FILED
01/07/21
12:08 PM

STATE OF CALIFORNIA GAVIN NEWSOM, *Governor*

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE

SAN FRANCISCO, CA 94102-3298

January 7, 2021

Agenda ID #19114
Ratesetting

TO PARTIES OF RECORD IN RULEMAKING 20-05-003:

This is the proposed decision of Administrative Law Judge Julie A. Fitch. Until and unless the Commission hears the item and votes to approve it, the proposed decision has no legal effect. This item may be heard, at the earliest, at the Commission's February 11, 2021 Business Meeting. To confirm when the item will be heard, please see the Business Meeting agenda, which is posted on the Commission's website 10 days before each Business Meeting.

Parties of record may file comments on the proposed decision as provided in Rule 14.3 of the Commission's Rules of Practice and Procedure.

The Commission may hold a Ratesetting Deliberative Meeting to consider this item in closed session in advance of the Business Meeting at which the item will be heard. In such event, notice of the Ratesetting Deliberative Meeting will appear in the Daily Calendar, which is posted on the Commission's website. If a Ratesetting Deliberative Meeting is scheduled, *ex parte* communications are prohibited pursuant to Rule 8.2(c)(4)(B).

/s/ ANNE E. SIMON
Anne E. Simon
Chief Administrative Law Judge

AES:jnf
Attachment

ALJ/JF2/jnf **PROPOSED DECISION** **Agenda ID #19114**
Ratesetting

Decision **PROPOSED DECISION OF ALJ FITCH (Mailed 1/7/2021)**

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003

DECISION TRANSFERRING ELECTRIC RESOURCE PORTFOLIOS TO CALIFORNIA INDEPENDENT SYSTEM OPERATOR FOR 2021-2022 TRANSMISSION PLANNING PROCESS

TABLE OF CONTENTS

Title **Page**

DECISION TRANSFERRING ELECTRIC RESOURCE PORTFOLIOS TO CALIFORNIA INDEPENDENT SYSTEM OPERATOR FOR 2021-2022 TRANSMISSION PLANNING PROCESS

Summary

The purpose of this decision is to recommend electricity resource portfolios to the California Independent System Operator (CAISO) to study in its 2021-2022 Transmission Planning Process (TPP).

This decision includes recommendations that are broadly consistent with the staff recommendations included in the October 20, 2020 Administrative Law Judge (ALJ) ruling issued in this proceeding, with some modifications to respond to parties' comments. The general recommendations are as follows:

- Base case portfolio, for both reliability and policy-driven purposes, to be used to determine transmission investments needed: a portfolio that meets a 46 million metric ton (MMT) greenhouse gas (GHG) emissions target in 2031, with additional pumped storage and out-of-state renewables included compared to the portfolio adopted in Decision (D.) 20-03-028. This base case portfolio includes approximately 10 gigawatts (GW) of new battery storage, 10 GW of new in-state renewables, and over 1 GW of out-of-state renewables.
- Two sensitivity portfolios, for study purposes:
  - One portfolio that meets a 38 MMT GHG emissions target in 2031. This portfolio includes approximately 20 GW of new in-state renewables, over 10 GW of new battery storage, and 3 GW of out-of-state renewables.
  - One portfolio that includes a large segment of offshore wind, to improve the transmission assumptions relevant to offshore wind for the benefit of future planning.
- Resource-to-busbar mapping methodology: includes improvements to the initial recommended methodology to

prioritize siting of preferred resources, especially battery storage, in disadvantaged communities and/or local capacity areas with poor air quality. The methodology is also updated to use the CAISO's updated deliverability, congestion, and curtailment information.

The name plate capacity of new resources (in megawatts (MW)) identified in the base case portfolio recommended herein is compared against last year's TPP base case portfolio of new resources in Table 1 below.

Table 1. Capacity of New Resources Included in TPP Portfolios (in MW)

Resource Type	**Base Case Portfolio for the 2020-2021 TPP (in 2030)**	**Base Case Portfolio for the 2021-2022 TPP (in 2031)**
Natural Gas	-	-
Biomass	-	-
Geothermal	1,256	-
Hydro (small)	-	-
Wind	992	2,909
Out of State Wind	-	1,062
Offshore Wind	-	-
Solar	6,763	7,743
Customer Solar	-	-
Battery Storage	-	9,419
Pumped Storage	-	627
Shed Demand Response	-	608
Total	**9,011**	**22,368**

Results from the CAISO's TPP study of the base case portfolio will be used to identify future transmission investments. These investments are intended to be "least regrets" projects necessary to meet not only the base case needs, but also to support transition to subsequent base case portfolios with lower GHG targets, without resulting in stranded investments. Results from the sensitivity cases will be used to inform future planning, analysis, and procurement.

This proceeding remains open.

1. Background

Under longstanding agreement among the California Public Utilities Commission (Commission), the California Energy Commission (CEC), and the California Independent System Operator (CAISO), and according to the terms of the CAISO tariff, every year the Commission recommends to the CAISO base case electricity resource portfolios to be used as key inputs to the CAISO transmission planning process (TPP). Typically, there is both a base case portfolio for reliability and another that is policy driven; the two portfolios have often been identical. In addition, the Commission usually requests that the CAISO study one or more sensitivity cases designed to help inform future planning and analysis.

On October 20, 2020, an Administrative Law Judge (ALJ) ruling (ALJ ruling) was issued seeking comments from parties on Commission staff recommendations for portfolios to be used in the upcoming 2021-2022 TPP. The ALJ ruling included a recommended framework for TPP portfolio selection, descriptions of the proposed portfolios, and a methodology for resource-to-busbar mapping and assumptions.

The following parties timely filed comments on or before November 10, 2020, in response to the ALJ ruling: American Wind Energy Association of California (AWEA-CA); Bay Area Municipal Transmission Group (BAMx); California Community Choice Association (CalCCA); California Energy Storage Alliance (CESA); California Environmental Justice Alliance (CEJA) and Sierra Club, jointly; CAISO; California Wind Energy Association (CalWEA); Center for Energy Efficiency and Renewable Technologies (CEERT); Coalition for the Optimization of Renewable Development (CORD); Defenders of Wildlife (DOW); Diamond Generation Corporation (Diamond); Eagle Crest Energy

(Eagle Crest); Golden State Clean Energy, LLC (Golden State); Green Power Institute (GPI); GridLiance West LLC (GridLiance); Long Duration Energy Storage Association of California (LDESAC); LS Power Development, LLC (LS Power); Natural Resource Defense Council (NRDC); Ormat Technologies, Inc. (Ormat); Pacific Gas and Electric Company (PG&E); Protect Our Communities Foundation (PCF); Public Advocates Office of the California Public Utilities Commission (Cal Advocates); San Diego Gas & Electric Company (SDG&E); Southern California Edison Company (SCE); Southwestern Power Group II, LLC (SWPG); The Utility Reform Network (TURN); TransWest Express LLC (TransWest); Vistra Corporation (Vistra); Vote Solar, the Large-Scale Solar Association (LSA), and the Solar Energy Industries Association (SEIA), jointly; Western Grid Development LLC (Western Grid); and Western Power Trading Forum (WPTF).

The following parties timely filed reply comments on or before November 20, 2020, in response to the ALJ ruling: AWEA-CA; CalWEA; CEERT; CEJA and Sierra Club, jointly; DOW; Eagle Crest; GridLiance; GPI; LS Power and Ormat, jointly; Peninsula Clean Energy (PCE); PG&E; PCF; SCE; SDG&E; Schatz Energy Research Center (Schatz); SWPG and Pattern Energy (Pattern), jointly; TURN; Vistra; and Western Grid.

2. Portfolios Proposed by Commission Staff

The October 20, 2020 ALJ ruling contained recommendations for a combined reliability and policy-driven base case and two sensitivity cases described in this section. In addition, an attachment was included describing in detail the methodology for mapping resources to busbars on the transmission system.

1.1. Framework for Portfolio Selection

To help guide the selection process for portfolios, Commission staff put forward a framework, with guiding principles. The purpose of the framework was to establish more of a structure around the portfolio selection process, and to increase the transparency in the selection of the portfolios to be transmitted to the CAISO for TPP purposes. The framework was designed to generate party feedback and help guide portfolio selection in future years.

1.2. Base Cases

The CAISO process requires recommendations for both a reliability base case and a policy-driven base case, both of which will lead to transmission investments being brought to the CAISO Board of Governors for approval if identified as needed during the study process. As has been the case in several prior TPP cycles, this year Commission staff recommended that the reliability and policy-driven base cases be the same resource portfolio. The recommendation was for the portfolio that meets the 2030 greenhouse gas (GHG) target of 46 million metric tons (MMT), which was adopted in Decision (D.) 20-03-028. However, Commission staff recommended that the portfolio be updated with the more recent data and assumptions from the California Energy Commission's (CEC's) 2019 Integrated Energy Policy Report (IEPR).

1.3. Sensitivity Cases

For the policy-driven sensitivity cases, which are for study purposes and do not necessarily result in transmission being brought to the CAISO Board for approval and development immediately, Commission staff recommended two scenarios. One policy-driven sensitivity portfolio was designed around the target of 38 MMT by 2030, which is the GHG target for which load serving entities (LSEs) also submitted IRPs in 2020. The second policy-driven sensitivity

portfolio was designed to obtain improved transmission capability and upgrade cost estimates for certain areas on the CAISO system not previously studied and other areas not studied with the high amount of resources, to aid in the modeling of offshore wind as a candidate resource in the future.

1.4. Resource to Busbar Mapping Methodology and Assumptions

For this purpose, the October 20, 2020 ALJ ruling contained an attachment that was an update to a prior methodology developed for mapping resources to specific locations on the transmission system. The most recent version contained significant updates particularly in the area of mapping for battery storage, as well as for non-battery resources and thermal generation retirement assumptions. We also note that this proposed base case portfolio includes the largest amount of battery storage we have ever had to examine.

The methodology relies on multiple criteria for prioritizing areas to site projects, including commercial interest, available transmission, environmental impact, battery charging constraints, and other factors.

3. Comments of Parties

This section summarizes the substantive comments of parties in response to the staff proposals included in the October 20, 2020 ALJ ruling. In general, some parties continue to seek more opportunities for stakeholder input and engagement on the TPP portfolio selection and resource-to-busbar mapping process. These parties generally include DOW, GridLiance, and WPTF. The sections below detail parties' comments on the particular high-level recommendations from the October 20, 2020 ALJ ruling.

3.1. Framework for Portfolio Selection

CAISO, as the recipient of the portfolios, had several suggestions for framing of the portfolio selection process. CAISO prefers that the Commission continue to select one base case portfolio that addresses both reliability and policy needs. CAISO also requested that the base cases and sensitivity cases requested meet loss of load expectation (LOLE) standards and GHG targets.

CalCCA commented that the portfolios should include the most up-to-date planning information, including LSE contracts.

3.2. Base Case

Numerous parties continued to advocate, in their comments, for the Commission to utilize a 38 MMT GHG emissions target case for 2030 as the base case, rather than the higher 46 MMT case adopted in D.20-03-028. Those parties included GPI, AWEA-CA, CalCCA, CalWEA, CEJA/Sierra Club, Eagle Crest, Golden State, NRDC, SWPG, and Western Grid. A few parties, including CEERT and DOW, would prefer that the Commission send the CAISO a base case with a 30 MMT GHG target in 2030.

A few other parties are comfortable with the 46 MMT GHG emissions target in 2030, with no modifications, including CAISO and Diamond. Still other parties are comfortable with the 46 MMT GHG target as the base case portfolio, but with some modifications. SDG&E suggested using the 46 MMT GHG case, while explaining the drivers of additional resources that were not in the original case. PG&E argued that the base case should be reconciled with the LSE portfolios filed on September 1, 2020, as much as possible.

BAMx suggested that the transmission capability limits be updated to reflect the CAISO's most recent deliverability methodology, which could accommodate more full capacity deliverability status (FCDS) resources,

especially co-located resources. Similarly, TransWest suggested that the base case portfolio identify assumed curtailment and transmission upgrades in each zone.

Ormat argued that more geothermal resources should be in the base case. CESA was concerned that the load assumptions and high electrification load shapes should be clarified and updated.

SCE did not object to the 46 MMT case as the base case, but commented that further analysis should be included on both pumped storage and out-of-state (OOS) wind resources. CalWEA recommended including 1,163 MW of OOS wind. SWPG also argued that the amount of OOS resources in the base case should be increased by at least 1,000 MW by 2022. SWPG also argued to update the RESOLVE model assumptions about in-state wind, including land availability. CORD and GridLiance commented that the transmission limits within the GridLiance West system for the base case should be increased, so that the selection of renewables in Southern Nevada is higher.

PCF, on the other hand, argued that the base case should not have any OOS resources, nor assume any new transmission development, because distributed solar is cheaper, and solar and battery storage should be expanded in the TPP portfolios.

Finally, Cal Advocates had several specific suggested changes to remove the Desert Star Energy Center and Cuyamaca peaker from the SDG&E resources within the TPP portfolios.

3.3. Sensitivity Cases

This section details comments from parties on the sensitivity cases recommended by Commission staff and included in the October 20, 2020 ALJ

ruling. Some parties expressed general concerns about the approach to sensitivity cases, as follows.

CESA commented that the sensitivity cases suffer from the same deficiencies as they were concerned about for the base case, including changes needed to load assumptions and load shapes considering electric vehicle load. CESA would also prefer additional vetting of the cases and assumptions.

CalWEA commented that the sensitivity cases should not just be used for better understanding of their transmission impacts, but also to work towards those plausible futures by being used for least-regrets planning.

GPI suggested studying a 33 MMT scenario instead of the 38 MMT suggested by staff. In addition, GPI suggested an additional scenario containing a high amount of baseload renewables. Ormat also suggested four scenarios as sensitivities that are geothermal-centric.

Cal Advocates recommended an additional sensitivity portfolio be studied that assumes the retirement of the Aliso Canyon natural gas storage facility.

3.3.1. 38 MMT Case

Most parties were generally comfortable with the configuration of this case, though as discussed above, many parties would prefer that it be the base case and not a sensitivity. Some had particular concerns with the composition of the portfolio, as discussed in this section.

The CAISO was concerned to make sure that any case forwarded for TPP purposes be studied to determine whether it meets the loss of load expectation (LOLE) standards of the Commission.

SCE felt that the revised 38 MMT case is close enough to the previous one, which they characterized as flawed, that it casts doubt on the ability of this portfolio to meet GHG targets and reliability standards.

Concerns about the treatment of OOS resources were also prevalent in comments on the recommended 38 MMT GHG emissions by 2030 sensitivity case. SWPG argued that transmission upgrades for OOS wind are needed sooner than offshore wind (OSW), so additional OOS wind should be studied now. LS Power argued that an additional scenario should be developed expressly to study additional OOS wind in the portfolio. LS Power also wanted to be sure that the most recent inputs included data for OOS wind in Idaho.

AWEA-CA argued that approximately 3 gigawatts (GW) of OSW should be forced into the portfolio by 2026, because it could reasonably come online by then and be relevant to replacement power for Diablo Canyon, assuming there are lease auctions in 2021. Western Grid also argued that OSW should be included in the 38 MMT sensitivity case, to test the deliverability of resources into local capacity areas.

Finally, TransWest asked that the Commission clarify how the portfolios and transmission assumptions should be treated in the TPP assessments in relation to the development of transmission upgrades in other states. TransWest would like the CAISO to evaluate those transmission upgrades driven by the policy sensitivity portfolios.

3.3.2. Offshore Wind Case

Many parties provided specific comments on the suggested OSW sensitivity portfolio of 8 GW by 2031. SCE argued that studying OSW is premature, because there are other new resource types equally likely to contribute to meeting the state's needs. SDG&E also saw no value in an OSW sensitivity, arguing that the TPP should instead study a more "realistic" portfolio, which includes high renewable natural gas and hydrogen. SDG&E

also suggested that adding OSW could increase curtailment of other renewables, and actually reduce GHG emissions savings in the portfolio.

SWPG suggested that OOS wind transmission upgrades would be needed earlier than for OSW.

PCF would have us eliminate the OSW portfolio and replace it with a distributed solar and battery portfolio, under the assumption that it would be less expensive.

Several other parties agreed with the idea of an initial study of OSW scenarios, but thought those put forward by Commission staff were too aggressive. GridLiance commented that the OSW scenario was overly aggressive, though they did not state a fundamental concern with using the assumptions to test the transmission impacts.

AWEA-CA suggested studying the central coast as a combined resource that could be mapped to both Diablo Canyon and Morro Bay locations, reasoning that there is uncertainty about resource boundaries. CalWEA suggested revising the scenario to study only 4 GW of central coast OSW by 2031. CalWEA suggested that studying north coast Humboldt locations are not necessary because the scale is insufficient to spur investment.

Western Grid suggested that, in addition to using the interconnection points at Morro Bay and Diablo Canyon, that the OSW sensitivity also utilize the busbars of gas plants in the Los Angeles Basin area, in order to study the Pacific Transmission Expansion Project (PTEP), a sub-sea transmission cable project for which Western Grid is the proponent. AWEA-CA supported further study of this project.

PG&E emphasized that no decision has been made regarding the deliverability of resources interconnected at Diablo Canyon or PG&E's retention of the facilities, which could lessen the utility of this sensitivity case. At a minimum, PG&E suggested that the study could inform future transmission assumptions but should not be considered actionable at this time.

TURN suggested refinements to the sensitivity, by determining the maximum OSW that could interconnect at Diablo Canyon and Morro Bay without requiring new transmission, and then determining other OOS and OSW tradeoffs, along with adding 2 GW of geothermal and lowering the amount of natural gas retained.

Finally, Schatz recommended incorporating their recent North Coast OSW wind study into the TPP.

3.4. Resource to Busbar Mapping Methodology and Assumptions

Parties provided a number of technical comments on the proposed methodology and assumptions for resource-to-busbar mapping included in the October 20, 2020 ALJ ruling.

Parties were divided about whether the Commission should rely on the use of commercial interest as measured by presence in the interconnection queue as a guide for mapping battery storage to substations. DOW and CEJA/Sierra Club argued against using commercial interest as the main guide. GPI expressed concerns about commercial interest being a moving target, and instead recommended a combination of commercial interest with policy-driven analysis. On the other hand, CalWEA and SEIA/Vote Solar/LSA expressed strong support for use of commercial interest as the main driver for mapping.

Golden State suggested mapping should consider the importance of avoiding curtailment, in addition to congestion. In addition, Golden State suggested the Commission ask the CAISO specifically to assess curtailment levels with its studies.

Several parties also commented that the Commission should prioritize siting of batteries in disadvantaged communities and/or local capacity areas with air quality issues, including CEJA/Sierra Club, CalWEA, GridLiance, CEERT, TURN, and Western Grid. CEJA/Sierra Club argued for a direct linkage between expected thermal retirements and the siting of battery resources. In addition, GridLiance argued for expanding the disadvantaged communities boundary to include busbars outside of California but still within the CAISO area.

Many parties also commented in support of utilizing the new CAISO transmission deliverability methodology, which would expand the availability of transmission for siting battery resources with solar. CalCCA, in particular, stressed the importance of this revised methodology. Vistra disagreed with the assumption that only batteries co-located with solar would benefit from the investment tax credit (ITC).

On a related issue, Cal Advocates and GPI specifically advocated for clarifying the definition and benefits of renewable/storage co-location.

On the voltage threshold for substations, Vistra Corporation, PG&E, SCE, and Western Grid argued that substations of all voltages should have resources mapped to them, not just those over 161 kilovolts (kV).

Vistra Corporation also advocated to increase the amount of headroom that batteries can be allocated up to the full available transmission limit rather

than apply a transmission utilization limit of 90 percent for mapping storage as is also applied for solar resources by the CAISO in its study.

4. Discussion

In this section, we include our recommendations to the CAISO for portfolios to use for the 2021-2022 TPP. In addition to the discussion in this section, there is an attachment that includes all of the analysis and mapping details of the implementation of the direction summarized here. Attachment A is titled "Modeling Assumptions for the 2021-2022 Transmission Planning Process" and summarizes in more detail the general direction described in this section of the decision.

We do not propose to adopt formally the framework put forward by Commission staff for evaluating TPP portfolios. Rather, we will use the framework, and comments from parties on it, to inform future rounds of evaluation of TPP portfolios.

We note that some parties still express concerns about the transparency of this process and the opportunities for input. The process this year, including bringing a formal proposed decision before the Commission for a vote on the appropriate portfolios to forward to the CAISO, represents an improvement over prior years, where portfolio transmittal was sometimes partly or fully informal. Within the limits of our resource constraints, we will endeavor to maximize opportunities for stakeholder input and transparency of full Commission decision-making, to the extent possible.

In addition, formal Commission adoption of these portfolios, though it cannot be assumed to prejudge the outcome of any future transmission siting applications, can be considered in the need determination phase, when the

Commission later considers a transmission project associated with the portfolios adopted herein.

Another issue common to all portfolios we recommend is that they should be and have been updated to include the most recent assumptions in the CEC's IEPR. These updates include not only load forecast information, but also load shapes associated with building decarbonization and vehicle electrification, as recommended by some parties. Assumptions about penetration of behind-the-meter (BTM) storage and solar have also been updated throughout the portfolios. Finally, the natural gas price forecast was updated.

New baseline resources were also identified from the individual LSE IRPs submitted on September 1, 2020. Those resources were also removed from the "selected resources" category, to avoid their being double-counted.

Finally, all resource portfolios were extended out to 2031, to adjust the ten-year planning horizon and add an additional year from prior portfolios studied.

4.1. Base Case

In this section we summarize our recommendations and rationale for the base case portfolio, both for reliability and policy-driven purposes, to be studied by the CAISO in the TPP for purposes of identifying necessary transmission upgrades to be sent for CAISO Board consideration and possible approval.

For this base case portfolio, we continue to recommend utilizing the portfolio associated with achieving the 46 MMT GHG emissions target in 2030, with updates for the IEPR assumptions already described above.

This portfolio aligns with the direction given to the LSEs for planning in D.20-03-028, and one of the key objectives of this process is to maintain close

alignment between planning and resource development, including transmission development.

This portfolio has also been tested with production cost modeling and determined to meet basic reliability and GHG emissions requirements, as requested by the CAISO, and as is most important for a base case scenario.

In addition, with the updated IEPR assumptions, this portfolio already identifies over 10 GW of new battery storage, over 15 GW of new in-state renewables, and over 1 GW of OOS renewables on new transmission, among other resources. This represents a significant amount of resource development in a decade, and includes the need for some likely transmission upgrades. This portfolio also includes significantly more resources than the prior 46 MMT resource portfolio analyzed by the CAISO in the prior TPP cycle.

Table 2 below compares the amount of new resources (in nameplate MW) in the base case portfolio we are recommending for this year's TPP (2021-2022) with the portfolio of new resources analyzed for last year's TPP (2020-2021), the results of which are not yet finalized. The numbers in Table 2 below are adjusted to subtract new resources that were already in the baseline, meaning that an LSE has already contracted for them, as indicated in their September 1, 2020 IRP filings. This avoids double-counting of new resources.

Table 2. Capacity of New Resources Included in TPP Portfolios (in MW)

Resource Type	**Base Case Portfolio for the 2020-2021 TPP (in 2030)**	**Base Case Portfolio for the 2021-2022 TPP (in 2031)**
Natural Gas	-	-
Biomass	-	-
Geothermal	1,256	-
Hydro (small)	-	-
Wind	992	2,909

Out of State Wind	-	1,062
Offshore Wind	-	-
Solar	6,763	7,743
Customer Solar	-	-
Battery Storage	-	9,419
Pumped Storage	-	627
Shed Demand Response	-	608
Total	**9,011**	**22,368**

Table 3 below compares the total capacity of new resources selected by the RESOLVE model, used to develop the Reference System Portfolio adopted in D.20-03-028, with the RESOLVE-selected total new resources in the base case portfolio we are recommending herein. These capacity totals are shown prior to the baseline reconciliation described above for mapping purposes to avoid double-counting.

Table 3. Capacity of New Resources Included in RESOLVE Portfolios (in MW)

Resource Type	**46 MMT with 2018 IEPR[1] (in 2030)**	**46 MMT with 2019 IEPR (in 2031) for 2021-2022 TPP**
Natural Gas	-	-
Biomass	-	-
Geothermal	-	-
Hydro (small)	-	-
Wind	2,837	3,267
Out of State Wind	606	1,062
Offshore Wind	-	-
Solar	11,017	12,394
Customer Solar	-	-
Battery Storage	8,873	10,635
Pumped Storage	973	627
Shed Demand Response	222	608

[1] Portfolio adopted as the Reference System Portfolio in D.20-03-028.

Gas Capacity Not Retained	30	-
Total In-State Renewables	**13,854**	**15,661**
Total Out-of-State Renewables	**606**	**1,062**

We recognize that a number of parties continue to advocate for us to utilize a portfolio with a lower GHG target, at most 38 MMT or lower. We asked the LSEs to include plans to meet that target in the individual IRPs that were filed on September 1, 2020, and that we are still evaluating, because we will consider moving in that direction in the future. However, this process is designed to move primarily in one direction, from identifying the required electricity resources to identifying the transmission resources necessary to make them deliverable. We seek to avoid developing transmission in areas where electric resources are unlikely to develop, to avoid stranding expensive transmission investment. Thus, as much as possible, we are attempting to ensure that reality follows planning, and that we do not invest in infrastructure that becomes stranded because it is in the wrong place.

If we were to adopt a 38 MMT case for transmission planning now, it would necessarily be based on the 38 MMT case modeled in RESOLVE, and not the 38 MMT future planned for by the LSEs in their individual IRPs, because those plans are still being analyzed. Thus, forwarding a 38 MMT portfolio now to the CAISO to be used in the TPP base case would risk planning for a 38 MMT future that is different from what the LSEs are actually planning to procure. It is possible, and even likely, that the modeled 38 MMT portfolio will have generation and storage assets in significantly different geographic areas from the actual resources LSEs will utilize. This could result in suboptimal transmission analysis in the TPP at this stage.

To reduce the risk of mis-judging the location of needed transmission, we will continue to request that the updated 46 MMT case be utilized as the base case for the 2021-2022 TPP, because it is "least regrets" planning on the path to the 38 MMT portfolio, which is currently being analyzed as a potential preferred system portfolio, which could be adopted by the end of 2021 in time for the 2022-2023 TPP cycle.

Due to the changes to the 46 MMT portfolio since the previous one analyzed for TPP purposes, we do expect some transmission upgrades to be needed to realize the portfolio, particularly in the second half of the next decade. In particular, during the mapping process for this portfolio, as detailed further in Attachment A, Commission and CEC staff mapped battery storage in the Tehachapi region and the Southern PG&E territory, and identified transmission upgrades that would be needed to support these resources.

We will continue to coordinate closely with the CAISO on specific projects identified as the TPP analysis progresses. We also expect that, because of the unprecedented amount of battery storage in this portfolio, we will need to continue to consult closely if the battery storage triggers additional transmission upgrades that we do not currently anticipate.

In addition, the 46 MMT portfolio includes approximately 1 GW of OOS renewables, as recommended by several parties, and approximately 600 MW of pumped storage. Though a few parties requested that long-duration storage be identified in a technology-neutral manner, this is difficult to implement in practice since the resources are generally large and geography-specific. Thus, the pumped storage represented in the CAISO interconnection queue is currently mapped for this purpose. We emphasize, however, that our inclusion of specific

resources in the mapping process does not mean that LSEs will or are required to acquire a specific project.

We recognize that this 46 MMT portfolio does not include geothermal resources, as requested by Ormat, that are also being studied in the 2020-2021 TPP cycle base case. It does, however, include resource types and amounts that, in combination, provide similar attributes as geothermal. TPP studies are sensitive to a significant degree to resource attributes, rather than resource types. Accordingly, the study of transmission requirements for this portfolio is likely to keep options open for what specific resource types, including geothermal, are ultimately procured. Some geothermal resources are also included in the 38 MMT sensitivity case discussed further below. We will consider including additional geothermal resources in the next cycle.

We also did not specifically modify the transmission limits in the GridLiance transmission zone, as suggested by CORD and GridLiance. This is similar to an issue that was raised by GridLiance in the last TPP cycle. At this stage, we continue to rely upon the CAISO's most recently published set of transmission capability estimates, from their May 2019 White Paper, titled "Transmission Capability Estimates as an input to the CPUC Integrated Resource Plan Portfolio Development." As described in more detail in Attachment A, Commission staff improved compliance with the criteria required by the resource-to-busbar mapping methodology by reallocating the highest possible amount of fully deliverable solar resources to the Southern Nevada (GridLiance) zone, without violating the CAISO's current transmission limits in the area.

Similarly, we did not change the assumed retirement dates for the two units in SDG&E's territory requested by Cal Advocates, because these were set during

the development of the inputs and assumptions for this IRP cycle. The model assumption changes for TPP portfolio development were limited to key changes such as those associated with the 2019 IEPR updates.

And finally, we disagree with PCF's assertion that distributed solar should be augmented in the portfolio and replace other grid-scale renewables. That analysis is already endogenous to the RESOLVE modeling, as supplemented by LSE resource choices, that makes up the portfolio in the first place, and we decline to augment the portfolio with additional distributed resources, beyond the amounts already in the CEC's IEPR forecast, because it would be speculative.

It is expected that a future 38 MMT portfolio will build on the transmission upgrades identified to support the 46 MMT case we recommend here.

4.2. Sensitivity Cases

Sensitivity cases are used primarily for informational purposes, to help inform future planning efforts. Best practices for transmission planning indicate that it is best for us to select sensitivity portfolios that build upon the base case portfolio. This section describes two sensitivity cases that we recommend the CAISO study in the 2021-2022 TPP, in preparation for the 2022-2023 TPP cycle.

For this round of TPP analysis, we decline to recommend study of the detailed geothermal scenarios suggested by Ormat, nor do we recommend a study in the event that Aliso Canyon is closed, as suggested by Cal Advocates. However, depending on progress on these resources in the near future, we will consider these scenarios for the next round of portfolio analysis for the TPP.

4.2.1. 38 MMT Case

The primary sensitivity case we recommend, consistent with the original staff recommendations included in the October 20, 2020 ALJ ruling, is a 38 MMT GHG target scenario, with updates to account for the more recent IEPR load

forecast, load shapes, and BTM resource forecasts. Study of this scenario will help us understand the transmission implications of a 38 MMT scenario not previously studied in the TPP, to inform future modeling inputs, assumptions, or scenarios, and to drive resource development.

Study of this scenario will help the CAISO and us identify which of the upgrades identified in the base case may be "least regrets" under this lower GHG target, to assist in future planning. This sensitivity case includes almost 20 GW of new in-state renewable resources, 3 GW of OOS renewables, and over 10 GW of battery storage, among other resources.

Study of this scenario should also help us identify preferable locations of some of these resources on the transmission system, while also identifying the optimal locations for the necessary transmission upgrades, likely in the second half of the decade ahead.

Mapping by Commission and CEC staff indicates that, in addition to the Tehachapi and Southern PG&E upgrades identified for the base case portfolio, it is likely that an upgrade would be needed in Southern California Desert and Southern Nevada regions to support the 38 MMT portfolio. This is an area that we expect the CAISO to study more closely in its analysis of this sensitivity portfolio.

We have declined to include additional OSW into the portfolio, as suggested by some parties, since OSW is not yet a default candidate resource type in IRP modeling and the OSW transmission implications are adequately covered by the sensitivity discussed in the next section.

However, this sensitivity does include almost triple the amount of OOS renewables compared to the base case scenario, which should allow us to

adequately evaluate the California transmission upgrades necessary to support additional renewable imports. In this regard, we agree with SWPG and others who argued that transmission will be needed sooner to support OOS renewables than for OSW.

4.2.2. Offshore Wind

On the wisdom of conducting a sensitivity for OSW resources, we find that this study should provide insight that will be helpful in the next several rounds of IRP, as we continue to evaluate resource options. Most parties were relatively neutral on this study, with a few exceptions including PCF, SCE, and SDG&E. No parties suggested replacement alternatives for this study.

We emphasize that the purpose of this study is to obtain key inputs for capacity expansion modeling to inform future portfolio development. We do not see the OSW portfolio used for this study as part of an optimal portfolio overall. Rather, this study is designed to test the transmission implications if barriers were to be removed to large-scale development of OSW.

This is the main reason we also decline to reduce the portfolio amount of OSW to be included in the study from 8 GW to 4 GW, as suggested by several parties. In addition, depending on the disposition of the transmission assets currently serving Diablo Canyon, up to 5 GW of OSW may be deliverable on existing transmission and not require additional buildout. Thus, reducing the portfolio amount of OSW would render the study less revealing about additional transmission costs associated with large-scale development of OSW.

In addition, we emphasize that this sensitivity case study does not assume that Diablo Canyon's transmission deliverability is reserved for offshore wind after the nuclear plant is retired. It was developed by forcing selection of OSW up to its technical potential at Diablo Canyon, Morro Bay, and Humboldt,

without consideration of existing transmission headroom. This will allow us to compare the transmission implications of planning for OSW resources in one area as compared to another in the future.

It is unlikely that the Commission will adopt a planning portfolio that includes large amounts of OSW for another several years. Thus, this allows for policy developments in the meantime, once the results of this TPP sensitivity are known. It is also possible that, in the future, other resources may compete to utilize existing transmission in these areas, not just OSW.

We also note, in response to PG&E's comments about the deliverability of resources interconnecting at Diablo, that the disposition of those assets is a subject for future decision-making. We are not taking a position on it here, but the Commission will likely want to weigh in on the disposition of those rights in the future.

In response to SDG&E's concern about the potential for the addition of a large amount of OSW to cause curtailment of other renewables, we expect that this will be assessed as part of the TPP study. The outputs of the study in this regard may be useful for future planning; we emphasize our earlier point that this portfolio is not expected to be part of the resource planning requirements at this time.

With respect to AWEA-CA's suggestion to combine the Diablo Canyon and Morro Bay resources for study purposes, the resource areas have different costs, capacity factors, and generation profiles. Thus, we would like to retain their distinction for these purposes. As the CAISO conducts the assessment of these resources in the 2021-2022 TPP, it can explore various transmission

upgrade alternatives and may find benefit in moving the interconnection point of a portion of the resources from one resource area to the other.

Next, we decline to ask the CAISO to study the PTEP specifically, since the purpose of our portfolio recommendations is not to select specific transmission for study, but rather to provide electric resources to study for their transmission needs. The PTEP is a potential transmission solution that may be considered, without our needing to request its study. In addition, it is a system upgrade, and not related to the need to interconnect specific resources. Thus, it could be an output from the sensitivity case, and not an input.

Finally, with respect to the comments of Schatz about their recent North Coast OSW study, we agree this is a resource that the CAISO can use as a reference when evaluating alternatives in this geographic area.

4.3. Resource to Busbar Mapping Methodology and Assumptions

In response to parties' comments on the resource-to-busbar mapping methodology and assumptions, we are adopting a number of changes compared to the initial proposed methodology, while maintaining some key features, as discussed in this section.

First, on the overall policy consideration of mapping battery resources based on commercial interest, we maintain this as a key consideration. It would not make sense to prioritize areas where there is little commercial interest over those where there are projects in the interconnection queue already. However, we direct Commission staff to take into account additional considerations, including prioritizing locations in disadvantaged communities and air quality non-attainment areas.

We are also utilizing the updated CAISO transmission deliverability methodology to map batteries co-located with renewables.

These changes will result in a rearrangement of the battery mapping methodology steps to be in the following priority order:

- Use commercial interest from the interconnection queue as an upper limit while considering all other transmission or local capacity requirements.
- Map to available transmission headroom with priority for local capacity requirement areas and disadvantaged communities.
- Use the updated CAISO transmission deliverability methodology and map co-located batteries to busbars.
- Map additional batteries outside of CAISO transmission deliverability zones and outside of local capacity reliability areas.
- Map any remaining batteries to locations using the steps above in the same order, even if transmission upgrades are triggered.

By taking this approach, we can maximize the utilization of the available transmission headroom.

We also accept the comments of parties asking that we implement the most recent CAISO transmission deliverability methodology for co-location, and clarify the definition of co-location consistent with the CAISO definition, as distinct from "hybrid" resources. First, this includes battery resources that are co-located not only with solar, but also with wind facilities. In addition, the mapping should be executed in a manner that preserves the full capacity deliverability status of both the batteries and the generation resources.

We also note that the approach we describe briefly above, and in more detail in Attachment A, will maximize the amount of batteries sited in local

capacity requirement areas and disadvantaged communities, but will not directly link the siting of batteries to thermal generation plant retirements. We are avoiding this direct link partly due to our lack of complete control over retirement decisions of individual generators, and partly due to the fact that the mapping decisions we make in this context may not have any direct impact on plant retirement decisions.

We also agree with those parties that suggest that we include consideration of curtailment impacts, in addition to congestion, in the mapping prioritization.

We do not, however, remove the transmission utilization limits for mapping battery storage, as suggested by Vistra. The transmission capability limits included by the CAISO in their May 2019 white paper titled "Transmission Capability Estimates as an input to the CPUC Integrated Resource Plan Portfolio Development," were developed specifically for solar resources and assuming that those resources would be dispatched at 90 percent of installed capacity. Siting beyond the current 90 percent limits on installed capacity for battery storage could risk the deliverability of the battery storage or indicate a need for transmission upgrades when not intended.

Finally, we maintain our approach to generally avoid mapping resources below the 161 kV threshold for substations, for several reasons. First, it would greatly increase the number of qualifying substations and the magnitude of the resources that would need to be mapped, which may be infeasible in the timeframe we have. In addition, it has the potential to overwhelm the TPP studies with local issues while picking winners and losers in a manner we would

prefer not to do. Finally, it seems the generator interconnection process is the more appropriate place to include these local considerations.

5. Comments on Proposed Decision

The proposed decision of Administrative Law Judge Fitch in this matter was mailed to the parties in accordance with Pub. Util. Code section 311 and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed by _____ on _____. Reply comments were filed by _____ on _____.

6. Assignment of Proceeding

Clifford Rechtschaffen is the assigned Commissioner and Julie A. Fitch is the assigned ALJ in this proceeding.

Findings of Fact

1. The CAISO requires portfolio recommendations from the Commission to utilize in conducting their annual TPP, as outlined in their tariff.
2. Electric resource portfolios utilized for TPP purposes are projected out ten years, now including 2031.
3. The electric resource portfolio that meets a 46 MMT GHG emissions target by 2030 aligns with the direction given to LSEs in D.20-03-028.
4. The electric resource portfolio that meets a 46 MMT GHG emissions target has been tested with production cost modeling and meets the Commission's current standards for system reliability.
5. The electric resource portfolio that meets a 46 MMT GHG emissions target based on updated assumptions includes significantly more renewables and storage resources than the previous portfolio analyzed by the CAISO in its previous TPP.

6. Although the Commission, in D.20-03-028, asked LSEs to submit plans to meet a 38 MMT GHG emissions target by 2030, the Commission has not yet adopted a portfolio that meets that target.

7. After review and evaluation of plans for procurement submitted by LSEs to meet the 38 MMT GHG emissions target in their individual IRP filings of September 1, 2020, the Commission may evaluate the 38 MMT system portfolio that results from these LSE plans, instead of theoretical modeling, in time for the next TPP cycle in 2022-2023.

8. Transmission to support achieving the portfolio that meets the 46 MMT GHG emissions target will also be necessary to support a portfolio that meets the 38 MMT GHG emissions target.

9. Best practices in transmission planning include cyclical annual study of portfolios that achieve greater GHG reductions and include the need for transmission to support deliverability of the portfolios in a linear fashion, building on prior annual analyses.

10. The Commission's role in the TPP is to select generation and storage resources for the CAISO to study for their transmission needs, not to select specific transmission solutions to be studied.

Conclusions of Law

1. It is not necessary for the Commission to adopt formally the framework put forward by Commission staff for evaluating portfolios to be used for TPP purposes. Rather, the framework should continue to be updated, taking into account parties' comments, to guide future portfolio development and selection.

2. To the extent possible, portfolios used for TPP purposes should be based on the most up-to-date assumptions included in the CEC's annual IEPR.

3. Based on analysis conducted by Commission staff thus far, utilizing the electric resource portfolio that meets the 46 MMT GHG emissions target as a reliability and policy-driven base case in the TPP will likely result in the need for new transmission investment to make the portfolio deliverable.

4. The Commission should avoid recommending portfolios to the CAISO that would lead to stranded transmission investments in the wrong geographic locations to serve the generation and storage resources of LSEs in the future.

5. It is preferable for the Commission to analyze and evaluate an aggregated 38 MMT GHG emissions portfolio as submitted by LSEs in their individual IRPs prior to providing such a portfolio to the CAISO as an input to the TPP base case.

6. The Commission should seek CAISO TPP analysis of two sensitivity cases in this TPP cycle: a case that achieves 38 MMT GHG emissions by 2031, and a second case designed specifically to improve transmission assumptions relevant to OSW for the benefit of future planning.

7. Demonstration of commercial interest in projects in particular geographic areas, as represented by having a place in the CAISO's interconnection queue, is reasonable to remain a major driver of the methodology for resource-to-busbar mapping, since it is more likely that those projects will be built compared with projects not in the queue.

8. Additional busbar mapping considerations should include prioritizing locations in disadvantaged communities and/or air quality non-attainment areas.

9. The CAISO's most recent (2019) transmission deliverability methodology for storage, and storage co-located with renewables, should be used in resource-to-busbar mapping.

10. The Commission should continue to map resources to substations at the threshold of 161 KV and above, to avoid false precision and unintended local consequences.

11. It is likely that transmission upgrades to support OOS renewables will be needed earlier than transmission upgrades to support OSW.

12. It is preferable for the full Commission to consider and vote on the portfolios recommended to the CAISO for TPP purposes, to the extent possible while still meeting the CAISO's deadlines.

O R D E R

IT IS ORDERED that:

1. The Commission transfers to the California Independent System Operator for its 2021-2022 Transmission Planning Process the reliability and policy-driven base case portfolio that meets the 46 million metric ton greenhouse gas emissions target by 2031, with updated assumptions from California Energy Commission's 2019 Integrated Energy Policy Report, as detailed in Attachment A of this order.

2. The Commission transfers to the California Independent System Operator for its 2021-2022 Transmission Planning Process two policy-driven sensitivity portfolios for study purposes that have been updated with assumptions from the California Energy Commission's 2019 Integrated Energy Policy Report: 1) a portfolio that meets a 38 million metric ton greenhouse gas emissions target by 2031; and 2) a portfolio to test transmission needs associated with offshore wind. Both sensitivity portfolios are further detailed in Attachment A of this order.

3. In mapping electric resources to busbars to identify geographic locations to support the California Independent System Operator's (CAISO's) Transmission Planning Process, Commission staff shall prioritize commercial interest, followed by locations in disadvantaged communities and local air quality non-attainment areas, especially for locating battery storage. The mapping process shall also be informed by the CAISO's most recent methodology associated with hybrid or co-located storage and generation resources.

This order is effective today.

Dated _____, at San Francisco, California.

ATTACHMENT A

Modeling Assumptions for the 2021-2022 Transmission Planning Process