BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Develop an Electricity Integrated Resource Planning Framework and to Coordinate and Refine Long-Term Procurement Planning Requirements.	Rulemaking 16-02-007 (Filed February 11, 2016)

COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

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Date: January 4, 2019

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I. Introduction

The California Independent System Operator Corporation (CAISO) hereby provides comments in response to the November 29, 2018 *Administrative Law Judge's Ruling Seeking Comments on Inputs and Assumptions for Development of the 2019-2020 Reference System Plan* (November 29 Ruling) and *Attachments A* (Attachment A) *and B thereto*, issued in this proceeding. The CAISO appreciates the opportunity to provide comments.

The November 29 Ruling and associated attachments reflect many significant process improvements and greater transparency in the integrated resource plan (IRP) process. The CAISO appreciates the efforts of the Commission and Energy Division staff to provide an early release of these documents and an opportunity for formal comments. In these comments, he CAISO provides three specific recommendations, which are summarized below.

- **CAISO Recommendation No. 1: The Commission should conform all data in the Inputs and Assumptions document to the California Energy Commission's (CEC) Integrated Energy Policy Report (IEPR) data, or justify in coordination with the CEC why certain data points should deviate.**

Attachment A to the November 29 Ruling specifically relies on non-CEC data sources for consumption load and behind-the-meter photovoltaic (PV) solar generation profiles. This contradicts the process alignment agreement between the Commission, the CEC, and the CAISO to use the CEC IEPR-managed forecast set for all planning and procurement decisions. The Commission should use the CEC IEPR data set as agreed to under the process alignment framework, unless there are extraordinary circumstances that justify deviation. If such extraordinary circumstances exist, Energy Division staff should provide an analysis of why the

non-CEC IEPR data is superior in a transparent process that should include CEC staff.

- **CAISO Recommendation No. 2: The Commission should include a discussion of the proposed improvements discussed in prior Administrative Law Judge Rulings in the next iteration of the Inputs and Assumptions document.**

On November 15, 2018, the Commission issued a separate ruling[1] in this proceedings specifying modeling approach changes for the 2019-2020 IRP cycle.[2] Many of these important changes—such as (1) iterative modeling of RESOLVE and production cost modeling; (2) revisiting the net export limit; and (3) more specific greenhouse-gas (GHG) emissions limits for Pacific Northwest hydro importers—are not mentioned in the November 29 Ruling or its attachments. The CAISO strongly supports these modeling improvements as they may have a significant impact on modeling results—both for understanding the resultant capacity expansion portfolio and its operability within reliability constraints.

- **CAISO Recommendation No. 3: The Commission should follow-up on informal Modeling Advisory Group (MAG) discussions and Energy Division staff commitments that impact parties' ability to respond to the November 29 Ruling and its attachments.**

Specifically, the November 29 Ruling requests comments on the IRP's proposed approach for modeling generation retirements. However, prior MAG discussions noted that the Commission would provide more detail regarding generation retirements in February 2019 with a separate Ruling. It is difficult to provide productive or actionable feedback if parties do not have sufficient information to respond to questions.

II. Discussion

In the discussion below, the CAISO provides responses to selected questions posed in the November 29 Ruling. The relevant questions are reproduced prior to each CAISO response.

Question 1: Base case selection. Please comment on the recommended base case assumptions outlined in Section 1 above. What assumptions would you modify and why?

The CAISO requests the Commission acknowledge that the IEPR vintage used in the IRP will differ from the vintage used in the CAISO's Transmission Planning Process (TPP). The November 29 Ruling's load forecast discussion notes that the retail sales and load modifiers

[1] *Administrative Law Judge's Ruling Finalizing Production Cost Modeling Approach and Schedule for Preferred System Plan Development* (November 15 Ruling).
[2] November 15 Ruling, p. 11.

forecast will come from the "mid" scenario in the CEC's IEPR 2018 Update. The CAISO agrees with this approach, but it may result in Reference or Preferred System Plan policy portfolios that are based on an IEPR vintage load forecast that differs from the load forecast that the CAISO uses in its TPP cycle that considers the Reference or Preferred System Plan policy portfolios. For example, the Commission will use the CEC's 2018 IEPR Update load forecast to develop the 2019 Reference System Plan policy portfolios that will be produced in late 2019 or early 2020. The CAISO will use those policy portfolios in its 2020-2021 TPP cycle. However, in the 2020-2021 TPP cycle the CAISO will also use the then-current CEC IEPR load forecast (*i.e.*, the 2019 IEPR load forecast) to conduct its transmission planning analyses. The Commission should clarify that this is necessary and acceptable because the IRP and the CAISO's TPP are completed serially.

In the November 29 Ruling's baseline resources discussion, it proposes to discount planned resources included in the 2018 individual IRP filings but without approved contracts by 50 percent to account for uncertainty.[3] As explained in more detail in response to Question 4, the CAISO requests greater clarification regarding what will be done with the results before it can sufficiently answer this question.

The November 29 Ruling also proposes using "an age-based retirement assumption, with thermal generation over 40 years old being retired, unless the resource is already under contract for longer."[4] As described in more detail in the response to Question 5, the CAISO requests the Commission provide more details about the "Economic Retirement or Retention" option so that parties can provide more informed and actionable feedback.

Question 2: Baseline resources. What changes would you make to the assumptions in Section 3 of Attachment A with respect to baseline resources? Explain.

Section 3.1: *Natural Gas, Coal, and Nuclear Generation* notes that "[r]esources that have announced an intention to mothball will not be removed."[5] The CAISO seeks clarification on whether the resource is kept in the model for administrative tracking purposes only, or if the resource will be allowed to operate in the model for any reason. Furthermore, this treatment

[3] November 29 Ruling, p. 5.
[4] November 29 Ruling, p. 5.
[5] Attachment A, p. A-15.

should be applied uniformly to all mothballed resources, as opposed to only thermal resources.

Section 3.3: *Large Hydro* notes that "existing large hydro resources in each zone of RESOLVE are assumed to remain unchanged over the timeline of the analysis."[6] Furthermore, a "fraction of the total Pacific Northwest hydro capacity will be made available to CAISO as a directly scheduled import. The quantity will be based on the amount of specified hydro imported into California will be based on historical import data."[7] The CAISO seeks clarification on and more detail about how Energy Division staff intends to model this.

Question 4: For planned resources without approved contracts in the base case:

a. What criteria should the Commission use to evaluate whether it is reasonable to assume that a planned resource will be completed?

b. Is it reasonable to assume a 50 percent failure rate for these types of resources? If not, what are the sources of uncertainty for these types of resources and how should the Commission plan and account for that uncertainty?

c. Provide data sources that speak to contract or project success rates.

Unlike approved contracts that may experience a quantifiable failure rate, assigning a failure rate to resources without approved contracts is arbitrary. From a modeling perspective, the Commission can either assume none of the resources will be built (because there is no firm commitment to do so) or all of the resources will be built (because the resource quantity is a reflection of legislative mandates or other requirements). In order to answer the questions posed, the CAISO requests that the Commission clarify how the proposed 50 percent failure rate would be applied and what the implications are for the resultant portfolio. For example, the Commission should articulate whether the total portfolio would lead to actionable transmission upgrades if only 50 percent of the uncontracted resources are included and the remaining capacity expansion is an output from the RESOLVE model.

[6] Attachment A, p. A-19.
[7] *Id*.

Question 5: As described in Section 3.1 of Attachment A, the 2019-2020 IRP version of RESOLVE will be capable of retiring baseline thermal resources economically within the optimization process. Fixed operations and maintenance costs of baseline thermal resources will be added to RESOLVE's optimization logic, such that existing thermal generators may be retired by the model, subject to reliability constraints, if it is cost-effective to do so. Provide suggestions for data sources that could be used for the fixed operations and maintenance costs of baseline/existing thermal resources.

At the Commission's December 7, 2018, MAG webinar, Southern California Edison Company (SCE) asked Energy Division staff to "elaborate on [the] methodology employed to retire generation economically [and] on how the reliability constraints impact the generation retirement optimization."[8] In response, Energy Division staff could not provide any further details at that time but expected the specific methodology to be implemented would be described in a Ruling to be released in February 2019.[9] Energy Division staff noted that suggestions for modeling economic retirements are welcome via party comments. In order for the CAISO to make an informed decision, additional clarity is needed on the "Economic Retirement or Retention" option described in Section 3.1.1. The description of this option notes that "the decision to retire is based on the cost to retain the resource *and as compared to the cost of alternatives*" (emphasis added).[10] However, earlier in Attachment A the same option is described as based on the "[f]ixed operations and maintenance costs (fixed O&M) of baseline gas-fired resources… considered in RESOLVE's optimization logic such that these generators may be retired by the model, subject to reliability constraints, if it is cost effective to do so."[11] This earlier description seems to convey that the retirement decision is based only on the fixed O&M costs and is not dependent upon a comparison with more cost-effective alternatives. Although not described in the November 29 Ruling or Attachment A, Energy Division staff described a more nuanced approach during informal discussions at the MAG. Based on the informal MAG discussions, the CAISO interprets the "Economic Retirement or Retention" option to mean:

[8] See 'Party Questions' at http://www.cpuc.ca.gov/General.aspx?id=6442459771.
[9] See 'Webinar Recording' at approximately 46 minutes available at: http://www.cpuc.ca.gov/General.aspx?id=6442459771.
[10] Attachment A, p. A-16.
[11] *Id.*, pp. A-15 to A-16.

- First, RESOLVE will retire any gas-fired generation that is in excess of the requirement to maintain an acceptable loss of load expectation (LOLE) starting with the most expensive gas-fired generator based on fixed O&M costs. This assumes no capacity value is realized by that generator and that RESOLVE has the capability to model individual generators and their specific fixed O&M costs.
- Second, additional gas-fired generation will be retired if lower cost alternatives are available to provide the necessary capacity, ancillary services and maintain the minimum LOLE.
- Third, the resultant portfolio will be validated by the Strategic Energy and Risk Valuation Model (SERVM) in the first year of the IRP cycle (rather than the second year) for immediate feedback on reliability.

Assuming this interpretation is correct, the CAISO suggests a modification to the first step to also consider prioritizing retiring gas-fired generation older than 40 years because such units tend to have an increased rate of operational failure. It is important to note that validation through the SERVM, in the third step described above, will likely not capture local capacity or flexibility needs. Therefore, the CAISO would like to work with Energy Division staff to conduct local and flexibility assessments after the 2019 Reference System Plan that have been validated through the SERVM. Ultimately, the Commission should provide clarification on the economic retirement methodology as soon as possible in order for parties to provide meaningful feedback.

Question 9: In order to analyze the Senate Bill (SB) 100 goal of 100 percent of retail electricity sales being supplied by zero-carbon resources by 2045, Commission staff are also considering using RESOLVE to run a limited number of scenarios on years beyond 2030. Considering the significant amount of modeling and run-time cost of each additional planning year, as well as potentially limited availability of data for years beyond 2030, what year(s) should be studied (e.g., 2035, 2040, 2045) and why?

The CAISO supports the Commission's intent to proactively consider the electric system trajectory on the path toward meeting SB 100 requirements, but before conducting any additional modeling analysis, the Commission should first address the broader policy issues and intended direction under SB 100. This may include engagement with other state agencies such as the CEC. The Commission has begun to address some of these issues under the recent *Ruling of the*

Assigned Commissioner and Administrative Law Judge Seeking Comment on Policy Issues and Options Related to Reliability, issued in this proceeding on November 16, 2018.[12] The CAISO encourages further discussion around these important policy issues.

Question 12: Provide any additional comments on the appropriateness of the draft inputs and assumptions proposed for the 2019 RESOLVE model runs for IRP purposes. What changes would you make and why? Please include references to the appropriate section number of Attachment A.

The CAISO provides the following additional comments regarding: (A) conforming the data in the Inputs and Assumptions document with the data from the CEC IEPR; (B) aligning the Inputs and Assumptions document with statements made in prior Commission rulings; and (C) using effective load carrying capability in the IRP process.

A. Conforming the data in the Inputs and Assumptions document with the data from the CEC IEPR

As described in Section 2, the CEC's IEPR will be used for the load forecast and load modifier inputs into the IRP modeling.[13] The CAISO strongly supports the use of these inputs and furthering process alignment between the CEC, the Commission, and—ultimately—in CAISO's related processes such as its TPP. However, Section 6.2 of Attachment A notes that certain operating assumptions will deviate from the CEC's IEPR. For example, the IRP will use the load profiles based on historical loads reported by the Western Electricity Coordinating Council (WECC) for 2007-2009 because those "profiles are assumed to reflect the baseline consumption profile because at that time there was virtually no behind-the-meter PV, electric vehicles, additional energy efficiency, or time-of-use rate impacts."[14] It is not clear why the Commission cannot use the "consumption" load from the CEC's IEPR forecast, which also removes the impacts of all of the load modifiers mentioned above.[15] Importantly, the CEC IEPR forecast is now available at hourly granularity and provides greater accuracy and remains consistent with the data set already used in RESOLVE. Similarly, the proposed behind-the-meter PV solar generation profiles deviate from the IEPR even though the hourly IEPR data is

[12] *Ruling of the Assigned Commissioner and Administrative Law Judge Seeking Comment on Policy Issues and Options Related to Reliability*, November 16, 2018.
[13] Attachment A, pp. A-6 to A-10.
[14] *Id.*, p. A-38.
[15] For example, see the description of "consumption load" from the California Energy Commission's *California Energy Demand 2018-2030 Revised Forecast*, February 2018, p. 73.

readily available.

The Commission, the CEC, and the CAISO adhere to a common load forecast to ensure that the joint agencies' electric planning and procurement efforts are consistent and based on the best available information. The joint agencies reached an agreement to use a single managed forecast set in response to legislative concerns expressed by Senators Padilla and Fuller. On February 25, 2013, the Commission, the CEC, and the CAISO sent a joint letter to Senators Padilla and Fuller, committing to a process to jointly recommend a single forecast set for use in procurement and transmission planning processes.[16] Since that time, staff from the Commission, the CEC, and the CAISO have expended considerable efforts to align the CAISO's TPP, the long-term demand forecast within the CEC's IEPR, and the Commission's long-term procurement plan (LTPP) proceeding to ensure that the state's planning processes are properly aligned, especially with respect to the use of common inputs and assumptions.[17] With IRP replacing LTPP, it is important that the Commission continues to honor the commitment memorialized in the Padilla Letter. Deviations from the single managed forecast set should occur only in extraordinary circumstances and, even then, only after Energy Division staff provides an analysis of why the non-CEC IEPR data is superior to the single managed forecast set and how it proposes to reconcile the deviation.[18] As stated in the CAISO's Recommendation No. 1, this should be conducted in a transparent process and should include CEC staff. Short of such extraordinary circumstances, the joint agencies should work together through the appropriate regulatory processes to ensure that the single managed forecast set reflects the most accurate and detailed information available.

[16] References to "process alignment" in these comments refer to the process alignment between the Commission, the CEC, the CAISO, and the California Air Resource Board and described in detail, in a letter to Senators Padilla and Fuller (Padilla Letter), February 23, 2013, can be found here: http://www.cpuc.ca.gov/General.aspx?id=6617.
[17] A detailed diagram and explanatory documentation describing the IEPR-LTPP-TPP process alignment can be found here: http://www.caiso.com/planning/Pages/TransmissionPlanning/Default.aspx.
[18] Attachment A, p. A-40.

B. Aligning the Inputs and Assumptions document with statements made in prior Commission rulings

The Commission's November 15 Ruling specified modeling approach changes for the 2019-2020 IRP Cycle.[19] The November 15 Ruling noted that the "most important structural change is to develop the RSP [Reference System Plan] in RESOLVE in conjunction with testing portfolio reliability with production cost modeling in SERVM."[20] This entails developing a common data set between the models as well as conducting the modeling "iteratively to arrive at an RSP recommendation informed by both."[21] The CAISO strongly supports this structural change but notes that the November 29 Ruling does not mention this iterative modeling process. The CAISO recommends that the Commission explicitly include this modeling approach in the Inputs and Assumptions document. Additionally, the Commission should also articulate through the Inputs and Assumptions document what the iterative process will try to achieve and the steps that will be taken to support that goal. To ensure transparency, the process should allow for feedback from parties.

The November 15 Ruling also notes that "Commission staff intends to consider [eight] potential improvements during the RSP development process for the next IRP cycle."[22] Five of these are reproduced below:

- Improve representation of lower GHG emissions from Pacific Northwest imports in lieu of the current fixed GHG credit for Pacific Northwest hydro.
- Consider scenarios or sensitivities on Pacific Northwest hydro delivering to CAISO or the Pacific Northwest.
- Incorporate new North Electric Reliability Corporation/ WECC BAL-002 reliability standard into modeling of operating reserves.
- Revisit the net export limit assumption during RSP development.
- Thoroughly investigate and align curtailment and storage dispatch assumptions and results.[23]

[19] November 15 Ruling, p. 11.
[20] November 15 Ruling, p. 11.
[21] *Id*.
[22] *Id.*, p. 12.
[23] *Id*.

The CAISO believes each of these potential improvements may have a significant impact on modeling results—both for understanding the resultant capacity expansion portfolio and its operability within reliability constraints. In fact, some of these assumptions may be pivotal in driving modeling outcomes.

Specifically, the CAISO previously advocated for improving the granularity and accuracy of GHG modeling for imports and correcting the net export limit assumption in RESOLVE.[24] As the CAISO noted in prior comments, modeling should be improved to reflect the much lower import emissions rates for specific importers, such as the Asset-Controlling Suppliers (ACS) approved and registered with the CARB. For example, ACS Bonneville Power Administration has a CARB-assigned emission factor of 0.0120 MT/MWh[25]—well below the IRP deemed rate (0.428 MT/MWh) noted in Attachment A.[26] Additionally, Attachment A does not mention any proposed improvements.[27]

With regard to the net export limit, the CAISO previously commented that it should be reduced from 5,000 MW to 2,000 MW to represent an appropriate and defensible figure.[28] Attachment A does not reference a specific net export limit, nor does it reference the November 15 Ruling that designated the net export limit assumption as a potential area for improvement.[29]

The CAISO also supports the remaining three improvements noted above such as scenarios or sensitivities for Pacific Northwest hydro. Although Pacific Northwest hydro has been a valuable electricity resource, it is important to analyze the major shifts in supply and demand that impact its availability. Major factors include baseload generation retirements in the Pacific Northwest, climate change impacts, and non-power requirements for fish and environmental management.

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[24] See for example from the CAISO: Comments of the CAISO on *Ruling Seeking Comment on Production Cost Modeling Comments* in this proceeding, October 10, 2018, p. 10; Reply Comments of the CAISO on *Ruling Seeking Comment on Production Cost Modeling*, October 17, 2018, pp. 3, 5; and Comments of the CAISO on *Ruling Seeking Comment on Proposed System Reference Plan and Related Commission Policy Actions*, in this proceeding, October 26, 2017, p. 4.

[25] See https://ww2.arb.ca.gov/mrr-acs.

[26] Attachment A, pp. A-46, A-52.

[27] *Id.*

[28] See for example from the CAISO: Comments of the CAISO on *Ruling Seeking Comment on Staff Proposal on Process for Integrated Resource Planning* in this proceeding, June 28, 2017, p. 9; Reply Comments of the CAISO on *Ruling Seeking Comment on Staff Proposal on Process for Integrated Resource Planning* in this proceeding, July 12, 2017, pp. 3-4; Comments of the CAISO on *Ruling Seeking Comment on Production Cost Modeling* in this proceeding, October 10, 2018, p. 9; and Reply Comments of the CAISO on *Ruling Seeking Comment on Production Cost Modeling* in this proceeding, October 17, 2018, pp. 4-5.

[29] Attachment A, p. A-46.

The CAISO requests that the next iteration of the Inputs and Assumptions document specifically address each of the potential improvements noted in the November 15 Ruling. The revised Inputs and Assumptions document should describe a process for how improvements will be made so that there are opportunities for party engagement and feedback. Importantly, the Commission should also explain why particular improvements cannot be made in time for the 2019 RSP.

C. Using Effective load carrying capability in the IRP process

Attachment A defines and describes the concept of effective load carrying capability (ELCC) but does not provide sufficient details about how the Commission intends to use the ELCC values in the IRP. Generally, the CAISO supports using marginal ELCC values to guide any necessary procurement—subject to after-the-fact validation to ensure that the overall portfolios achieve the desired 0.1 LOLE. The CAISO also supports modeling of behind-the-meter PV as a supply-side resource. The CAISO requests that the Commission provide more detail in the next iteration of the Inputs and Assumptions document regarding how it intends to use the ELCC values in the IRP process.

III. Conclusion

The CAISO recommends the following improvements:

- CAISO Recommendation No. 1: The Commission should conform all data in the Inputs and Assumptions document to the data from the CEC's IEPR, or justify in coordination with the CEC why certain data points should deviate.
- CAISO Recommendation No. 2: The Commission should include a discussion of the proposed improvements discussed in prior ALJ Rulings in the next iteration of the Inputs and Assumptions document.
- CAISO Recommendation No. 3: The Commission should follow-up on the informal MAG discussions and Energy Division staff commitments that impact

parties' ability to respond to the November 29 Ruling and associated attachments.

Respectfully submitted,

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Date: January 4, 2018