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Submitted to: CAISO (regionaltransmission@caiso.com)

COMMENTS OF NEXTERA ENERGY TRANSMISSION WEST, LLC ON THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION'S 2015-2016 TRANSMISSION PLANNING PROCESS DRAFT REPORT AND FEBRUARY 18, 2016 STAKEHOLDER MEETING

NextEra Energy Transmission West, LLC (NEET West) appreciates this opportunity to provide comments on the California Independent System Operator Corporation's (CAISO) 2015-2016 Transmission Planning Process, Unified Planning Assumptions and Study Plan ("2015-2016 TPP") Draft Plan and associated results discussed at the February 18, 2016 stakeholder meeting. In summary, we invite CAISO to consider the following factors as it undertakes its current transmission planning efforts in the 2015-2016 TPP and the 2016-2017 TPP:

- Implementation of a comprehensive and consistent metric system for evaluating all viable alternative reliability transmission solutions.
- Additional opportunity for stakeholder engagement and participation in the project analysis phase for specific regions of interest.
- Process improvements for the screening and selection of reliability projects.
- Proposed framework and re-consideration of several of NEET West's previously submitted reliability projects.

CAISO Planning Standards, North American Electric Reliability Corporation's ("NERC") Reliability Criteria (TPL 001-4, NUC-001-2.1) and the Western Electricity Coordinating Council's" ("WECC") Regional Criteria serve as the foundation for CAISO's regional transmission plan and provide the minimum transmission system performance standards. Over the last several years, NEET West has valued and appreciated CAISO's efforts in its planning of a high voltage transmission grid while involving very complex and sometimes competing priorities. At the same time, CAISO has considered more than just the minimum reliability criteria by taking into account other complex changes that could impact transmission system reliability and result in savings for customers. For

example, CAISO has included studies that are associated with emerging issues, such as the implications of significant displacement of conventional generation with renewable resources that do not have the same inherent fundamental operating characteristics, how low hydro conditions (i.e., Big Creek) impact reliability, or extreme contingency events such as a catastrophic seismic event in the San Francisco area. To aid in CAISO's comprehensive long term transmission planning process evaluation, NEET West respectfully requests that CAISO consider several recommendations explained below to broaden CAISO's study policies and to more comprehensively assess the benefits of all viable reliability-driven transmission alternatives.

NEET West Recommends the Implementation of a Comprehensive and Consistent Metric System for Evaluating Viable Alternative Reliability Transmission Solutions

NEET West believes that the identification of the most appropriate and cost effective reliability solution among multiple competing reliability projects should be performed by using a consistent framework for quantifying important costs and overall reliability benefits. One such framework for evaluation is CAISO Transmission Economic Assessment Methodology ("TEAM")[1], which is designed to evaluate both economic and reliability driven projects. NEET West recommends that CAISO apply and share with stakeholders a comprehensive and consistent metric system for evaluating viable competing reliability solutions that includes:

- Evaluating all alternatives for reliability and performance by testing system thermal loading, voltage performance and control, stability performance, short-circuit margins, extreme contingency performance, and interface impacts (internal/external).
- Assessing overall project viability including constructability, environmental impact, rights-of-way impact, in-service dates, outage requirements and impacts.
- Determining any long-term project benefits including expansion capabilities, lifetime efficiency and expectancy.

[1] See CAISO TEAM, ES.8.1 Reliability Evaluations and TEAM Methodology, stating that the TEAM methodology can be applied to both reliability-driven and market-driven transmission expansion/upgrade projects.

- Examining operational and maintenance related issues and costs on a high-level basis to ensure that solutions do not introduce new operational or maintenance related concerns. This component of the evaluation should outline the benefits to "Operational Reliability" or "Operational Flexibility" (more options for maintenance outages, additional flexibility for switching and protection arrangements).
- Evaluating the overall costs and benefits (possibly including a net present value analysis) and performance of the viable competing reliability projects to determine which is the most appropriate and cost-effective solution. The cost/benefit evaluation should include items that may impact project selection such as: construction costs, long-term congestion impacts, cost of outages associated with construction, costs associated with operation and maintenance of the assets, cost of losses, local capacity requirement benefits and reductions that otherwise would have to be purchased through reliability-must-run (RMR) contracts, capacity benefits of the transmission upgrade(s) (potential increases to reserve sharing and firm capacity purchases, and associated decrease to the amount of local area power plants that have to be constructed to meet adequacy requirements), environmental benefits of avoiding local air emissions, etc.
- Incorporating high voltage transmission aging infrastructure decisions into the ongoing TPP. The aging transmission infrastructure represents a significant element in the operational and long-term planning followed by a risk evaluation aimed at anticipating and mitigating the impact of significant transmission loss events. Similar to efforts performed in other regions[2], the analysis, as part of the long term transmission plan, should take into account the aging of high voltage transmission elements in the system over CAISO's entire footprint. In addition, the analysis should include stakeholders review and engagement in the development of

[2] To demonstrate with a specific example, Probabilistic Risk Assessment implementation at PJM Interconnection LLC (PJM) is a risk management tool employed to reduce the potential economic and reliability consequences of high voltage transmission system equipment losses. Initially focused on an aging 500/230 kV transformer fleet, PJM has begun to examine aging 500 kV lines, some more than 40 years old. A number of them have been identified as constraints in 2015 Baseline Aging Infrastructure analyses (PJM Regional Transmission Expansion Plan, Section 8: 2015 Baseline Analysis – Aging Infrastructure, page 173).

transmission solutions to mitigate operational, reliability, and market impact of such transmission losses.

- Communicating the final results, including appropriate metrics of all tested alternatives to all stakeholders and publishing the results in the CAISO TPP.

NEET West recognizes that some of the factors, such as "Operational Reliability" have dimensions that are not easily measurable in monetary terms (e.g., the value of avoiding the adverse impact to society of a system-wide blackout). NEET West recommends that some of the factors as described herein are considered as complimentary to the existing reliability studies and detailed cost evaluation and that they are intended to help support differentiation of a particular project in making a final selection.

NEET West Requests Additional Stakeholder Engagement and Participation throughout the Project Analysis Phase

NEET West appreciates CAISO's effort to follow its Federal Energy Regulatory Commission (FERC) approved transmission planning process, which FERC found to be just and reasonable and not unduly discriminatory or preferential. CAISO has provided for open and transparent access and stakeholder consultation opportunities as set out in that process. NEET West appreciates the current CAISO transmission planning process, which provides for the opportunity to submit needed reliability projects, to participate in stakeholder meetings, and to submit comments throughout the process. In order to have a more meaningful impact upon the CAISO TPP and its objective to determine the most cost-efficient solution, NEET West requests that CAISO allow interested stakeholders to participate in the project analysis phase for specific regions of interest, where competing reliability projects are under evaluation.

NEET WEST Requests Clarity for the Process Used by CAISO in the Evaluation of NEET West's Reliability Proposed Projects Against Alternative Proposals.

Evaluation of Reliability Transmission Solutions for the Lugo – Victorville Thermal Overload

Southern California Edison ("SCE") submitted the joint Lugo-Victorville 500 kV line upgrade project to mitigate the Lugo-Victorville 500 kV thermal overload, which has an estimated in-service date of 12/31/2018. NEET West proposed an alternative solution which consisted of a new 17-mile 500 kV transmission line between Lugo 500 kV substation and Adelanto 500 kV substation, which has an estimated in-service date of 6/1/2022. The 2015-2016 TPP Draft Plan provides the following response to the NEET West proposed alternative:

> "The proposed project provides thermal overloading relief to the Lugo-Victorville 500kV line under contingency conditions. However, the proposed project includes construction of a new 500 kV line, which needs to go through an environmental review permit process, and has a higher cost, and a later proposed in-service date, than the recommended Lugo-Victorville 500 kV Upgrade Project. For these reasons, the project was not found to be needed."

The 2015-2016 TPP Draft Plan suggests that the evaluation criteria utilized by CAISO for alternative reliability projects was limited to a comparison of capital cost and online date. To improve upon the analysis of the Lugo –Victorville thermal overload, NEET West requests that the 2016-2017 TPP evaluation include the reliability assessment of the NEET West Lugo – Adelanto project and a comparison of the NEET West project alternative against alternatives considered to determine the most cost effective solution. In addition, the 2016-2017 TPP evaluation should include the following:

- Evaluation of the congestion management costs under normal operating conditions, currently estimated at a cost of $43 million since January 2013.[3]

[3] CAISO 2015-2016 TPP Draft (February 1, 2016), Page 109

- This analysis would need to include the WECC Path P61 rating, and the impact of both projects to this rating. There is a potential that the Lugo-Adelanto alternative will eliminate the operating nomogram completely, while the Lugo-Victorville Upgrade project will not.
- This analysis would need to include the impact that 50% RPS will have on the path. The assumption that all renewables over 33% are Energy Only may change in the next planning cycle. The addition of additional Full Capacity Deliverability Status units to this region can easily surpass the capability of the Lugo-Victorville Upgrade Project.

- Evaluation of the congestion management costs under construction conditions of the Lugo-Victorville Upgrade project versus the Lugo-Adelanto alternative.

NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the Pacific Gas &Electric (PG&E) Oakland Area

To improve the reliability and to mitigate thermal overloads within the Oakland area, NEET West submitted a new transmission solution that consists of a new 230 kV transmission source connecting Sobrante 230 kV substation to a new Oakland C 230 kV substation, with an in-service date of 6/1/2022.

In the 2015-2016 TPP, CAISO indicates that they will continue to consider transmission, generation or non-transmission solutions as they revisit the assessment of Oakland area needs in the 2016-2017 TPP cycle. In the near-term, the Oakland area relies on Special Protection Systems ("SPS") with a relatively small amount of load shedding as allowed per the CAISO Planning Standards; however CAISO will consider alternatives for the long-term horizon.

- NEET West requests that the CAISO's 2016-2017 TPP cycle include a special assessment of the Oakland/East Bay area and to evaluate the NEET West project alternative against alternatives considered to determine the most cost effective solution. Due to its characteristics, long-term planning for the Oakland/East Bay Area should incorporate an approach similar to the San Francisco Peninsula Extreme Event Reliability Assessment previously performed in the CAISO's 2015-2016 TPP cycle. The Oakland East Bay

assessment should explore all viable mitigation options that address the special circumstances for this area; some of these circumstances include:

- A high-density urban area consisting of over 400MW of load.
- Potential retirement due to age[4] of Oakland area combustion turbine (CT) generation. It should also be noted that previous versions of the CAISO Planning Standards included the Greater Bay Area Generation Outage criterion, which recognized a higher unavailability of these units due to their age and forced outage rates.
- Elimination of the reliance on SPS or Remedial Action Schemes ("RAS") per the CAISO's new High Density Urban Load Area planning standard, which no longer allows "non-consequential load dropping in high density urban load areas in lieu of expanding transmission or local resource capability" to mitigate NERC TPL standard contingencies and transmission system impacts (for facilities ≥115 kV). NEET West recognizes there are multiple existing Special Protection Schemes in the East Bay (PG&E Greater Bay Area: Moraga-Oakland J 115 kV line OL RAS, Grant 115 kV OL SPS, Oakland 115 kV C-X Cable OL RAS, Oakland 115 kV D-L Cable OL RAS); these schemes are designed to drop load in order to comply with NERC TPL contingency events.
- The environmental restrictions and economic impacts of the Oakland combustion turbines (that are RMR units) and Northern California Power Agency ("NCPA") combustion turbines in Alameda have on the system and how these restrictions and economics may be impacted with the addition of the NEET West Oakland Project.
- Exposure and restrictions of transmission system topology. Existing critical overhead transmission sources (Moraga-Claremont, Moraga-Station X, and Moraga Station J 115kV circuits) are confined to multiple-circuit corridors and traverse

[4] Oakland Power Plant became operational in January, 1978. Source: Master CAISO Control Area Generating Capability List. Revised Database to reflect known CAISO Control Area generating resource information as of: October 9, 2015.

heavily-wooded areas, foothill ridges and canyons. These conditions limit accessibility, and expose these facilities to causes of common-corridor outages (such as fire). Likewise, downtown Oakland's aging network of 115 kV underground cables (gas-filled pipe-type cables constructed in the 1960's) offer limited access due to heavy urban development, and are also exposed to seismic considerations (proximity and orientation to the Hayward Fault). All these factors complicate the timely restoration and/or reinforcement of existing circuits, and likewise present routing challenges for new facilities. Planning studies should consider the implications of multiple-circuit/extreme outages, and the potential for sustained unavailability of one or more circuits.

NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the PG&E Fresno Herndon Area

CAISO planning analysis has shown that a Category P2 and P2-1 outages of Bus fault at Herndon 115 kV bus, Herndon Bullard #1 115kV line, or Herndon Bullard #2 115kV line will cause an emergency overload of the Herndon Bullard #1 115 kV line or Herndon Bullard #2 115 kV line starting in 2017, up to 140% in 2025. In addition, and under multiple NERC category (P2 and P2-2) contingencies as listed in Table 1 below, CAISO 2015-2016 TPP preliminary reliability results indicate:

- Transient Stability Performance Issue for a Bus 2 fault at Herndon 115 kV bus.
- Thermal overloads on the Pinedale to Bullard 115 kV lines.

To improve the reliability and thermal overloads within the Herndon area, NEET West submitted a proposal to construct a new 230 kV transmission system that consists of a new 230/115 kV Transformer at Bullard Substation and a new 230 kV transmission line from Ashlan Ave to Bullard Substations, which has an in-service date of 6/1/2021. The NEET West 230 kV transmission line between Ashlan Ave to Bullard removes the identified transient stability issues for a Bus 2 fault at Herndon 115 kV.

CAISO reviewed the submission and based upon the reliability assessment found a need for further evaluation in 2016-2017 TPP of potential mitigation to address the category P2 longer term issues identified. NEET West requests that the 2016-2017 TPP evaluation include the reliability evaluation

of the NEET West Herndon project and a comparison of the NEET West project alternative against alternatives considered to determine the most cost effective solution.

NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the SCE Big Creek Area

The 2020 Summer Peak with Low Hydro Reliability Assessment for the SCE Tehachapi and Big Creek Corridor revealed thermal performance concerns (including Magunden – Vestal 230 kV 1 or 2, Rector – Vestal 230 kV 1 or 2, and Magunden – Springville 230 kV 2) under various category P1, P3, and P7 outages. Based on the assessment results, the ISO proposed to manage hydro generation to utilize during peak hours to avoid load arming.

Furthermore, the Tehachapi and Big Creek Corridor Baseline and Sensitivity Scenario reliability assessment identified transient stability concerns under Big Creek 1-Big Creek 2 230 kV line (P5) outage. To mitigate this concern, SCE will be installing second (dual) high speed protection for this line with OD of December 2017. In the interim, for faults at the remote terminal ends of Big Creek 1 - Big Creek 2 and upon loss of the high speed protection, the total output of the Eastwood unit should be maintained below 160 MW.

To improve the reliability, thermal overloads, and transient stability concerns in the Big Creek area, NEET West submitted a proposal to construct a new Pittman Hill 230 kV substation project that will tie the following transmission lines together:

- Helms – New E1 230 kV #1 & #2 Lines (PG&E)
- Big Creek 3 - Rector 230 kV Line #2 (SCE)
- Big Creek 4 - Springville 230 kV Line (SCE)
- Big Creek 1 - Rector 230 kV Line (SCE)

This project has an estimated in-service date of June 1, 2021.

The CAISO 2015-2016 TPP indicated that CAISO will continue to study Sensitivity Scenarios with Low Hydro conditions in future TPP cycles and will consider alternative projects if managing hydro is not sufficient to mitigate the thermal overloads.

NEET West requests that further TPP 2016-2017 evaluation include the following key factors regarding the SCE Big Creek Area:

- Evaluate all alternatives, including NEET West Pittman Hill project, for reliability and performance by testing system thermal loading, voltage performance and control, stability performance, short-circuit margins, extreme contingency performance, and interface impacts (internal/external).
- Evaluate the Midway 500 kV Substation Extreme Event outage and capture additional reliability benefits that the NEET West Pittman Hill Project has over any other alternatives.
- Evaluate potential for less reliance on Helms Pumped-Storage RAS.
- Evaluate load dropping RAS at Rector under contingency conditions for all alternatives.
- Determine the necessary reliance on Big Creek Generation under contingency conditions.
- Quantify benefits for potential increased operational flexibility of the Helms Pumped-Storage Plant.

NEET West commends CAISO staff for all of the time and effort that it put into the 2015-2016 TPP. NEET West submits these comments with the goal of enhancing the methodology and the processes utilized in the evaluation of alternative reliability projects in the transmission planning process. NEET West appreciates the opportunity to participate in the transmission planning process and to provide these comments.

Sincerely,

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