COMMENTS OF THE STAFF OF THE CALIFORNIA PUBLIC UTILITIES COMMISSION REGARDING PRELIMARY ECONOMIC ASSESSMENT RESULTS AND OTHER MATTERS PRESENTED AND DISCUSSED AT THE NOVEMBER 16, 2017 CAISO TRANSMISSION PLANNING PROCESS STAKEHOLDER MEETING

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NOVEMBER 30, 2017

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 Corporation's (CAISO) 2017-18 Transmission Planning Process (TPP) meeting on November 16, 2017, addressing projects costing less than $50 million and preliminary economic assessment results. Our comments address the following topics:

1. CPUC Staff appreciates the CAISO's proposal to add Phasor Measurement Units (PMUs) to all ISO interties at the boundaries of its balancing authority area, as PMUs have the potential to offer many benefits. However, CPUC Staff requests that the CAISO provide specifics on how the installation cost was estimated, and the estimated benefits and cost savings of the proposed PMU installations.

2. CPUC Staff asks the CAISO to provide one-line diagrams for all projects reviewed in the TPP process.

3. CPUC Staff appreciates the CAISO's review of the need for previously approved projects that have not been completed and requests: (1) clarification on alternatives considered for each project during this current review, (2) explicit identification of the originally assessed need for each project, and (3) additional support information.

4. CPUC Staff looks forward to the CAISO's assessment of all newly proposed projects as well as cancellations and scope modifications of previously approved reliability projects estimated to cost over $50 million, and requests that the CAISO include the original justification for any project being reassessed.

5. CPUC Staff requests that the CAISO include in the 2017- 2018 Draft Transmission Plan an explanation of the specific factors in 2027 that are expected to significantly reduce California Oregon Intertie (COI) congestion.

1. ***CPUC Staff appreciates the CAISO's proposal to add Phasor Measurement Units (PMUs) to all ISO interties at the boundaries of its balancing authority area, as PMUs have the potential to offer many benefits. However, CPUC Staff requests that the CAISO provide specifics on how the installation cost was estimated, and the estimated benefits and cost savings of the proposed PMU installations.***

CPUC Staff appreciates the CAISO's new proposal to add Phasor Measurement Units (PMUs) to all CAISO interties at the boundaries of its balancing authority area as presented at the November 16, 2017 meeting. CPUC staff sees potential for significant value in this proposal, as PMUs can offer many benefits. Among other things, CPUC Staff understands that a significant benefit of PMUs is the capability to use the data gathered to inform dynamic system ratings which could increase reliability and reduce congestion. PMUs provide real-time data on actual grid conditions which can reveal additional transmission capacity available at bottleneck points, which are not obvious when looking instead at line operating limits.[1] This information will become increasingly useful as renewable generation, intermittently generated and often constrained by operating limits, increases in California and neighboring states.

As transmission costs continue to rise, CPUC Staff also recognizes that all system upgrades, like the PMU proposal, should be considered through the lens of costs and benefits to ratepayers. To this end, CPUC requests that the CAISO consider the following before implementing the PMU proposal.

First, CPUC Staff asks that the CAISO provide specifics in its 2017-18 TPP Draft Plan on how the $30,000 cost per installation was arrived at. Although installation costs may have decreased, a DOE study conducted a few years ago showed that costs of PMU installations across the U.S. ranged from $40,000 - $180,000. That study reflects that PG&E's costs for PMUs were on the higher end, at least double the cost of other utilities.[2] With an estimated 50 PMU installations, as was stated during the Q&A session following Neil Millar's presentation, it is prudent that CAISO further investigate installation costs. Additionally, CPUC Staff recommends that the CAISO identify methods for reducing installation costs, taking into consideration the various cost reduction strategies outlined in the DOE report.

[1] Southwest Power Pool, Slide 12, https://www.spp.org/documents/48577/using%20synchrophasors%20at%20spp.pdf

[2] DOE, Factors Affecting PMU Installation Costs. P.11 U.S.https://www.smartgrid.gov/files/PMU-cost-study-final-10162014_1.pdf

Second, CPUC Staff request that the TPP draft include a summary of information regarding cost savings achieved by the already installed PMUs within the CAISO service territory, which are not insignificant in number. To this end, Table 3-4 in the NASPI paper titled, *The Value Proposition for Synchrophasor Technology*[3] lays out the benefits, benefit metrics, and calculation methods that may prove useful for quantifying PMU benefits moving forward. A quantification of benefits can help rank PMU benefits such as mitigation of major equipment failures, expedited service restoration, or congestion reduction. A better understanding of the cost savings by PMU function can inform metering strategy and storage prioritization of the high volume of data.

CPUC Staff thanks the CAISO for the preliminary work conducted to prepare this proposal and looks forward to additional details as the proposal is further developed.

2. CPUC Staff asks the CAISO to provide one-line diagrams for all projects reviewed in the TPP process.

CPUC Staff agrees with a recommendation proposed by a member of the public at the November 16, 2017 stakeholder meeting to provide one line diagrams for all proposed projects. In the preliminary assessment slides, one-line diagrams were provided for SDG&E projects. However, only geographic maps were provided for PG&E projects. CPUC Staff requests that in the future the CAISO provide one-line diagrams for all projects, because one-line diagrams include electrical components such as transformers, capacitors, and other limiting equipment necessary for assessing the need for projects. Consistent use of one line diagrams will allow stakeholders to better understand how proposed alternatives can address the identified need for the project.

3. CPUC Staff appreciates the CAISO's review of the need for previously approved projects that have not been completed, and requests (1) clarification on alternatives considered for each project during the current review (2) explicit identification of the originally assessed need for each project, and (3) additional support information.

CPUC Staff thanks the CAISO for reviewing previously approved projects that have not yet been completed to determine if they are still needed.

[3] NASPI, The Value Proposition for Synchrophasor Technology: Itemizing and Calculating the Benefits from Synchrophasor technology Use, October 2015.
https://www.naspi.org/sites/default/files/reference_documents/5.pdf?fileID=1571

CPUC Staff requests clarification regarding the "less than $50 million projects concluded at this time to proceed with the current scope" listed in the table on slide 10 of the PG&E specific presentation made by Mr. Shrestha. That table appears to show that for many of the projects proposed to proceed, an alternative was not considered because "no reasonable lower cost alternative was available." CPUC Staff requests the CAISO clarify if this means that no alternatives were evaluated, or that alternatives were in fact considered but were all estimated to result in a higher cost than the proposed projects and therefore were not listed. If the former, CPUC Staff requests that the CAISO explain why no alternative "was available" and whether an alternative could be made "available," and if so, how. If the latter, CPUC Staff requests that the CAISO provide information on all alternatives considered and their relative costs.

CPUC Staff requests additional information for the "less than $50 Million projects recommended for cancellation without any further action" presented in the table on slide 11 of the same PG&E-specific presentation. Currently, a majority of these projects appear to have "No need specified" as the reason for cancellation. CPUC Staff believes that an additional column, describing the originally identified need for each project, would be of great value. At a minimum, the CAISO should cross reference the specific page(s) of the TPP that provides the originally assessed need that led to approval of the project. This information will provide transparency that will, among other things, facilitate tracking of projects over time, which may reveal a pattern in the types of previously approved projects that result in later cancellations.

For similar reasons related to transparency, CPUC Staff also requests that the CAISO provide the historical power flow data files used for the needs assessment of projects approved during the earlier TPPs. This additional information would be invaluable for stakeholders interested in understanding the transmission grid conditions at the time of these TPP project approvals.

4. ***CPUC Staff looks forward to the CAISO's assessment of all newly proposed projects as well as cancellations and scope modifications of previously approved reliability projects estimated to cost over $50 million, and requests that the CAISO include the justification for any project being reassessed.***

The "Next Steps" presentation included in the November 16, 2017 Stakeholder Meeting slide deck states that all new projects as well as cancellations and scope modifications of reliability projects over $50 million requiring ISO Board of Governors approval will be included in draft plan to be issued for stakeholder comments by January 31, 2018. This information is particularly

valuable to the CPUC CEQA unit for contracting and assignment planning. As requested in number 3, CPUC Staff requests that information regarding the originally assessed need for each project also be included.

5. ***CPUC Staff requests that the CAISO include in the 2017- 2018 Draft Transmission Plan an explanation of the specific factors in 2027 that are expected to significantly reduce California Oregon Intertie (COI) congestion.***

The high level analyses of the California Oregon Intertie congestion found on slide 9 of the "Preliminary Results of Congestion and Economic Assessment" slide deck presented at the November 16, 2017 Stakeholder Meeting represented a forecast for very low congestion costs and short congestion durations in 2027, considering historical congestion levels. CPUC Staff requests that an explanation of the specific factors in 2027 that are expected to significantly reduce congestion are included in the 2017- 2018 Draft Transmission Plan released on January 31, 2018.

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