Further, the decision determines the error reporting template is unnecessary given that the Commission declines to limit informal comments on the draft revised calculator to demonstrable, functional errors.

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[269] Joint Utilities Opening Comments on the Proposed Decision at 10-11.

[270] Joint Utilities Opening Comments on Proposed Decision at 10-11.

[271] Joint Utilities Opening Comments on Proposed Decision at 10-11.

[272] SEIA Opening Comments on Proposed Decision at 13.

[273] Public Advocates Office Opening Comments on Proposed Decision at 3-6.

Lastly, CLECA argues that the IRP proceeding does not provide adequate due process.[274] This argument should be made in the IRP proceeding; it is not in the scope of this proceeding to assess the adequacy of due process in another proceeding. Further, claims about errors in IRP modeling inputs to the Avoided Cost Calculator should be addressed through a petition for modification in the IRP proceeding.

5. Assignment of Proceeding

Darcie L. Houck is the assigned Commissioner and Kelly A. Hymes is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. The purpose of the Avoided Cost Calculator is to provide guidance across a wide variety of proceedings on the value of distributed energy resources as part of the overall portfolio mix with supply-side resources.
2. The lack of guiding principles has not deterred adoption of the Avoided Cost Calculator in the past.
3. A well-designed and defined set of guiding principles will lead to a proper assessment of the valuable characteristics needed in the Avoided Cost Calculator, such as accuracy and consistency.
4. The record warrants additional information on which guiding principles to adopt and the methods to assess whether proposed changes to the Avoided Cost Calculator meet the principles.
5. The record shows that revisions in the schedule to update the Avoided Cost Calculator are needed to further improve transparency and the efficiency of the Avoided Cost Calculator update process.

[274] CLECA Opening Comments on Proposed Decision at 6.

6. More time is needed to conduct the formal update of the Avoided Cost Calculator in order to prevent errors.

7. Efficiencies in the biennial Avoided Cost Calculator update schedule can be made by rearranging certain activities.

8. The timing of the staff proposal is misplaced within the current biennial Avoided Cost Calculator update schedule.

9. Providing the final staff proposal and a workshop early in the proceeding will allow for improved transparency and a more robust record.

10. Eliminating the minor update of the Avoided Cost Calculator will allow parties and Energy Division to concentrate on the biennial update occurring in even-numbered years.

11. Little time between annual cycles has resulted in insufficient review and benchmarking.

12. Eliminating the minor update will provide improved review and benchmarking for the major update of the Avoided Cost Calculator and lead to improved accuracy.

13. It is not necessary to authorize Energy Division to conduct a routine minor update of the Avoided Cost Calculator if there is a delay in the formal proceeding.

14. The assigned Commissioner and Administrative Law Judge can work with parties to determine whether a minor update is necessary, what the update would entail, and develop a plan to proceed.

15. SEIA's recommendation to subsume the resolution process into the formal proceeding process would require two decisions and two briefing cycles, resulting in a longer regulatory process.

16. The final Avoided Cost Calculator modeling cannot be performed until after a Commission decision is approved adopting policies and modeling changes.

17. The dual decision-resolution process used for the Avoided Cost Calculator is akin to the decision-advice letter process used often by the Commission to adopt tariff changes.

18. Use of the resolution process for adopting a final Avoided Cost Calculator is efficient, effective, and allows for due process.

19. The record shows that changes to the resolution process are needed to improve transparency.

20. Energy and ancillary services prices developed in the SERVM model is not typically reviewed as part of the IRP proceeding.

21. Review of the draft updated Avoided Cost Calculator and the associated SERVM model necessitates additional time, increased transparency, and improved due process.

22. Limit written informal comments in the resolution process to demonstrable, functional errors with reference to the specific cell in which the errors occur could impede the process and lead to a less efficient process

23. Error reporting can be conducted more efficiently through the post-decision/pre-resolution workshop discussion and subsequent informal comments.

24. Use of an adopted capacity expansion plan in the Avoided Cost Calculator leads to a more transparent review process.

25. D.22-02-004 adopted a Preferred System Plan portfolio and commits to continuing a two-year IRP planning process, which should eliminate Energy Division's concern of using an out-of-date capacity expansion plan.

26. Additional steps in the resolution process are needed to ensure an appropriate level of due process.

27. The IRP proceeding is the appropriate venue to chart the electric sector path to decarbonization.

28. The Commission has repeatedly stated the Avoided Cost Calculator should align with the IRP proceeding and not the other way around.

29. Alignment of the Avoided Cost Calculator with the IRP proceeding ensures an accurate reflection of current demand-side and supply-side resource planning objectives.

30. Disagreements with the analysis or outcomes of the IRP modeling must be conveyed in the IRP proceeding.

31. D.20-04-010 directed that the update of the Avoided Cost Calculator shall align with work in the IRP, use the "No New DER" Scenario from the Reference System portfolio, and use the SERVM software for production cost modeling.

32. Removing distributed energy resources that add load from the "No New DER" Scenario accurately portrays what the grid would look like if there were no ratepayer funded distributed energy resources programs.

33. The recommendation to revise the "No New DER" Scenario by removing distributed energy resources that add load is justified.

34. It has been the unadopted practice of the Commission to use the Avoided Cost Calculator to determine the increased supply costs of the fuel substitution measures that are part of the energy efficiency portfolio.

35. The wealth of data contained in the Avoided Cost Calculator should be used to its fullest potential.

36. The current Avoided Cost Calculator includes an avoided cost of methane leakage associated with the production and transportation of natural gas produced in-state.

37. In D.20-04-010, the Commission found that methane leakage is in the CARB carbon inventory and, therefore, its reduction contributes to ratepayer funded greenhouse gas emissions reduction efforts, which leads to avoided costs.

38. The reduction of methane leakage continues to contribute to ratepayer funded greenhouse gas emissions reduction efforts.

39. The Commission is mandated to work with CARB in terms of regulating greenhouse gas emissions.

40. It is prudent to ensure Commission measures align with CARB's emissions inventory.

41. Greenhouse gas emissions know no state boundary.

42. Sensitivity analysis is a useful tool when carefully constructed.

43. Without careful construction and clear guidelines, parties can choose a sensitivity that creates desired outcomes.

44. The record does not currently provide the careful construction of sensitivity analysis or clear guidelines for such construction.

45. Additional study of the Market Equilibrium Approach needs to be conducted prior to consideration of its adoption.

46. The single example provided in the Staff Proposal is not sufficient for ensuring to the Commission that the Market Equilibrium Approach will produce the correct economic signals it promises.

47. It is prudent to continue to explore the Market Equilibrium Approach given its potential benefit of creating a technology-agnostic approach to avoided costs that better aligns with the IRP.

48. The battery storage data are inputs to the IRP modeling.

49. Because utility planning is guided by the IRP modeling, the value of distributed energy resources depends on the extent to which the costs of that planning can be avoided.

50. The IRP proceeding is the appropriate regulatory procedure to convey arguments regarding battery storage data.

51. The Commission provides parties an opportunity to file comments in the IRP.

52. SEIA and CLECA should have presented their arguments on battery storage data in the IRP proceeding.

53. The regulatory procedure in the IRP allows for comments instead of testimony but provides parties due process.

54. Making a change to an IRP input in this proceeding could create an unfair alignment between distributed energy resources and supply side resources.

55. Making a change to an IRP input in this proceeding could be a violation of the due process rights of parties in the IRP proceeding.

56. The battery contract term obtained by the Lazard study is an input to the IRP.

57. The proper procedural venue to request a change to the battery contract term is the IRP proceeding.

58. Alignment with IRP on technology costs and cost forecasts is important.

59. Alignment on how technology costs are annualized is not required.

60. The annualized avoided cost value for generation capacity should reflect the value of deferring the investment to a later year when technology costs are lower.

61. The National Economic Research Associates (NERA) approach (published in *A Framework for Marginal Cost-Based Time-Differentiated Pricing in the United States, topic 1.3, National Energy Regulatory Associates, February 1977*) reflects the value of deferring the investment to a later year when technology costs are lower.

62. The NERA approach is the foundation of the real economic carrying charge or RECC, which has proven itself in past cost-allocation proceedings at the Commission.

63. Use of RECAP modeling for Expected Unserved Energy in the allocation of capacity value results in an unexplained number of hours being unreasonably allocated to the month of September.

64. A weighting on loss of upward reserves implies the use of a less stringent reliability target, which would conflict with the current LOLE reliability target of 0.1 used to calculate the ELCC of supply-side resources.

65. The SERVM modeling already accounts for operating reserves amounting to six percent of load.

66. Because a loss of load event is triggered in SERVM when three percent spinning reserve and three percent regulation up reserves are not met, any loss of load that appears in the SERVM heatmap has already accounted for the loss of critical reserves in the current modeling framework.

67. The use of SERVM should provide a reasonable solution and outcome for the allocation of generation capacity value.

68. Joint Utilities have not shown that removing secondary distribution costs from the Avoided Cost Calculator is a practicable solution.

69. In Resolution E-5150, the Commission determined that while secondary costs are not time-differentiated, they are not zero.

70. Eliminating or zeroing out the secondary distribution costs would make it difficult, if not impossible, for third parties to determine the secondary distribution value for which their resources would be credited.

71. Removal of the secondary distribution costs would decrease the transparency of the Avoided Cost Calculator.

72. Including the secondary distribution costs in the Avoided Cost Calculator would not prevent the three utilities from working with stakeholders to develop an improved method for quantifying and allocating secondary distribution costs in the 2024 Avoided Cost Calculator update.

73. SEIA has conflated revenue allocation and rate design calculations.

74. It is necessary to develop approaches to analyze the costs and benefits of increased electrification load on the secondary system and evaluate strategies to reduce the associated primary and secondary distribution costs.

75. New construction of all electric buildings avoids investment in new natural gas distribution infrastructure.

76. The time is right to incorporate an avoided gas infrastructure cost in the Avoided Cost Calculator, given the electrification policies embraced by this Commission and that a similar mechanism is being used already for new-construction energy efficiency measures.

77. While there is overlap with the Building Decarbonization and the Long-Term Gas rulemakings, neither address the specifics of the Avoided Cost Calculator or the nuances of the Avoided Cost Calculator.

78. R.14-10-003 is the appropriate venue to address the incorporation of an avoided gas infrastructure cost in the Avoided Cost Calculator.

79. For the avoided gas infrastructure cost, the proposed categories of in-house infrastructure and plan reviews, involve avoided participant costs and the data for these categories are not available.

80. There are clear differences between the near-term distribution capacity costs calculated from GNA and DDOR and the general rate case based long-term distribution capacity costs.

81. Some of the differences between the near-term distribution capacity costs and the long-term distribution capacity costs can be explained by the use of the more accurate GNA costs versus the forecasted general rate case costs; the inclusion in the general rate case costs of unknown but anticipated investments; and the specificity of the GNA versus the inclusion of both known projects and cost trends in the general rate case.

82. The testimony of CLECA, CUE, and SEIA regarding distribution capacity costs is unsubstantiated and arbitrary.

83. A thorough and dedicated investigation of distribution and transmission capacity costs is needed to improve the record and ensure accurate measurement of avoided distribution and transmission costs.

84. It is reasonable to adopt the unopposed value of $52.45 per kW-year as the avoided cost of transmission for PG&E.

85. The value of $54.93 per kW-year proposed as the avoided cost of transmission for SCE is not an uncontested value and was not adopted by the Commission.

86. It is reasonable to use the same analysis as done in the 2020 Avoided Cost Calculator to develop an avoided cost of transmission for SCE.

87. The Commission anticipates the establishment of a successor to this proceeding.

88. Using a different natural gas forecast or splitting values between Northern and Southern California would create an unfair misalignment between distributed energy resources and supply side resources.

89. Natural gas prices can change very quickly, which increases forecasting challenges.

90. It is difficult to state with any certainty that using a forecast based on recent market prices is any more accurate than using the IEPR forecast.

91. In D.20-04-010 the Commission stated that natural gas forecasts should be determined by the CEC in its IEPR proceeding.

92. Additional simulation runs are prudent to address a potential for unrealistic prices, given this is the first time SERVM results have been extended beyond the year 2030.

93. Commission resources are limited and are not available for the 2022 Avoided Cost Calculator update.

94. Limited Commission resources do not allow the adoption, at this time, of the following proposals despite their prudency: the use of heat rates instead of actual energy prices using both 2020 and 2021 dates, benchmarking the within-day volatility in heat rates, and selection of a weather year with similar hydrologic conditions to 2020 and 2021.

95. Given the evolution of the grid, relying on 2021 market prices for the next 25 years would most likely lead to inaccurate valuations.

96. SEIA has misinterpreted the SCE production cost modeling results conducted and filed in the IRP proceeding.

97. It is prudent to formally address in this decision the validity of the Vibrant Study for use in the evaluation of avoided costs.

98. The Vibrant Study is a study to locate distributed energy resources where they best suit the grid.

99. The Commission does not prescreen customers installing distributed energy resources to ensure optimal location and maximized performance.

100. Customers who install distributed energy resources are provided an incentive no matter where that resource is located and no matter the value that resource provides to the grid.

101. The Avoided Cost Calculator estimates the value to the grid of unplanned and untargeted distributed energy resources adoption.

102. The Vibrant study is of little value to helping the Commission determine the most cost-effective resource, be it a distributed energy resource or supply side resource.

103. It is reasonable to defer discussion of changes to the greenhouse gas adder as it is part of the Market Equilibrium approach.

104. Rebalancing is needed to accurately assess the greenhouse gas emissions contributions or reductions of distributed energy resources.

105. The current rebalancing method may not be as accurate as it could be, but making changes without further investigation could lead to less accuracy.

106. There is no perfect way to determine what portion of future distributed energy resources will have a marginal versus non-marginal effect.

107. There are broader policy questions that need to be answered before revising the rebalancing method.

108. Whether to value the marginal distributed energy resources or the portfolio of distributed energy resources with the Avoided Cost Calculator is an issue that needs to be addressed for all value categories, not just greenhouse gas avoided costs.

109. There are many concerns regarding using the electric sector greenhouse gas adder for the natural gas sector.

110. It is prudent to adopt an interim natural gas-specific greenhouse gas adder, while additional study and discussion can occur to develop a permanent natural gas-specific greenhouse gas adder.

111. The Long-Term Gas Planning proceeding may be an appropriate venue for developing the renewable gas supply curve and portfolio model, but such development may not be in the scope of that proceeding.

112. An interim natural gas-specific greenhouse gas adder based on building electrification is supported by NRDC, Public Advocates Office, and Sierra Club.

113. The CEC analysis on gas sector decarbonization, discussed in the Staff Proposal, is the best available data source for developing the interim adder.

114. The Staff Proposal recommendations to revise the Refrigerant Avoided Cost Calculator address challenges and improve the efficiency and use of the RACC.

115. In D.20-04-010, the Commission found that both methane and refrigerant leakage are in the CARB carbon inventory and, therefore, their reduction contribute to ratepayer funded greenhouse gas emissions reduction efforts, which leads to avoided costs.

116. Because parties express a number of questions and concerns with the use of resource-specific ELCC values in the Avoided Cost Calculator, this decision determines it is prudent to continue to study the use of resource-specific ELCC values in the Avoided Cost Calculator.

Conclusions of Law

1. In the successor proceeding, the Commission should continue to consider proposed guiding principles for updating the Avoided Cost Calculator and

methods by which to assess whether proposed updates to the Avoided Cost Calculator meet the guiding principles.

2. Until guiding principles are adopted, the Commission should adopt proposals in this decision that align with the previously stated purpose of the Avoided Cost Calculator.

3. The Commission should adjust the schedule for the Avoided Cost Calculator update such that a final staff proposal is provided to parties through a ruling, in the successor proceeding, issued no later than July 15 of odd-numbered years.

4. The Commission should eliminate the routine minor update of the Avoided Cost Calculator.

5. The Commission should retain the current dual process of a Commission decision adopting policies and modeling changes followed by the resolution process where the technical details of the Avoided Cost Calculator are finalized.

6. The Commission should provide the draft revised Avoided Cost Calculator to parties six weeks prior to the issuance of the draft resolution adopting the updated Avoided Cost Calculator.

7. The Commission should not adopt the use of an error reporting template for the Avoided Cost Calculator.

8. The Commission should instruct Energy Division to provide the data sets outlined in Table 2 of this decision to parties after the issuance of the decision adopting the IRP modeling.

9. The Commission should instruct Energy Division to hold a workshop to discuss the results of the data sets in Table 2 and the results of the draft revised Avoided Cost Calculator and take informal comments on the data, revised calculator, and workshop discussion.

10. The Commission should not revise the outputs of the IRP modeling in this proceeding for purposes of updating the Avoided Cost Calculator.

11. Load growth distributed energy resources should be removed from the "No New DER" Scenario.

12. The Commission should formally adopt, as a policy, the past practice of using the Avoided Cost Calculator to evaluate increased supply costs.

13. The Commission should not eliminate avoided costs of in-state methane leakage from the Avoided Cost Calculator.

14. The Commission should not adopt the inclusion of avoided costs of out-of-state methane in the Avoided Cost Calculator.

15. The Commission should authorize the Energy Division to continue to monitor activities related to out-of-state methane leakage – including legislation and research – and provide an update during the next update of the Avoided Cost Calculator.

16. The Commission should explore sensitivity analysis in the successor proceeding that addresses future revisions of the Avoided Cost Calculator and other cost-effectiveness framework matters.

17. The Commission should continue to explore the Market Equilibrium Approach in the successor proceeding.

18. The Commission should not adopt the battery storage cost changes requested by CLECA.

19. The Commission should not revise the battery contract assumption in the Avoided Cost Calculator.

20. The Commission should adopt the NERA approach to obtain the annual avoided cost of the battery investment.

21. The Commission should revise the Avoided Cost Calculator annualization method by modifying the real discount rate and adjusting for the end-of-year value in the Avoided Cost Calculator net CONE model.

22. The Commission should replace the use of RECAP with SERVM to properly allocate generation capacity value.

23. The Commission should adopt an interim two-year solution to include secondary distribution costs with primary distribution costs in the Avoided Cost Calculator.

24. The Commission should not adopt the proposal to use the allocation approach of an equal cents per kilowatt-hour for allocating secondary distribution costs.

25. The Commission should require Joint Utilities to develop alternative methods for quantifying and allocating secondary distribution costs in the Avoided Cost Calculator with a focus on using the PG&E distribution final line transformer calculations approach approved in D.21-11-016.

26. The Commission should adopt in this proceeding, an avoided gas infrastructure cost (AGIC) using values from the utilities' general rate cases, or a data source that aligns with the categories of AGIC specified in the decision, as values for the categories of mainline extension, service extension, and meter.

27. The Commission should maintain the current process of using the utilities' GNA and general rate case distribution capacity costs to determine distribution avoided costs in the 2022 Avoided Cost Calculator.

28. The Commission should adopt the value of $52.45 per kW-year as the avoided transmission cost for PG&E.

29. The Commission should perform the same analysis as was done in the 2020 Avoided Cost Calculator update to calculate the avoided transmission cost for SCE.

30. The Commission should conduct a study on the avoided cost of transmission and distribution.

31. The Commission should not adopt the natural gas forecast proposals recommended by SEIA.

32. The Commission should use the IEPR natural gas forecast to be consistent with IRP modeling and to ensure distributed energy resources are treated evenly with supply-side resources.

33. Natural gas transportation rates should be resolved in the CEC's IEPR proceeding.

34. The Commission should adopt the recommendations to use the years 2040 and 2045 IRP modeling run to determine post-2032 values and use the associated method for scarcity price adjustment.

35. The Commission should require Energy Division to run price simulation for the year 2040 in addition to the year 2045.

36. In the next update of the Avoided Cost Calculator, the Commission should consider the following improvements for Production Cost Modeling: use of heat rates instead of actual energy prices using both 2020 and 2021 dates, benchmarking the within-day volatility in heat rates, and selection of a weather year with similar hydrologic conditions to 2020 and 2021.

37. The Commission should not adopt the proposal to benchmark SERVM to actual CAISO market prices.

38. The Commission should not adopt the use of the Vibrant Study in assessing the avoided costs of distributed energy resources.

39. The Commission should continue using the current greenhouse gas adder in the 2022 Avoided Cost Calculator.

40. The Commission should study the issue of greenhouse gas rebalancing in the successor proceeding prior to the 2024 update of the Avoided Cost Calculator.

41. The Commission should retain the current greenhouse gas rebalancing method for the 2022 Avoided Cost Calculator update.

42. The Commission should adopt an interim natural gas-specific greenhouse gas adder, while additional study and discussion can occur to develop a permanent natural gas-specific greenhouse gas adder.

43. The Commission should adopt an interim natural gas-specific greenhouse gas adder based on building electrification and use the CEC analysis on gas sector decarbonization.

44. The Commission should adopt the Staff Proposal recommendations to improve the Refrigerant Avoided Cost Calculator.

45. The Commission should decline to adopt the proposal to eliminate avoided costs of refrigerant leakage from the Avoided Cost Calculator.

46. The Commission should not adopt the use of resource-specific ELCC values at this time.

O R D E R

IT IS ORDERED that:

1. Future updates of the Avoided Cost Calculator will begin on approximately July 15 of odd-numbered years and commence with the issuance of a staff proposal through an Administrative Law Judge's Ruling, which will also notice a workshop to discuss the contents of the staff proposal. The review of the Avoided Cost Calculator shall be a two-part process, with the formal

proceeding addressing policies for the Avoided Cost Calculator and proposals for revisions to the modeling and the informal resolution process addressing the technical aspects of the calculator. The minor update of the Avoided Cost Calculator is eliminated. If it is determined that a major update cannot occur in a timely manner, the assigned Administrative Law Judge and Commissioner are authorized to develop a plan for a minor review of the Avoided Cost Calculator, with input from parties. Below is an approximate schedule signifying the intent of the Commission to enable a more thorough review process. The assigned Administrative Law Judge and Commissioner are authorized to establish a final schedule for each update.

Tentative Schedule for the Biennial Review of the Avoided Cost Calculator	
Approximate Date	**Activity**
July 15 (of odd-numbered years)	Ruling Introducing Staff Proposal and Noticing Workshop and Adopted Schedule for the Update
August	Workshop
September 30	Discovery Completed
October	Opening Testimony
November	Rebuttal Testimony
January (of even-numbered years)	Evidentiary Hearing
February	Opening Brief
February	Reply Brief
60 days after adoption of a Preferred System Plan	Release of Data from the Integrated Resource Planning Proceeding
≤ 90 days (after submission of briefs)	Proposed Decision Issued
≥ 30 days (after issuance of proposed decision)	Proposed Decision Adopted
Six weeks (before issuance of draft resolution)	Issuance of Draft Calculator
Approximately 2 weeks later	Workshop

Tentative Schedule for the Biennial Review of the Avoided Cost Calculator	
Approximate Date	**Activity**
Approximately 2 weeks later	Informal Comments
Approximately 2 weeks later	Issuance of Draft Resolution Adopting Updated Avoided Cost Calculator

2. The following policies for future updates of the Avoided Cost Calculator are adopted:

(a) Energy Division will issue a final Staff Proposal on proposed changes to the Avoided Cost Calculator at the commencement of the update.

(b) Energy Division will host a workshop to discuss the Staff Proposal after issuance of the proposal.

(c) Energy Division will address questions and data requests from parties on the Staff Proposal.

3. Beginning with the 2022 update of the Avoided Cost Calculator, the following policies are adopted:

(a) The Avoided Cost Calculator will use the most recently adopted capacity expansion plan adopted in the Integrated Resource Planning proceeding.

(b) Energy Division will release the results of the "No New DER" Scenario and the following data sets after adoption of a capacity expansion plan in the Integrated Resource Planning (IRP) proceeding: i) IRP resource build by scenario, gas forecast, fossil plant heat rates, and renewable profiles; ii) key changes to the SERVM model since last update: iii) SERVM dispatch raw results for a typical week in each season for a subset of years; iv) post-processed scarcity adjusted price results; v) month-hour average heatmap of raw energy and ancillary service prices and an historical prices comparison; and vi) price

duration curves for prices and an historical prices comparison.

(c) Energy Division will provide a draft of the updated Avoided Cost Calculator, after adoption of the decision adopting policies and modeling changes but not later than six weeks prior to the issuance of the draft resolution adopting the updated Avoided Cost Calculator.

(d) Energy Division will host a workshop on the draft updated Avoided Cost Calculator and the data sets provided in 2(e) above.

(e) Energy Division will establish a schedule for data requests and the submission of informal comments on the draft calculator and the data sets.

(f) Energy Division will include a discussion of the workshop and the informal comments in the draft resolution adopting the updated Avoided Cost Calculator.

4. Beginning with the 2022 Avoided Cost Calculator, the following revisions to the calculator are adopted:

(a) Load growth distributed energy resources shall be removed from the "No New DER" Scenario.

(b) The Avoided Cost Calculator shall be used to determine the increased supply costs of fuel substitution measures that are part of the energy efficiency portfolio.

(c) Annualization in the Avoided Cost Calculator shall be revised to modify the real discount rate, adjust for end-of-year value in the Avoided Cost Calculator, and use the National Economic Research Association (NERA) method, published by NERA in *A Framework for Marginal Cost-Based Time-Differentiated Pricing in the United States topic 1.3 (February 1977).*

(d) Generation capacity value shall be allocated using SERVM and Expected Unserved Energy from early morning spring hours shall be removed.

(e) Secondary distribution costs shall be included with primary distribution costs in the Avoided Cost Calculator, on a two-year basis only.

(f) An Avoided Gas Infrastructure Cost (AGIC) shall be incorporated into the Avoided Cost Calculator on a separate tab and not included in the hourly marginal costs. The AGIC shall include three categories of costs: i) mainline extensions; ii) service extension; and iii) meter. Separately, and only for new construction projects, measures and programs that have this benefit, the values will be added to the benefits used in cost-effectiveness tests. Values for in-house infrastructure and plan reviews will be determined through a Commission Decision in individual proceedings for programs and measures that have this benefit.

(g) The Avoided Cost Calculator shall continue to use distribution capacity costs from the utilities' Grid Needs Assessments and general rate cases to determine distribution avoided costs for the 2022 Avoided Cost Calculator.

(h) The value of $52.45 per kilowatt-year is adopted as the avoided transmission cost for Pacific Gas and Electric Company. The Avoided Cost Calculator shall use the same method as was conducted in the 2020 Avoided Cost Calculator to obtain the avoided transmission cost for Southern California Edison Company.

(i) The natural gas forecast from the California Energy Commission's Integrated Energy Policy Report shall be used in the Avoided Cost Calculator.

(j) Production Cost Modeling shall use the year 2045 modeling run from the Integrated Resource Planning proceeding to determine post-2032 values, with an additional price simulation run for 2040.

(k) The greenhouse gas rebalancing method remains unchanged.

(l) An interim natural gas-specific greenhouse gas adder, based on building electrification is adopted. Energy Division is instructed to use the data contained in the California Energy Commission's analysis on gas sector decarbonization to develop the value for the adder. The value, itself, will be reviewed in the resolution adopting the 2022 Avoided Cost Calculator.

(m) The following revisions to the Refrigerant Avoided Cost Calculator are adopted: i) discount the annual refrigerant leakage at mid-year; ii) account for the avoided cost of a measure type instead of a device; and iii) allow users to input additional refrigerant values.

5. The following issues are set aside for the scope of the successor to this proceeding:

(a) Discussion on and development of a set of well-designed and defined guiding principles to properly assess the valuable characteristics needed in the Avoided Cost Calculator.

(b) Discussion on and development of clear guidelines for the use of sensitivity cases for the natural gas forecast, the cap-and-trade allowance forecast, and the greenhouse gas adder.

(c) Discussion on and potential development of the Market Equilibrium Approach proposed by Energy Division, including the proposed changes to the greenhouse gas adder and the Effective Load Carrying Contribution values.

(d) Discussion on and potential development of an alternative method for quantifying and allocating secondary distribution costs in the 2024 update of the Avoided Cost Calculator with a focus on the distribution final line transformer calculations approach approved in Decision 21-11-016.

(e) Discussion on and development of methods to properly value greenhouse gas emissions avoided costs.

(f) Discussion and development of an improved greenhouse gas rebalancing method.

(g) Discussion of whether to value the marginal distributed energy resources or the portfolio of distributed energy resources with the Avoided Cost Calculator with respect to all value categories.

6. Not later than 180 days from the adoption of this decision, Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall jointly submit to the Commission's Energy Division a proposed Avoided Cost Calculator error tracking template, developed with the input of parties to this proceeding.

7. San Diego Gas & Electric Company (SDG&E) and Southern California Edison Company (SCE) shall work together to develop secondary distribution costs estimates based on the Pacific Gas and Electric Company (PG&E) distribution final line transformer approach approved in Decision 21-11-016. Subsequently, SDG&E and SCE shall work with PG&E (together, Joint Utilities) to explore how secondary distribution costs based on the final line transformer approach should be reflected in the Avoided Cost Calculator. Joint Utilities shall jointly serve and file a report on their findings in the successor to this proceeding, no later than nine months from the adoption of this decision,

8. The Director of the Commission's Energy Division is authorized to:

(a) Conduct a workshop in the successor proceeding to discuss proposals for guiding principles and tools to assess whether the Avoided Cost Calculator meets its guiding principles.

(b) Monitor activities related to the issue of out-of-state methane leakage and provide a report as part of the

Staff Proposal in the 2024 update of the Avoided Cost Calculator.

(c) Develop a full application example of the Market Equilibrium Approach using the most recently adopted Integrated Resource Planning proceeding modeling for review in the successor proceeding.

(d) Conduct analysis on avoided transmission and distribution costs to aid in the development, during the successor proceeding, of improved methods to calculate these values.

9. Rulemaking 14-10-003 is closed.

This order is effective today.

Dated May 5, 2022, at Sacramento, California.

ALICE REYNOLDS
President
CLIFFORD RECHTSCHAFFEN
GENEVIEVE SHIROMA
DARCIE L. HOUCK
JOHN R.D. REYNOLDS
Commissioners