PROPOSED DECISION

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

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Appendix A – Modeling Assumptions for the 2021-2022 Transmission Planning Process

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:

- <u>Base case portfolio, for both reliability and policy-driven</u> <u>purposes, to be used to determine transmission</u> <u>investments needed</u>: a portfolio that meets a 46 million metric ton (MMT) greenhouse gas (GHG) emissions target in 2031, with pumped storage and additional out-of-state renewables included compared to the portfolio adopted in Decision (D.) 20-03-028. This base case portfolio includes approximately 9 gigawatts (GW) of new battery storage, 16 GW of new in-state renewables, 1 GW of out-of-state renewables, and geothermal and pumped storage resources.
- <u>Two sensitivity portfolios, for study purposes</u>:
 - One portfolio that meets a 38 MMT GHG emissions target in 2031. This portfolio includes approximately 19 GW of new in-state renewables, over 9 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.

• <u>Resource-to-busbar mapping methodology:</u> 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.

Resource Type	Base Case Portfolio for the	Base Case Portfolio for the
	2020-2021 TPP (in 2030)	2021-2022 TPP (in 2031)
Natural Gas	-	-
Biomass	-	-
Geothermal	1,256	651
Hydro (small)	-	-
Wind	992	2,943
Out of State Wind	-	1,062
Offshore Wind	-	-
In State Solar	6,763	13,043
Customer Solar	-	-
Battery Storage	-	9,368
Pumped Storage	-	627
Shed Demand Response	-	608
Total	9,011	28,303

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

While the base case portfolio is designed to meet a 46 MMT GHG emissions target, the additional resources now included in the portfolio after changes in response to party comments on the proposed decision comprise the great bulk of resources that would be needed to meet a 38 MMT target, and thus will position the Commission to move toward setting that lower target. This is separate from the sensitivity portfolios that will also provide valuable information about the transmission costs associated with a 38 MMT target and a portfolio that includes offshore wind resources.

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,

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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).

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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

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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.

LS Power commented that the TPP process should account for reliability, policy, and economic benefits combined to accurately assess new transmission options, including out-of-state (OOS) transmission projects.

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

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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 OOS wind resources. CalWEA suggested that the 1,163 MW of OOS wind can be delivered to the CAISO on the existing transmission infrastructure and does not require new transmission to reach the CAISO system. Thus, CalWEA does not find this

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useful for purposes of long-term transmission planning. 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.

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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

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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

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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 the proposed amounts of north coast Humboldt offshore wind by 2031 are too small to be relevant, and that instead the resource should be studied at larger scale in the longer-term outlook assessment, to capture economies of scale.

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

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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

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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.

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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-themeter (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. Generally, those resources were also removed from the "selected resources" category, to avoid their being double-counted. In the case of battery storage, those resources were subtracted from the baseline across all portfolios. For non-battery resources, because some of their locations were unspecified in the LSE plans, they could not be subtracted from the resources selected by the RESOLVE model in specific zones. Further, there are some new baseline resources that are in locations where RESOLVE had not selected resources at all, and therefore those also could not be subtracted.

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 9 GW of new battery storage, over 16 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.

In response to comments on the proposed decision by LS Power, TransWest, SWPG/Pattern, and the CAISO, we will recommend that the CAISO to study injection of OOS wind resources at two locations, the El Dorado substation in the Southern California Desert and Southern Nevada transmission zone and the Palo Verde substation in the Riverside East and Palm Springs transmission zone, in order to better understand the transmission upgrade needs should the resources develop at either location.

With respect to comments by GridLiance on the proposed decision about the siting of solar resources in Arizona instead of Southern Nevada, we are persuaded that we should add to the base case 1,400 MW of energy-only solar resources in the GridLiance area, represented by commercial interest and the comments of several other parties including CUE and the Nevada Governor's Office, to be studied for the need for grid upgrades. This change is also consistent with the resources that are contained in the 38 MMT GHG target portfolio. We also note our general agreement with the comments on the proposed decision of IEP and ACP-CA that energy-only arrangements have not been shown to be a preference in the market with the structure of current contracts. However, we note that with the declining marginal capacity value of solar, these types of arrangements may be likely to emerge in the near future. Adding these resources now will allow us to study the transmission implications, representing a least-regrets strategy, while watching how market preferences continue to develop.

We also agree with the comments on the proposed decision of Ormat and a few other parties, noting that geothermal resources dropped out of the portfolio but continue to represent desirable portfolio diversity. Thus, we are adding back to the portfolio 651 MW of geothermal resources, which is also consistent with our desire not to create large swings in resource selection between TPP study years.

Finally, in response to comments on the proposed decision from LDESAC and DOW, we are diversifying the locations of the pumped storage resources mapped for TPP purposes, while continuing to note that this mapping is in no way intended to suggest any Commission preference for specific projects, or even for pumped hydro projects over other types of long-duration storage projects or technologies.

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 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

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indicated in their September 1, 2020 IRP filings. As explained earlier, this avoids double-counting of new resources.

Resource Type	Base Case Portfolio for the	Base Case Portfolio for the	
	2020-2021 TPP (in 2030)	2021-2022 TPP (in 2031)	
Natural Gas	-	-	
Biomass	-	-	
Geothermal	1,256	651	
Hydro (small)	-	-	
Wind	992	2,943	
Out of State Wind	-	1,062	
Offshore Wind	-	-	
Solar	6,763	13,043	
Customer Solar	-	-	
Battery Storage	-	9,368	
Pumped Storage	-	627	
Shed Demand Response	-	608	
Total	9,011	28,303	

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

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 I	Resources	Included in	n RESOLV	/E Portfolios	(in MW)
							· /

Resource Type	46 MMT with 2018	46 MMT with 2019
	IEPR ¹ (in 2030)	IEPR (in 2031) for
		2021-2022 TPP

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

Natural Gas	-	-
Biomass	-	-
Geothermal	-	651
Hydro (small)	-	-
Wind	2,837	2,943
Out of State Wind	606	1,062
Offshore Wind	-	-
Solar	11,017	13,043
Customer Solar	-	-
Battery Storage	8,873	9,368
Pumped Storage	973	627
Shed Demand Response	222	608
Gas Capacity Not Retained	30	-
Total In-State Renewables	13,854	16,638
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

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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 were instructed to plan for in the 2019-2020 IRP cycle, and with a magnitude of resources that magnifies the uncertainty. It is possible that the modeled 38 MMT portfolio will have generation and storage assets in 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. It is important to reiterate that transmission upgrades likely needed to deliver the 46 MMT portfolio are also likely to be needed to deliver the 38 MMT portfolio, and indeed set the stage for portfolios with lower targets. Once additional generation and storage resources are more certain, and the Commission finishes aggregating and evaluating the LSE plans for the 38 MMT GHG target, the Commission can consider the 38 MMT portfolio for use in the next 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. In particular, during the mapping process for this portfolio, as detailed further in Attachment A, Commission and CEC staff

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mapped solar resources in the Southern PG&E territory and mapped solar, wind, and battery resources in the Tehachapi region, 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 critical for system or local grid reliability and resilience, whether short- or long-duration, 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. As noted in Attachment A, references to Wyoming wind and New Mexico wind should be understood to refer to various types of resources from various states that may inject at the El Dorado substation and Palo Verde substation, respectively, and not just wind resources physically located in Wyoming or New Mexico.

A few parties requested that long-duration storage be identified in a technology-neutral manner, but this is difficult to implement in practice since some of the resources are large and geography-specific. LDESAC emphasized, in their comments on the proposed decision, the importance of defining long-duration storage attributes (eight hours or more of storage capability) rather than by technology. We agree with this for procurement purposes. For transmission planning, however, we are forced to choose specific locations in the short term. Thus, the pumped storage represented in the CAISO interconnection queue, currently or in the recent past, is currently mapped for this purpose. We

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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. Should we additional or other types of long-duration storage projects be identifiable in the near future, they will be included in the next round of mapping for TPP purposes.

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.

As already emphasized above, 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. Indeed, with the additional resources now included in the base case, the portfolio includes the great bulk of resources that would be needed to meet a 38 MMT GHG target.

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

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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

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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 necessarily 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.

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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.

Study of this sensitivity allows for policy developments to occur in parallel with consideration of generation buildout, 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 is carefully reviewing this issue and will likely want to weigh in on the disposition of those rights in the future, which may well be extremely valuable for development of OSW generation.

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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.

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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, while noting the comments of CalWEA on the proposed decision that we not site battery storage in such a way as to increase the likelihood of fossil-fueled resources needing to run in local capacity areas to charge the battery storage.

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.

We also 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.

Finally, in response to comments on the proposed decision from GPI, we emphasize the requirements of LSEs that were previously stated only in Attachment A, that we will require mapping of demand response resources to specific busbars to assist in the TPP analysis. LSEs are requested to submit this information directly to the CAISO through its stakeholder process, at a time and in a manner specified by the CAISO.

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

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comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure.

Comments were filed on January 27, 2021 by the following parties: American Clean Power-California (ACP-CA, formerly known as AWEA-CA); CalWEA; CAISO; CEERT; CEJA and Sierra Club, jointly; CESA; CORD; Coalition of Utility Employees (CUE); DOW; GPI; GridLiance; LDESAC; LS Power; Nevada Governor's Office of Energy; Ormat; PCF; SWPG and Pattern, jointly; TransWest; and Western Grid.

Reply comments were filed on February 1, 2021 by the following parties: ACP-CA; CAISO; CalWEA; CEERT; DOW; GridLiance; GPI; Independent Energy Producers Association (IEP); LS Power; PCF; PG&E; SWPG and Pattern, jointly; Vote Solar, SEIA, and LSA, jointly; and Western Grid.

This section summarizes in a thematic manner the major comments from parties and our responses to them. Changes in response to the comments with which we agree have also been made throughout the text of the decision, where appropriate.

First, numerous parties continued to suggest that a 46 MMT GHG emissions target for 2030 is inappropriate, and the Commission should select a 38 MMT emissions target as the base case for TPP purposes. Parties supporting a 38 MMT base case included ACP-CA, CalWEA, CEERT, CEJA/Sierra Club, DOW, GridLiance, and Western Grid. PG&E, in its reply comments, opposed the 38 MMT case as the base case, arguing that it would be premature, since the LSE plan aggregation process and preferred system portfolio development is not yet complete. We concur with PG&E's reasoning even as we sympathize with the numerous parties who want us to move to the 38 MMT as the GHG target. In fact, the 46 MMT base case is, from a transmission development perspective, an important step on the path toward the 38 MMT case. As further detailed in the attachment to this decision, current analysis suggests that the additional transmission that may be needed to achieve the 38 MMT GHG target is related to OOS renewables, which will be studied in a sensitivity case this year, in order to be ready to be inserted in the base case in the future.

We also understand that for many parties, it is a matter of timing; they feel that the progress of the annual iterations of TPP analysis is too slow and incremental, and that the Commission should not wait any longer to plan the transmission that will be needed by the end of the decade. Part of this frustration reflects the fact that the handoff between the IRP process and the CAISO TPP is incremental by design. Every year the base case builds upon the base case from the prior year, to the extent possible. And there is also an inherent tension in attempting to balance utilization of the current transmission system with transmission buildout to support the new resources needed to meet future goals. At times this is more art than science or modeling. This decision, as with prior TPP recommendations, attempts to strike the appropriate balance, with some judgment involved, as detailed herein.

For purposes of this decision, we are maintaining the 46 MMT GHG target as the basis for the base case until the Commission fully considers the aggregation of the individual IRPs with plans to achieve the 38 MMT target. Once the Commission makes a determination about a lower GHG target, that target would determine the base case in the next round of TPP.

Several parties commented on the OSW sensitivity case proposed in the decision. PCF argued that cost-competitiveness of OSW should be demonstrated

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before the resource is studied in the TPP. ACP-CA and Western Grid instead argued that OSW should already be included in the base case this year. Western Grid also included information about recent Federal actions with respect to investment tax credits; these actions occurred after the proposed decision was published. CalWEA suggested that the OSW portfolio should be based on the 38 MMT GHG target, and include gas plant retirement in the LA basin.

We decline to make changes now to the OSW sensitivity in the decision. The recommended sensitivity case intentionally includes a large amount of OSW resources in order to develop information about the costs of transmission required at various locations with OSW potential. The information learned from the study of this scenario will help inform future policy with respect to siting and procurement of OSW.

Several parties also included detailed comments on the locations for OOS renewables. The proposed decision included approximately 1 GW of OOS wind interconnecting at the El Dorado substation, which would most likely deliver resources from Wyoming or Idaho. TransWest supported this location in the base case in its comments. LS Power also supported this mapping but suggested that the Commission request that the CAISO conduct a more comprehensive assessment to determine the appropriate location. SWPG and Pattern, on the other hand, suggested locating the resources to interconnect at the Palo Verde substation, which would most likely deliver resources from New Mexico, as originally selected by the RESOLVE model.

The CAISO, in reply comments, suggested that they could study separately the injection of the full amount of energy at both the El Dorado substation representing resources from Wyoming, Idaho, or potentially other

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locations, and the Palo Verde substation, resentation resources from New Mexico or other SouthWest locations, delivering results for further consideration at the end of this TPP cycle. We understand this to be a unique situation where the CAISO may be able to offer optionality within the base case analysis, and therefore we will take the CAISO up on this offer and work with them to understand better the transmission buildout requirements associated with generation siting in both locations.

A similar issue arises with respect to the siting of solar resources either in Arizona or in Southern Nevada. Several parties, including GridLiance, CUE, and the Nevada Governor's Office, argued that locating resources in Southern Nevada is more economic both from an interconnection cost and land availability standpoint. They suggested including approximately 1,400 MW of energy-only solar resources in the GridLiance area, which would likely trigger grid upgrade costs. GridLiance argues these upgrade costs would be more than offset by the less expensive interconnection costs. Ormat further argued that moving resources into Southern Nevada could free up transmission capability to accommodate a more diverse set of resources in the Southern California area overall. IEP, on the other hand, in their reply comments, and ACP-CA in their opening comments, raised concerns about reliance on energy-only resources, since the market has not shown a preference for these types of resources in commercial contracts.

On balance, we are persuaded by GridLiance's arguments and analysis that suggests that adding 1,400 MW of energy-only solar resources in their transmission area would represent a least-regrets strategy, while also continuing

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to site solar in Arizona as suggested by the modeling results. Thus, we have made this change to the decision.

Several parties, including Ormat, LS Power, Western Grid, and GPI, also continued to emphasize in their comments, the value of resource diversity. Ormat also urged consistency with past TPP base case portfolios, which included geothermal resources. In response to these comments, we are adding 600 MW of geothermal in the Imperial Region and another 51 MW in the Sonoma area back into the portfolio, similar to last year's base case portfolio. This will increase consistency with the prior TPP portfolio and also provide the resource diversity benefits cited by many parties.

LDESAC, in its comments, noted that the base case portfolio includes fewer long-duration storage resources than the RSP adopted in D.20-03-028. This is generally because of the changes in assumptions in the updated IEPR load forecast, after re-running the RESOLVE model. LDESAC also disputed the characterization of long-duration storage resources as "generally large and geographically-specific," noting that some long-duration storage technologies have quite different characteristics than the pumped hydro projects represented in the portfolio suggested in the proposed decision. LDESAC is correct that the projects included here are intended as proxy for a large diversity of potential projects, only some of which may have the characteristics noted. While the transmission planning purpose of this decision requires us to make decisions about locations of potential projects, this should in no way be read as an endorsement of specific projects to be procured or even specific types of resources. It is an approximation for transmission planning purposes only, which requires that large projects be assumed to be sited somewhere.

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Also on the subject of the siting of specific pumped hydro projects, DOW criticized the selection of specific projects, noting the many land-use and environmental concerns associated with specific projects, even though they are in the CAISO interconnection queue. In acknowledgment of these issues, in revisions to this decision, Commission staff are re-mapping pumped storage resources in the base case, 38 MMT sensitivity, and OSW sensitivity portfolios to include an additional pumped storage project (the San Vicente project) that was previously studied in the prior TPP sensitivity cases, so that the resources are spread between two projects instead of a single project in the base case and between three projects instead of two in both sensitivity portfolios. This will increase the diversity of siting, and again, the mapping of these projects should never be read as a Commission endorsement of a particular project or location.

We also include several more minor revisions to reflect inaccuracies in the proposed decision. We have corrected the characterization of CalWEA's earlier comments that were inaccurate. We have also included in the text of the decision itself some requirements that were previously included only in the attachments, as suggested by GPI. This includes the requirements for all LSEs to provide mapping of demand response resources to substations.

Finally, a number of parties, including CESA, DOW, and GPI, suggested modifications to the process for future rounds of IRP-TPP planning. We agree that certain improvements should be under consideration, including conducting production cost modeling on all portfolios, to the extent feasible, as well as improvements to assumptions in both the capacity expansion and production cost modeling going forward. DOW also refers to the suggested transmission working group to support planning for Senate Bill 100 long-term goals. We will

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endeavor to take these concerns and comments into account as we consider next year's recommendations for TPP purposes.

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. The Commission's current practice is to evaluate electric resource portfolios utilized for TPP purposes using a ten year planning horizon, 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. Transmission solutions to support both policy and reliability goals combined with ratepayer savings can provide significant benefits to California.

7. 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 completed aggregation and analysis of the plans or adopted a portfolio that meets that target.

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8. 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.

 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.

10. 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.

11. 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

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new transmission investment to make the portfolio deliverable. Transmission projects should be evaluated for reliability, policy, and economic benefits.

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 or other regions' interconnection queues, is reasonable to remain one 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 interconnection queues.

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.

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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. LSEs should be required to submit busbar locations for demand response resources directly to the CAISO through its stakeholder input process for the TPP study plan, at a time and in a manner specified by the CAISO.

13. 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.

ORDER

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.

4. All load-serving entities with demand response resources shall submit to the California Independent System Operator (CAISO), at a time and manner specified by the CAISO as part of their Transmission Planning Process stakeholder input process, the specific busbar locations on the transmission system where the demand response resources will be delivered.

This order is effective today.

Dated _____, at San Francisco, California.

ATTACHMENT A

Modeling Assumptions for the 2021-2022 Transmission Planning Process