

**COMMENTS OF THE STAFF OF THE CALIFORNIA
PUBLIC UTILITIES COMMISSION**

**REGARDING PRELIMINARY RELIABILITY ASSESSMENT RESULTS AND OTHER
MATTERS PRESENTED AND DISCUSSED AT THE SEPTEMBER 21-22, 2016 CAISO
TRANSMISSION PLANNING PROCESS STAKEHOLDER MEETING**

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October 7, 2016

Introduction

The Staff of the California Public Utilities Commission (“CPUC Staff”) appreciates this opportunity to provide comments on matters discussed at the California Independent System Operator’s (CAISO) 2016-17 Transmission Planning Process (TPP) meetings on September 21 and 22, 2016, addressing preliminary reliability assessment results, special studies, and Participating Transmission Owners’ (PTOs’) proposed solutions.

- 1. When Reliability Studies Identify Events Requiring Mitigation, the CAISO Should Consistently Identify Not Only the Violation(s) and Contingency(ies) Involved, But Also the Time Horizon(s) and Study Scenarios(s) Involved.***

Specific scenario and time horizon information is sometimes not provided (e.g., in the September 21 TPP meeting presentation), but is important for stakeholder understanding. In particular, scenario assumptions such as loads and dispatch of resources representing particular “snapshot” system conditions for the 2018, 2021 and 2026 time horizons are informative for resource planning purposes. Therefore, CPUC Staff recommend that this information be provided in a more widely accessible form that actually accompanies reliability assessment interpretation and conclusions (e.g., at the September meeting and subsequently), which should not be overly burdensome.

2. Scenario and Time Horizon Information Described Under Comment 1 Should Be Accompanied by a Complete and Updated Description Of (1) What Specific Base and Sensitivity Reliability Study Scenarios Were Run For Each Grid Area¹, and (2) The Key Assumptions for Each Scenario.²

CAISO reliability study scenarios should also describe what specific base and sensitivities were run for each grid area and the key assumptions for each scenario. Specifically, documented scenario assumptions should include:

- Typical time of day/week/season the scenario represents (e.g., winter peak hours 17-18)
- Load level (e.g., x% of the summer 1-in-2 peak from a particular CEC IEPR load forecast)
- Assumed output levels for different categories of renewable generation (e.g., as % of nameplate/Pmax /NQC)
- Assumed BTM PV output level.

This information is needed for the same reasons discussed in Comment 1 above: for stakeholder understanding generally, but more specifically for clear linkage between drivers of identified reliability problems and the relevant planning, market and policy developments and options.

As an accompaniment to results and conclusions, key assumptions for the study scenarios could be presented in tables such as the following tables in the Final Study Plan of March 31, 2016:

- Table 4.7.1 (Summary of Renewable Output)
- Table 4.11 (Summary of Study Base Scenarios)
- Table 4.11-2 (Summary of Study Sensitivity Scenarios)

¹ CPUC Staff understand and request confirmation that reliability standard violations modeled in *sensitivity* scenarios may be informative and may impact future study priorities and designs, but will not by themselves be interpreted as indicating need for mitigation investments.

² For example, a case representing 2021 summer peak with high renewable output for the SCE metro area

These tables should be updated and expanded relative to what was provided on March 31. Updating is required because some of the assumptions are missing from the March 31 Tables. For example, Table 4.7-1 includes some “TBD” entrees and contains no renewable generation output assumptions for spring off-peak scenarios, spring light load scenarios or summer peak with heavy/high renewables scenarios. Furthermore, notes for Table 4.7-1 provide very limited documentation of what typical times each scenario represents, e.g., summer minimum load = PG&E hours 2-4 AM). The table also doesn’t adequately explain what the modeled load level represents, e.g., it might be 1-in-10 summer peak from CEC’s IEPR mid-demand/mid-AAEE/mid-BTM PV forecast or it might be 50% of 1-in-2 summer peak from the same IEPR forecast level, etc. This documentation of hours/times and load levels represented by particular study scenarios is only provided for several example study scenarios in the March 31 Study Plan, and should be expanded to cover all study scenarios, since the scenarios are now finalized.

Additionally, it should be made explicit in the above-requested tables what a study scenario with no BTM PV represents. If a particular “summer peak with no BTM PV” scenario represents the summer peak load from a particular *identified* load forecast, and that load peak is assumed to be at the same MW level as in the original peak load hour (such as 4-5 PM), with BTM PV removed but without adjusting the peak load MW to represent a later hour when no PV output is expected - - then this method should be made explicit. The preceding example represents how CPUC Staff understands that “no BTM PV” scenarios were developed. Also, CPUC Staff request clarification regarding how BTM PV output assumptions for different study scenarios were or were not harmonized with assumed wind and solar output levels for the same scenarios. For example, if there is no BTM PV output in a particular summer peak scenario, is there also no output from larger scale, wholesale PV and CSP resources?

In summary, the tabular documentation of study scenario assumptions requested above would be very helpful for planning and collaboration purposes and should not be burdensome, especially compared to the effort of developing, modeling, interpreting and drawing conclusions from the studies.

3. *There Should be a “Big Picture” Evaluation of How The Continuing Trend of Identifying Needs for Voltage (Especially High Voltage) Controls in the PG&E Area May be Mitigated or Exacerbated by Foreseeable System-wide Developments Such as Increased Wind and Solar Generation, Increased BTM PV, EV Penetration and Various Demand Management Measures.*

CPUC Staff request that the CAISO and PTOs consider whether and how they can shed more light on how the trending voltage issues and related mitigation investments could be impacted (reduced or exacerbated) by foreseeable system-wide changes such as increased wind and solar generation, increased BTM PV, EV penetration and various demand management measures. This could help integrate this issue into the broader planning context.

4. *For the East Bay Special Reliability Study, CPUC Staff Request Clarification of (1) Whether “Eliminating Reliance of SPS Under New CAISO Planning Standards” Arises Only In the Event of Significant Retirement Of Local Generation, and (2) Whether Study Results Would Materially Change if Replacing Alameda GT Retirement Scenarios with Oakland GT Retirement Scenarios.*³

CPUC Staff understand and request confirmation that:

- a. “SPS under new ISO planning standards” refers to allowing nonconsequential (planned) load shedding under certain contingencies in dense urban areas only as a temporary measure until already-planned solutions are in service; and
- b. Activation of such SPS under reliability planning contingencies (P0, P-1, etc.) is a foreseeable development only with significant retirement of local generation without replacement by other measures, i.e., a retirement that is not currently planned.

CPUC Staff look forward to CAISO’s assessment of potential and/or actual proposals from the market, regarding local replacement resources that could offset potential GT retirements. We also note that the any future reliability risk is lower than assessed in the previous

³ This scenario substitution was requested by Flynn RCI at the September 21 meeting.

planning cycle due to a lower load forecast. This highlights the importance of continued focus on demand-side and distributed measures, including realistic forecasting and modeling.

5. CPUC Staff Look Forward to CAISO's November Update on the Review of Approved Projects in the North Area Including the Roles of Increased BTM PV and AAEE.

Forecasting and modeling of BTM PV, AAEE and other demand-side or distributed measures play an increasingly important role in California energy planning. CPUC Staff look forward to learning how these rapidly evolving market trends factor into the CAISO's review of approved projects, including issues regarding locational specificity of such resources and measures.

6. CPUC Staff Look Forward to the CAISO's Assessment Regarding the Gates-Gregg Transmission Project, Including Both Reliability and Renewables Integration Considerations as Well as the Roles of Updated Information and Forecasts for BTM PV, AAEE, and Renewable Generation in the Fresno Area.

Assessing the need for the Gates-Gregg transmission project using updated information in the 2016-2017 TPP cycle especially regarding load forecasts takes into account (1) the need to manage anticipated renewables-driven over-generation situations; and (2) rising expectations for distributed resources penetration, including demand management measures. CPUC Staff's interest in understanding how the above developments impact the CAISO's Gates-Gregg assessment parallels our interest (see Comment 5) in how updated information impacts the review of other previously approved projects. Furthermore, when physical and economic "renewables integration" benefits are considered in the Gates-Gregg assessment, CPUC requests that the CAISO consider a transparent range of assumptions regarding net exports and energy pricing (exports and internal) under over-generation conditions, similar to our recommendations regarding the Bulk Energy Storage Resource Case Study (Comment 10).

7. CPUC Staff Thank the CAISO for Efforts to Refine Informational 50% RPS Special Studies, and are Especially Interested in Understanding the Modeling of Out-Of-State Transmission, Net Export Limits and Assumed Energy Pricing Under Over-generation Situations - - Which Appear to Be Important but Highly Uncertain.

Other studies including the previous 50% RPS study and SB 350 studies have clearly indicated both the importance and the modeling challenges associated with WECC-wide renewable transmission planning and assessing the export limits and assumed energy pricing of both exported and internally delivered generation under over-generation situations. While we acknowledge that there is no clear “right” way to model the above issues at this moment in time, CPUC Staff request that the CAISO provide and document a transparent and robust approach that helps us move forward. In addition, CPUC Staff also request that the CAISO clarify if and how information from the current 50% RPS study may inform interregional planning studies pursuant to Order 1000, and vice versa.

- 8. *For the CAISO’s Longer Term (2026) Electric-Gas Coordination Study Focusing on the Aliso Canyon Storage Situation, CPUC Staff Recommends Considering a Range of Gas Supply/Storage Circumstances Ranging From Present Conditions to a Return to Full Storage Availability and We Look Forward to Discussion at the November TPP Meeting. [for Molly: keep or delete this comment?]***

CPUC Staff understand that the CAISO’s longer term 2026 gas-electric coordination study will reflect OTC generator retirements/replacements plus approved resource, storage and transmission additions by 2026. However, it is unclear what gas supply/storage restrictions will be assumed. CPUC Staff recommend that the CAISO consider an informative, transparent range of restrictions from current gas supply restrictions to a return to full storage availability. We look forward to discussion of this study at the November TPP stakeholder meeting.

- 9. *The CAISO’s Special Study Regarding Frequency Response Modeling Refinements Appears to Have Value For Both Near-Term Compliance and Long Term Planning, and We Request Clarification Regarding (1) the Extent To Which Frequency Response is Now Limited by Practices Versus Capabilities, (2) Plans for Developing a Frequency Response Procurement Mechanism, and (3) How Nonconventional Providers of Frequency Response Are Being Considered.***

Given FERC requirements, the changing composition of the electric supply system, and the state’s energy and environmental goals, how the CAISO-operated grid will reliably and economically provide frequency response in combination with other flexibility and reliability services is clearly an important challenge. CPUC Staff understand that addressing this challenge involves several changing and interacting elements; including modeling improvements, communications with PTOs and generation owners; studies of system frequency response under future scenarios; near-term compliance in a manner that economically and reliably meets NERC

and FERC requirements; potential development of a market product or other efficient frequency response procurement mechanism; and possibly other “pieces of the puzzle.”

We request that the CAISO

1. Clarify the extent to which system frequency response (apparently inadequate for NERC/FERC compliance today) is limited by physical capabilities as opposed to practices that might be altered by incentives including procurement mechanisms;
2. Clarify the timeline and milestones for developing a frequency response procurement mechanism that applies to both conventional (e.g., gas and hydro generation) and nonconventional providers; and
3. Explain how potential frequency response provisions by nonconventional providers (such as renewable generation, storage and demand management measures) are being factored into planning studies.

10. The Bulk Energy Storage Resource Case Study Should Examine Multiple Sensitivities Regarding Next Export Limits and Regarding Energy Pricing Assumptions (Exports and Internal) Under Over-generation Conditions.

For the storage valuation study, assumptions regarding export limitations and pricing of energy under over-generation conditions can strongly impact the calculated economic valuation of storage in helping to manage over-generation. And yet the “correct”, or at least best, assumptions regarding export limitations and pricing under over-generation conditions are unclear. CPUC Staff request that the CAISO

1. fully document modeling assumptions regarding net exports and pricing of exported and internally delivered energy under over-generation conditions;
2. examine at least two sets of contrasting assumptions regarding net export limits and energy pricing under over-generation conditions (e.g., prices received for exports, prices paid to internally delivered and internally curtailed generation under over-generation conditions); and
3. examine multiple renewable resource portfolios having contrasting over-generation implications.

11. In the Described Economic Retirement of Gas Generation Special Study the Generator Retirement Criteria and the Impact of Non-Energy Revenues in Forestalling Retirements are Very Uncertain, and These Aspects of the Analysis Should be Clearly Documented While the Study Itself Should be Viewed as Exploratory and Informational.

Modeled generator capacity factors relative to historical utilization are very crude indicators of potential economic retirements. Specifically, gas-fired generator capacity factors are *expected* to decline with increased renewable generation at the same time that increases in revenues from various non-energy (e.g., flexibility and reliability) services are unclear. Furthermore, major system changes will impact operating margins further making capacity factors per se poor predictors of economic viability. Beyond this, selection of which generators will be “LCR resources” is uncertain. For example, should it be based on projected capacity factors, electric effectiveness relative to binding constraints, or something else? In addition, future revenues for providing local capacity are uncertain. CPUC Staff request that the CAISO clearly document the criteria used for selecting generators for “economic retirements”, or the alternative sets of criteria used to select alternative sets of generators for economic retirements.

Additionally, if initially-projected economic retirements produce system shortfalls in reliability and flexibility services, then the magnitude of shortfall and the revenue/procurement consequences of meeting the shortfall (instead of retiring) should be documented and interpreted. For example, would some “economically retired” generators have to be incentivized to not retire, or should they be expected to already be incentivized by market design and revenues for non-energy services? To what extent are non-conventional sources of reliability and flexibility services (presumably not at risk of economic retirement) considered?

Thus, there appears to be a somewhat circular logic. If certain generators are projected to be at risk of economic retirement based on capacity factors and not being needed for LCR, and such retirement leaves need for additional ancillary/flexibility or other services the provision of which would provide additional but uncertain revenues - - how are study results to be interpreted?

Given the above situation, CPUC Staff’s concluding recommendation is that the Economic Risk of Retirement Special Study, while potentially providing useful information, should be viewed as exploratory and not as a conclusive study.

12. CPUC Staff Appreciate the Preview of the CAISO’s Economic/Production Cost Model Development, and Look Forward to Clarification of How Reliability Driven Resource Commitment Will be Modeled (Including But Not Limited to Local Capacity and System Frequency Response) as Described Below.

Commitment of resources for local reliability, ancillary services, and flexibility has significantly impacted a variety of production simulation studies by the CAISO and others, including the SB 350 studies and the flexibility studies for last year’s LTPP proceeding. We request and look forward to a full description of the updated approach being used for modeling reliability-driven resource commitments for production simulation studies associated with the 2016-2017 TPP, including commitments for local capacity, traditional ancillary services, flexible reserves and frequency response. This includes variation (if any) in this modeling methodology across different studies. Additionally, the CAISO should report and discuss with stakeholders the assumed (currently modeled) and potential (not yet modeled) roles of nonconventional resources in helping to meet the above reliability/flexibility needs for the 2026 time horizon. “Nonconventional” resources may include renewable generation, battery storage, and demand management measures.

13. The CAISO Should Prioritize and Expedite the Review of Proposed Reliability Projects that Support Large Electrified Transportation Infrastructure Programs.

Slides 4-5 of PG&E’s 2016 Request Window Proposals presentation describes the scope, transmission impact assessment, and requested in-service dates of proposed upgrades to South San Francisco’s East Grand and San Jose’s FMC substations, which are necessary to support the Caltrain Electrification Project. Caltrain’s project schedule states that full electrification will be achieved within five years, with system testing commencing in just two years. The CAISO should prioritize and expedite review of PG&E’s proposed projects so as not to cause unnecessary delay of a major infrastructure project.

Additionally, the High Speed Rail project’s initial operating segment falls within the 10-year transmission planning horizon, and therefore should be studied for reliability impacts as soon as is feasible. To this end the CAISO should collaborate with PG&E and the California High Speed Rail Authority (CHSRA) in the development of Technical Study Reports, which detail the scope of electrical interconnections required to support the project’s load on a granular, region by region basis. CPUC Staff understands that neither finalized system impacts nor

proposed reliability projects have been publicly submitted to the CAISO by PG&E or CHSRA, but urge continued efforts by all of the above parties to commence study on the network reliability needs of the High Speed Rail project.

14. SDG&E Proposes Approximately \$125M of Subtransmission and 230 kV Reliability Projects, But the Underlying Study Assumptions are Unclear and Should be More Fully Documented in the Same Manner as Requested in Comments 1 and 2 for the CAISO's Reliability Studies.

In the September 22 TPP meeting, SDG&E indicated that studies supporting the proposed subtransmission and 230 kV infrastructure investments assumed a high load forecast by incorporating a low level of AAEE. However, the load and generation assumptions used for these studies, including BTM PV output levels and overall correspondence to specific CEC IEPR forecast(s) were not fully provided. It was also unclear whether SDG&E ran additional studies using the same assumptions as used in the CAISO's base scenarios, and what the results were. Thus, justification of proposed SDG&E investments requires greater clarity regarding what specific scenarios were studied for what years. This could be achieved by documenting study scenarios in the same manner that CPUC Staff request for the CAISO's reliability assessment case, in Comments 1 and 2 above. Otherwise it is not possible to understand the relationship between SDG&E's study results versus the CAISO's study results.

15. SDG&E's Proposed Renewable Energy Express Project Estimated to Cost \$0.9-1.0B Should be Justified Based on (1) Reliability Studies, (2) Economic/Congestion Studies and (3) Policy/RPS Benefit Studies, Where CPUC Staff Assume (Confirmation is Requested) that (2) and (3) Will be Assessed in the Interregional Projects Portion of the CAISO's Transmission Planning Process.

SDG&E claims a number of reliability, economic and RPS policy benefits from this large investment, including "congestion management", "increase San Diego import capability by 500-1000 MW", "mitigate Southern California LCR needs", and "reduce reliance on ...load-shedding." Such benefits are qualitatively plausible but specific quantitative analyses including documented analytic assumptions and benefits are not reported. Thus CPUC Staff request clarification that the applicable reliability, economic and policy-oriented studies remain to be done.

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