

The ISO received comments on the topics discussed at the November 18, 2019 stakeholder meeting from the following:

1. [American Wind Energy Association of California \(AWEA-California\)](#)
2. [Bay Area Municipal Transmission group \(BAMx\)](#)
3. [California Public Utilities Commission – Staff \(CPUC-Staff\)](#)
4. [Center for Energy Efficiency and Renewable Technologies \(CEERT\)](#)
5. [Consolidated Edison Development \(CED\)](#)
6. [Horizon West Transmission \(Horizon West\)](#)
7. [LS Power Development \(LS Power\)](#)
8. [North Gila Imperial Valley #2 \(NGIV2\)](#)
9. [Nevada Hydro Company \(NHC\)](#)
10. [Public Advocates Office \(PAO\)](#)
11. [Smart Wires](#)

Copies of the comments and economic study requests submitted are located on the 2019-2020 Transmission Planning Process page at:

<http://www.caiso.com/planning/Pages/TransmissionPlanning/2019-2020TransmissionPlanningProcess.aspx>

The following are the ISO's responses to the comments.

1. American Wind Energy Association of California (AWEA-California) Submitted by: Caitlin Liotiris		
No	Comment Submitted	CAISO Response
1a	<p>AWEA-California appreciates this opportunity to comment on the discussion and materials presented during the November 18th TPP stakeholder meeting, including the preliminary results of the two sensitivity cases assessed as part of the CAISO's policy assessment in the 2019-20 TPP. Based on the estimates from the California Public Utilities Commission's (CPUC) Integrated Resource Planning (IRP) process, Policy Sensitivity #2 would save ratepayers \$300M-\$558M/year, after paying for the transmission required to deliver Wyoming and New Mexico wind resources to CAISO. It is, therefore, important that CAISO accurately model this case and the expected operational impacts associated with it, so that all interested parties have a better understanding of this cost-effective case and the benefits it may bring through delivery of a more diverse portfolio of resources to CAISO and increased opportunities for export from CAISO during oversupply conditions.</p>	<p>The CAISO conducted considerable analysis in the 2016/2017 and 2017/2018 transmission planning cycles regarding out of state transmission and the implications of bringing out of state renewables to California and the implications within California. To be effective, consideration of out of state transmission requirements requires considerable coordination with the CPUC and out of state entities – the regional transmission planning entities and their members, in particular. With 2020 being an “input” year into the interregional transmission planning process, the opportunity may exist in the 2020/2021 planning cycle to more fully explore these issues. As the CAISO indicated in other responses, a unilateral review conducted solely by the CAISO would have limited value.</p>
1b	<p>I. Modeling Conventions for Sensitivity #2 do not Reflect Operational Reality and are Inaccurate and Require Adjustment</p> <p>Policy Sensitivity #2 includes 4,250 MW of new wind resources in Wyoming and New Mexico. Per the CPUC's transmittal of this case, these resources would require new transmission in order to be delivered to the CAISO interties. However, CAISO has not modeled this policy sensitivity case as including remote resources in these locations connected to CAISO by new transmission and, instead, has made simplifications that distort the operational results of this case. These simplifications must be addressed and remedied in order to produce reliable and accurate information on the transmission and policy impacts of Sensitivity #2.</p> <p>While this policy case transmitted by the CPUC clearly requires the construction of new transmission to deliver the New Mexico and Wyoming resources to CAISO, CAISO did not (as AWEA-California and others advocated early in the 2019-20 TPP Study Plan development) model incremental transmission that extended out from the current CAISO boundaries to these resources. Instead, to analyze this case in the 2019-20 TPP, the New Mexico and Wyoming wind are effectively assumed to be located inside the existing renewable energy zones of Riverside East/Imperial renewable and Southern</p>	<p>Notwithstanding the response to comment (1a) provided above, the export limits to this point have been based consideration of the ability of areas outside of the CAISO to accommodate imports, not by transmission line limits.</p>

No	Comment Submitted	CAISO Response
	<p>Nevada/Eldorado/Mountain Pass renewable energy zones, respectively. And no new transmission capacity to deliver these resources, or to facilitate exports of oversupply inside of CAISO to other loads, is included in the CAISO's modeling of Policy Sensitivity #2.</p> <p>While this simplified modeling convention did not require CAISO to model any proposed or generic transmission projects that might be used to deliver the output of this significant wind build out to CAISO, this assumption does not reflect the electrical reality of delivering power from these locations. The changes to the electrical system that will result from the addition of these wind resources and new transmission lines will be material different than simply assuming their output is located inside existing renewable energy zones. For instance, by adding new transmission capacity to deliver these wind resources, new export opportunities to loads elsewhere in the Western Interconnection are facilitated. But CAISO's current approach to Policy Sensitivity #2 does not account for this and, therefore, the results CAISO presented during the November 18th stakeholder meeting are unreliable and likely highly inaccurate.</p> <p>Specifically, this modeling convention/over simplification increases the amount of curtailment attributable to this case and may also increase congestion. It is logical that, by not including the associated new transmission within the study assumptions for Policy Sensitivity #2, CAISO has unrealistically restricted export opportunities utilizing these new lines and, therefore, also underestimates revenues CAISO may receive from selling overgeneration into these markets. But this can be demonstrated by comparing the results of CAISO's assessment of Policy Sensitivity #2 to other regional studies, including the CAISO's previous efforts of a similar nature. The Special Study on a 50% Renewable Portfolio Standard and Interregional Transmission Projects, finalized by CAISO in early 2018, demonstrated that a portfolio very similar to Policy Sensitivity #2, when modeled on actual transmission lines connecting the resources to potential terminus points, is likely to have significantly reduced levels of generation curtailment compared to a less diverse portfolio. The modeling simplification that CAISO has utilized for Policy Sensitivity #2 is inappropriate and distorts any comparisons that may be made between different policy cases.</p>	

No	Comment Submitted	CAISO Response
	<p>Going forward, when reviewing the transmission system impacts of renewable resources located outside of the CAISO's current boundaries, CAISO should utilize generic or actual proposed transmission projects to mimic actual system conditions associated with this type of resource build out. This treatment would be consistent with the modeling CAISO performs for existing remote resources delivered to CAISO on existing transmission. Failing to change CAISO's current modeling practice for Policy Sensitivity #2 and similar cases studying regional resources that require new transmission will continue to result in distorted operational information and will fail to provide the CAISO, the CPUC, and other stakeholders with the information they need to appropriately consider the impacts of this case and to compare it against.</p>	
1c	<p>II. CAISO Should Provide as Much Information as Possible on the Operational and Other Impacts Associated with the Policy Cases Studied in the 2019-20 TPP</p> <p>As noted above, CAISO must address the modeling conventions used for Policy Sensitivity #2 and correct the current practices that are being utilized for remote resources to more accurately reflect actual system operations. This is paramount to producing credible and reliable data and results for the TPP's assessment of this case. Once that issue is addressed, CAISO should provide additional information to the CPUC and stakeholder regarding the operational impacts of the various policy cases.</p> <p>AWEA-California reiterates the comments made on the September TPP meetings, which request for additional operational information for the various cases. But, importantly, the modeling conventions discussed above must be addressed first, in order to make the comparison of operational information appropriate and reasonably accurate.</p>	<p>As noted in response to comment (1a) above and previous responses, the focus in this cycle is limited to the impact inside the CAISO footprint of these out of state resources being delivered to the boundary.</p>
1d	<p>III. The CAISO and the CPUC Should Improve RESOLVE's Transmission Constraints</p> <p>In the last set of comments on the TPP, submitted on October 11th, AWEA-California discussed the transmission constraints that are incorporated into RESOLVE. Specifically, there is a pressing need to update and revise some of the transmission constraint assumptions in light of:</p>	<p>The ISO will work with the CPUC to provide the updated transmission input during the 2019-2020 IRP proceedings if and when the proposed changes to the deliverability methodology get approved and implemented.</p>



No	Comment Submitted	CAISO Response
	<ul style="list-style-type: none">• The expected implementation of a new deliverability assessment methodology• The need to better reflect the diversity of regional resources that may be delivered to the CAISO and• The need to begin to assess the deliverability of significant quantities of offshore wind. <p>AWEA-California reiterates that request and points the CAISO back to our prior set of comments in the 2019-20 TPP.</p>	

2. Bay Area Municipal Transmission group (BAMx) Submitted by: Paulo Apolinario		
No	Comment Submitted	CAISO Response
2a	<p><u>Policy-Driven Assessment</u> BAMx supports the CAISO's decision of not recommending the approval of any policy-driven projects, where the need for the project is subject to change based upon the assumptions that are expected to change. One such example is the revised deliverability assessment methodology that the CAISO Board unanimously approved on November 13, 2019. Under the revised methodology, the on-peak deliverability assessment is expected to result in a much lower level of need for delivery network upgrades to accommodate Full Capacity Deliverability Status (FCDS) resources. This methodology is expected to be effective as early as January 2020 subject to FERC approval. Similarly, BAMx also supports the CAISO not recommending any policy driven transmission projects which could be avoided simply by changing the intra-zonal generation resource mapping distribution.</p>	<p>The ISO would be cautious in considering seeking approval for projects that would that had a reasonable risk of change; however for the transmission planning the ISO may need to move forward with certain projects so as to avoid continual second guessing of potential future changes so as to meet the policy objectives.</p>
2b	<p><u>CPUC IRP and CAISO TPP Feedback Loop</u> Historically, BAMx has expressed some serious concerns about the sufficiency of the feedback loop concerning transmission capability information between the CAISO reliability and deliverability assessment, and the CPUC's renewable portfolios. BAMx has observed that the renewable portfolio resource to busbar mapping process plays a critical role in the level of renewable generation and curtailments. For example, the 42MMT sensitivity portfolio in the 2018-2019 TPP indicated renewable curtailment of more than 40,000GWh, whereas the comparable 42MMT base portfolio in the latest 2019-2020 TPP shows a much lower renewable curtailment, that is, 12,812GWh. We understand that in addition to the change in resource mix, a better-coordinated resource to the busbar mapping process between the CPUC Integrated Resource Planning (IRP) and the CAISO 2019-2020 TPP has led to a reduced and more realistic renewable curtailment levels.</p> <p>There is a continued need for a timely and robust feedback loop between the 2019 IRP and 2020- 2021 TPP along with periodic opportunities for the stakeholders to provide meaningful feedback. For example, the 2019 IRP renewable resource portfolios currently under development for the 2020-2021 TPP need to identify the locations of the storage capacity with some degree of</p>	<p>The ISO is continuing to work with the CPUC on providing input related to busbar mapping.</p>

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	<p>granularity. The 2017 IRP portfolio entailed approximately 2,000MW of Li-Ion battery storage resources by 2030. However, the 2019-2020 TPP did not model them at all as CPUC did not identify their general locations. The 2019 IRP portfolios are expected to have more than 11,000MW of Li-Ion battery storage capacity by 2030. Therefore, it is critical that in addition to providing the updated zonal transmission capability estimates, the CAISO plays a key role in helping the CPUC and the California Energy Commission (CEC) in identifying appropriate locations and types of storage resources. At a minimum, BAMx suggests that the CAISO delineate in their draft of this year's TPP a plan to achieve a yet higher level of coordination on this critical issue.</p> <p>BAMx believes that the Flexible Capacity Deliverability studies and LCR Economic Assessments performed by the CAISO in the current TPP and 2018-2019 TPP are very useful in identifying the location and attributes of storage resources. In particular, the Flexible Capacity Deliverability Assessment performed by the CAISO in the current TPP - as summarized in Table 1 - could provide a good guideline for the CPUC in locating the selected 2019 IRP storage resources in different generation pockets.</p> <p>Table 1: Potential Storage Capacity in Generation Pockets As Determined by the CAISO 2019-2020 TPP Flexible Capacity Deliverability Assessment</p> <table border="1"> <thead> <tr> <th style="text-align: center;">Generation Pocket</th> <th style="text-align: center;">Energy storage could be added without hitting the transmission limit (MW)</th> </tr> </thead> <tbody> <tr> <td>North of Fresno Constraint</td> <td>~700MW</td> </tr> <tr> <td>North of Fresno Constraint # 2</td> <td>New upgrade could provide high amounts</td> </tr> <tr> <td>SCE North of Lugo Constraint</td> <td>280MW</td> </tr> <tr> <td>SCE North of Magunden Constraint</td> <td>500MW</td> </tr> <tr> <td>SCE Blythe Constraint</td> <td>70MW</td> </tr> <tr> <td>SDG&E Doublet Tap-Friars Constraint</td> <td>More than 500MW</td> </tr> <tr> <td>SDG&E Silvergate-Bay Boulevard Constraint</td> <td>More than 500MW</td> </tr> </tbody> </table> <p>Similarly, the CAISO's LCR Economic Assessments should inform the amount of battery storage that could be located in the various load pockets. These studies are also very informative in identifying the attributes of the required storage resources. It appears that in some LCR areas and/or sub-areas, 4-hour</p>	Generation Pocket	Energy storage could be added without hitting the transmission limit (MW)	North of Fresno Constraint	~700MW	North of Fresno Constraint # 2	New upgrade could provide high amounts	SCE North of Lugo Constraint	280MW	SCE North of Magunden Constraint	500MW	SCE Blythe Constraint	70MW	SDG&E Doublet Tap-Friars Constraint	More than 500MW	SDG&E Silvergate-Bay Boulevard Constraint	More than 500MW	
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	<p>storage is adequate, but in some other areas like SCE's Santa Clara subarea, 8-hour storage might be required. Presumably, if the need for 8-hour vs. 4-hour storage had been known, proposals could have been requested that complied with that need. It seems like instead of stacking two 4-hour battery storage units it should be more effective to add an 8-hour battery storage in the Santa Clara area. Additionally, the CAISO should provide guidance on defining an adequate amount of utility-side (front-of-the-meter) solar resources which could be co-located in local areas or sub-areas to ensure that there is adequate generation available to charge the battery storage. The massive amount of storage that is selected in the various options for a recommended reference plan raises the importance of the above requests.</p>	<p>The ISO believes that the need for 8 hour storage in the Santa Clara sub-area was known before bids were due for that RFO. However, we are continuing to work towards providing this type of information for other areas in the ISO area.</p>
2c	<p><u>Need to Utilize Dynamic Transmission Rating Methodology</u> The CAISO's transmission planning analysis assumes the summer emergency ratings that presumably correspond to the traditional summer peak hour, that is, HE16. However, as the Summer peak hour is expected to shift to HE 18 or HE19 in the future, it would be appropriate to update (increase) the transmission line ratings accordingly. It appears that by modeling the traditional summer peak temperature rating, the CAISO might be underestimating transmission line capacity and in turn, the local area import capabilities. BAMx recommends that the CAISO start a stakeholder process where the Participating Transmission Owners (PTOs) can explain proposals they may have for taking this shift (in the timing of maximum stress on the transmission system) into account in their line rating process. Although we would expect some circumstances might lead to different rating methodologies among PTOs, it would be very informative to have a single stakeholder process to allow comments on the proposed methodologies.</p> <p>Furthermore, from an operational standpoint, the CAISO needs to consider utilizing dynamic ratings. The import capability envisioned in the LCR reduction studies is assumed to be the same throughout the day because the CAISO assumes the circuits are rated the same throughout the day. However, if the CAISO were to adopt dynamic ratings as done by PJM10, the night hours would have a higher rating for transmission lines and transformers than the daytime ones since the transmission elements would not be heated due to solar radiation. This more appropriate approach would provide greater imports and</p>	<p>The ISO applies the Facility Ratings as determined and provided by the transmission owners for their transmission facilities. Further to this, with respect to transmission lines in the PG&E area that have been rerate based upon 4 ft/s wind speeds (increased from 2 ft/s) the higher rating is only applicable from 10 am to 7 pm. The ISO will continue to assess this in future planning cycles.</p>

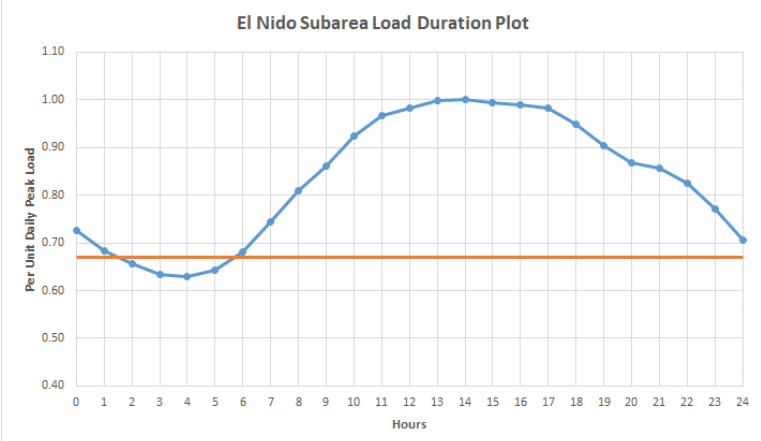
No	Comment Submitted	CAISO Response
	<p>help solve the apparent inadequacy of generation to charge storage resources identified by the CAISO during the November 18th stakeholder meeting and discussed above.</p>	
2d	<p><u>Less than \$50 Million Project Recommendations</u> Tulucay-Napa #2 Circuit (\$5-\$10 million) The capital cost of the project seems high for the scope of the project. Replacing jumpers and switches to upgrade a rating of one 60kV circuit should not carry with it this cost. BAMx members would request the CAISO to conduct an additional review of the cost estimates provided for the project. Also, the CAISO should investigate whether closing the normally open switch between Tulucay and Basalt Substation relieves the identified P0 overload beginning in 2024. If putting the second Tulucay-Napa 60kV circuit into service helps to relieve the identified overload, the CAISO should evaluate an operating configuration with both Tulucay-Napa 60kV circuits in service.</p>	<p>The project scope includes replacing 60 kV bus structure and switches at Basalt substation for which the expected cost is \$5 million. The high end estimate of \$10 million includes 100% contingency. Closing the normally open switch addresses the P0 contingency but results in reliability constraints under P1 contingencies.</p>
2e	<p>Moraga 230kV Bus Upgrade (\$17-\$34 million) The driver for the Moraga 230kV Bus Upgrade project is a P2 bus breaker outage at the Moraga substation - which open ends every circuit and overloads the North Dublin-Cayetano 230kV and Lonetree-Cayetano 230kV lines. Based on CAISO's preliminary results for the Greater Bay Area region, the overload on these circuits is within a 101-106% range. These relatively minor overload levels could be mitigated by scaling down generation around the Contra Costa/Lonetree area. It might not be cost-effective to invest in network upgrades where minor generation dispatch assumptions could mitigate the potential overload. Additionally, some thermal generation around the Contra Costa area could retire in the near future, resulting in a different dispatch pattern that might not require mitigation. In case the CAISO congestion management process is not sufficient, compliance with the NERC standards could be achieved in the interim by setting up a Special Protection Scheme (SPS) to drop generation under contingency conditions. Although the approval of the Moraga 230kV Bus Upgrade may ultimately be a proper component of a long-term plan for the Northern Oakland Area, BAMx recommends using the above potential operating procedures to comply with the planning standards until a long-term plan is approved.</p>	<p>Generation scale down in Contra Costa area with SPS could alleviate these overloads. However, the thermal generation around Contra Costa area are relatively new and are not expected to retire in the near future. Also, with the expected cost of Moraga 230 kV bus upgrade (\$17 million) and with added benefit in East Bay area in the long-term, the ISO believes upgrading Moraga 230 kV bus is appropriate.</p>

3. California Public Utilities Commission – Staff (CPUC-Staff) Submitted by: David Withrow		
No	Comment Submitted	CAISO Response
3a	<p>Overview</p> <p>The CAISO's preliminary assessment of a base portfolio of renewable resources, which corresponds to a greenhouse gas (GHG) reduction target of 42 million metric tons (MMT) by 2030, as well as two sensitivities that correspond to a more aggressive 32 MMT target, is an important marker for the CPUC's IRP process and the CAISO's development of its 2019-2020 Transmission Plan. The CAISO's analysis tests the transmission capability estimates used in the IRP and provides useful information on the transmission impacts of the base and sensitivity portfolios. The CAISO's expertise helps ensure the IRP portfolios provide realistic, actionable paths toward the GHG reduction targets set forth in SB 350 in a way that ensures requirements for grid reliability. This is a critical part of the IRP process and CPUC Staff appreciates the considerable amount of work performed by CAISO planners to complete this assessment.</p> <p>The CAISO's preliminary results indicate that all but 90 MW of renewable resources identified as full capacity deliverability status (FCDS) would be deliverable under the 42 MMT base case scenario, assuming implementation of certain remedial action schemes (RAS) and local upgrades identified in the CAISO's interconnection process. For the two 32 MMT sensitivity portfolios – one that allows only existing transmission to interconnect out-of-state resources and the other portfolio allowing new infrastructure that could enable 4,250 MW of New Mexico and Wyoming wind – the CAISO also determined that all FCDS resources are expected to be deliverable with RAS and local upgrades identified through the interconnection process.</p> <p>CPUC Staff recognizes the CAISO's analysis did not include assessment of the need for specific out-of-state transmission lines, nor did it reassess previously submitted interregional transmission projects. CPUC Staff looks forward to continued collaboration with the CAISO to enhance the analysis of the transmission infrastructure required to accommodate future out-of-state resource procurement. Similarly, CPUC Staff acknowledges that the portfolios transmitted to the CAISO for the 2019-2020 TPP did not have generic storage resources mapped to specific busbars. CPUC Staff looks forward to continued</p>	<p>The comment has been noted.</p>

No	Comment Submitted	CAISO Response
	collaboration with the CAISO to develop clear, transparent busbar mapping methodologies for generic storage as well as hybrid resources.	
3b	<p>1. Explain the Options to Ensure Deliverability for the Base Case Portfolio: The CAISO's deliverability analysis indicates that all but 90 MW of FCDS resources are expected to be deliverable under the base scenario (with RAS and GIDAP upgrades). CPUC Staff suggests the CAISO elaborate on the options, if any, that could be utilized to realize this base case portfolio without additional transmission costs. CPUC Staff also suggests the CAISO explain how these results might change if the new deliverability methodology is implemented.</p>	The full impact of the new methodology will require more thorough analysis to be definitive and will be applied in future planning cycles, subject to FERC approval.
3c	<p>2. Elaborate on the Constraint Impacting Sensitivity #1: For the "observations" related to the analysis on Sensitivity #1 (overall slide #46), CPUC Staff suggests that the CAISO explain the nature of the constraint that could affect deliverability on the 230kV system. Would relief of this constraint necessarily involve RAS mitigation, or might other strategies be employed to manage this constraint?</p>	The nature of this constraint is a thermal limitation. RAS mitigation is unlikely to be adequate to address this issue. Please note that this was a mapping sensitivity performed by the ISO to test the impact on transmission IF the resources mapped to 500 kV by the CPUC ended up developing on the 230 kV system.
3d	<p>3. Elaborate on the Import Assumptions for the IID Area: Regarding import assumptions (overall slide #22), CPUC Staff seeks to better understand the implication of using MAX MIC and, for the IID area, going beyond the MIC in order to satisfy the portfolio. CPUC staff suggests it may be useful to explain in the draft Transmission Plan why this assumption was made for the IID area.</p>	The portfolios included 624 MW of FCDS geothermal generation located in the IID balancing area. Although FCDS is a term that only applies to ISO connected generation, it was assumed that labeling the IID connected geothermal generation as FCDS meant that it should be able to count for resource adequacy. In order for generation in other balancing areas to count toward resource adequacy it needs to have an import capacity allocation. Currently there is 702 MW of MIC planned for imports from the IID area and it is already needed to accommodate existing renewable generation imports from the IID area that will count towards resource adequacy. Adding an additional 624 MW of imports that will also count towards resource adequacy requires the maximum import capacity (MIC) from the IID area to be increased. As demonstrated in the deliverability study results presented, this increase is not expected trigger major transmission upgrades.

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3e	<p>4. Review How Energy Storage is Valued in the TPP Economic Assessment:</p> <p>Regarding its economic assessment, the CAISO stated its considerations for storage costs for this TPP cycle are largely consistent with the considerations it used for 2018-2019 TPP cycle. The CAISO further mentioned that potential market revenues may be considered such that they offset the cost of storage. CPUC Staff encourages further review and public discussion regarding how the CAISO should value energy storage as a transmission solution within future TPPs.</p> <p>CPUC Staff suggests careful review of the full value of energy storage systems. If a reliability solution is needed to address peak hour ramps or summer peak loads, the potential market revenues likely to accrue to energy storage during non-peak hours or the months outside the summer period should be evaluated as part of a TPP economic assessment.</p> <p>CPUC Staff suggests the Presidio NAS Battery Project, a 4-hour sodium sulfur energy storage system in Presidio, Texas, as an example for the range of value that storage can offer. This storage project has been in place since 2010 and provides backup power, up to eight hours during an outage or other emergency or maintenance events, as well as voltage support. This storage system is compensated through the transmission access charge for the reliability services it provides and participates in the market to offset its costs when not needed for reliability purposes. This project has provided reliability support and islanding capability as an alternative to more costly infrastructure.</p>	<p>The comment has been noted.</p>
3f	<p>5. Multi-period Power Flow Modeling Can Address Storage Charging and Discharging:</p> <p>The ISO's report on flexible capacity deliverability contained initial results on the possible deliverability of energy to the greater CAISO footprint from certain areas. As part of the presentation, the ISO stated that a next step for this work would be to model the potential charging of the storage resources in the same areas to evaluate full feasibility of storage resources. CPUC Staff commends the ISO for this forward-looking approach.</p>	<p>The comment has been noted</p>

No	Comment Submitted	CAISO Response
	<p>Energy storage charges energy in one time period and allows it to be discharged at a future time period. Transmission lines allow power from one place to be moved to another place. In either case, storage or transmission lines, the usefulness of the asset depends on the availability of energy generation on the other side. For storage resources this means that energy must be deliverable to the location at the earlier time and from the location at a later time. The CAISO is uniquely positioned to be able to carry out this modeling. CPUC Staff looks forward to working with the CAISO on this kind of modeling in the future to ensure that energy storage resources are able to provide the maximum value.</p>	
3g	<p>6. Consider Most Recent Energy Storage Cost Data for Evaluation of Storage Alternatives: For the 2019-2020 TPP “Less than \$50 Million Project Recommendations” for the PG&E Area, CPUC Staff requests consideration of more recent energy storage costs to determine if energy storage could be a cost competitive alternative for the proposed Borden 230/70kV TB #1 Capacity Increase project in Greater Fresno Area.</p>	<p>Energy storage was considered as an alternative for the Borden 230/70kV TB #1 capacity increase project and not recommended due to the higher cost compared to the \$11.5 million expected cost of the capacity increase project.</p>
3h	<p>7. Explore the Range of Options to Reduce LCR Needs: Regarding the CAISO’s review of LCR requirements, the CAISO’s analysis identifies several storage options to reduce or replace LCR capacity. For the EI Nido / West LA sub-areas located in the SCE transmission area, CPUC Staff requests clarification on the energy requirements for storage in these sub-areas, specifically what duration of storage capacity would be required. CPUC Staff also requests clarification on whether CAISO considered synchronous condenser and/or static var compensator capacity in lieu of storage capacity to satisfy at least a portion of the requirement to reduce LCR.</p>	<p>The ISO performed a study to determine what level of loads in the EI Nido subarea that would not cause identified thermal loading concerns. It was determined that the load level would need to be about 67% of its summer peak to avoid having thermal overloads under contingency condition. For the load profile presented for EI Nido subarea at the CAISO November 18, 2019 meeting, it would require the battery energy storage system to provide loading relief for approximately 20 hours. The hourly capacity need from the battery energy storage system ranges from a low of 13 MW to a high of 308 MW. The following plot illustrates the energy need for the battery energy storage system.</p> <p>Since the reliability concern was identified to be thermal loading concern, installing voltage support devices such as synchronous condensers or static var compensator will not help mitigate the thermal loading concern. Voltage support devices are effective for mitigating voltage concern, but are not for thermal loading concern. Only active</p>

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		<p>resources that produce active power (MW) are effective in mitigating thermal loading concern. Transmission upgrade such as line reconductoring to increase transmission line capacity is also effective in mitigating line loading concern.</p> <div data-bbox="1150 435 1906 873" style="text-align: center;">  <p>El Nido Subarea Load Duration Plot</p> </div>																											
3i	<p>8. Clarify the SCE Upgrades Included in TPP Base Plan: SCE's Transmission Owner Tariff Transmission Rate Filing (TO2019A) indicates that 20 significant transmission projects (greater than \$5 million in ISO-related charges) were under development in 2019. CPUC Staff requests clarification that these upgrades are included with the 2019-2020 TPP base plan. For future TPPs, CPUC Staff suggests the CAISO work with Transmission Owners to clarify what projects being put in TO rate cases for specific years are specifically in or out of the TPP assumptions.</p>	<p>The CAISO received the following list of projects from SCE that was listed in their workpapers for the 2019A filing titled "WP Schedule 10&16 Identification of ISO Projects Above \$5m.docx"</p> <table border="1" data-bbox="1150 1052 1906 1482"> <thead> <tr> <th>No.</th> <th>PIN</th> <th>Project</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4211</td> <td>Replace Bulk Power Circuit Breakers</td> </tr> <tr> <td>2</td> <td>4756</td> <td>Substation Miscellaneous Equipment Additions & Betterment</td> </tr> <tr> <td>3</td> <td>5089</td> <td>Bulk Power 500kV & 220kV Line Relay Replacement</td> </tr> <tr> <td>4</td> <td>5210</td> <td>Substation Transformer Bank Replacement Program (AA-Bank & A-Bank)</td> </tr> <tr> <td>5</td> <td>Various</td> <td>Transmission Line Rating Remediation</td> </tr> <tr> <td>6</td> <td>7392</td> <td>Seismic Assessment and Mitigation Program for Transmission Assets</td> </tr> <tr> <td>7</td> <td>7820</td> <td>Substation Physical Security Enhancements Project</td> </tr> <tr> <td>8</td> <td>Various</td> <td>Substation Maintenance and Test Building Improvements Program</td> </tr> </tbody> </table>	No.	PIN	Project	1	4211	Replace Bulk Power Circuit Breakers	2	4756	Substation Miscellaneous Equipment Additions & Betterment	3	5089	Bulk Power 500kV & 220kV Line Relay Replacement	4	5210	Substation Transformer Bank Replacement Program (AA-Bank & A-Bank)	5	Various	Transmission Line Rating Remediation	6	7392	Seismic Assessment and Mitigation Program for Transmission Assets	7	7820	Substation Physical Security Enhancements Project	8	Various	Substation Maintenance and Test Building Improvements Program
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3	5089	Bulk Power 500kV & 220kV Line Relay Replacement																											
4	5210	Substation Transformer Bank Replacement Program (AA-Bank & A-Bank)																											
5	Various	Transmission Line Rating Remediation																											
6	7392	Seismic Assessment and Mitigation Program for Transmission Assets																											
7	7820	Substation Physical Security Enhancements Project																											
8	Various	Substation Maintenance and Test Building Improvements Program																											

No	Comment Submitted	CAISO Response
		<p>9 3138 LADWP DC electrode replacement</p> <p>10 6791 Lugo 500 kV Substation breaker installation for No. 1AA & No. 2AA</p> <p>11 6824 La Fresa Sub (Phase 2 Scope): Install new MEER building</p> <p>12 7113 El Nido 230/66 kV: Bank on Circuit Breaker Project</p> <p>13 7115 Johanna 230/66 kV: Bank on Circuit Breaker Project</p> <p>14 7119 Walnut 230/66 kV: Bank on Circuit Breaker Project</p> <p>15 7120 Chino 230/66 kV: Bank on Circuit Breaker Project</p> <p>16 7763 Lugo-Victorville 500 kV T/L SPS</p> <p>17 8090 Bob Switch to Eldorado 220 kV Interconnection</p> <p>18 6420 West of Devers</p> <p>19 7546 Eldorado-Lugo-Mohave Upgrade</p> <p>20 7555 Mesa Substation</p> <p>The following projects that affect power flow modeling were included in the 2019-2020 TPP assumptions (basecases) based on their scheduled operating date:</p> <p>16. Lugo-Victorville 500 kV T/L Special Protection Scheme ("SPS") (Pin 7763)</p> <p>17. Bob Switch to Eldorado 220 kV Interconnection (Pin 8090)</p> <p>18. West of Devers (Pin 6420)</p> <p>19. Eldorado-Lugo-Mohave Upgrade (Pin 7546)</p> <p>20. Mesa Substation (Pin 7555)</p> <p>The various Transmission Line Rating Remediation projects (Item # 5) that affect power flow modeling will be implemented into the TPP upon finalization of the design. These various projects were submitted into the 2018 CAISO Request Window for review and consideration.</p> <p>The remaining 14 projects do not affect power flow modeling and were not included in the 2019-2020 TPP assumptions.</p>

4. Center for Energy Efficiency and Renewable Technologies (CEERT) Submitted by: Carleigh Osen		
No	Comment Submitted	CAISO Response
4a	<p>CEERT appreciates the CAISO’s work on the two-year Special Project to evaluate how transmission investments could cost effectively reduce Local Capacity Requirement (LCR) needs. The project did uncover a few instances in which minor upgrades could potentially reduce LCR needs with the minimal revenue stream generated by the difference in generic Local and System Resource Adequacy (RA) prices. As noted in the meeting, the more robust revenue stream in locations where Capacity Procurement Mechanism (CPM) or Reliability Must Run (RMR) resources supply LCR could allow more economic transmission upgrades. This minimal additional analysis could be completed in this cycle. We assume that if the preliminary assessment holds up, these projects will be included in the recommended economic-driven projects in the final TPP.</p> <p>Perhaps more importantly, this study characterized all the LCR needs in such a way that assessment of the value of portfolios of use limited preferred resources (including storage) to mitigate LCR needs is possible. This information will become increasingly important as these resources begin to play a much more prominent role in the future grid. In particular, the illustration of how a portfolio of four-hour batteries could be “stacked” in dispatch to meet an eight-hour LCR need in the Santa Clara sub-area is very relevant. Also of note was the contribution of Behind-the-Meter batteries charged by rooftop solar (the Swell Energy Project) that provided full nameplate capacity value to the portfolio. Furthermore, in the discussion about the results in the West LA Basin, it was noted that only 20-minute response time DR was counted as an LCR resource. The question arose as to whether hybrid resources, such as a one hour battery “ stacked” with 52-minute response time DR, could have LCR capacity value (neither have any stand-alone NQC).</p> <p>CEERT would appreciate a short discussion of these issues in the text of the Draft TPP. Thank you for your attention.</p>	<p>Further analysis of the need for any of the minor upgrades identified in the LCR reduction analysis will need to consider how the need for system capacity would impact the resource replacement cost. In the near-term this cost could be higher than it has been in the past, so the economic value of the LCR reduction could be lower than the preliminary assessments provided.</p> <p>As described in section 3.8.2 of the 2019-2020 TPP Study Plan dated April 3, 2019, the 52 minute response time DR, as long as it is a PDR resource would count for local resource adequacy.</p>

5. Consolidated Edison Development (CED) Submitted by: Ellen Jandt		
No	Comment Submitted	CAISO Response
5a	<p>At the November 18 meeting, in connection with the CAISO's preliminary economic study results, the CAISO identified the Fresno Avenal area upgrade (Gates-Tulare Lake 70 kV line) as a high priority study area to receive further, detailed simulation and economic assessment. CED strongly supports further economic study of the Fresno Avenal area upgrade (Gates-Tulare Lake 70 kV line). CED's operating assets in the Avenal area have experienced frequent curtailments arising from peak season of Exception Dispatches which has resulted in lost renewable energy production delivered to the grid and suspects these losses will continue to grow absent a solution.</p> <p>While the CAISO's initial economic analysis indicates that the overall market costs of congestion in the Fresno area are currently relatively modest, the magnitude of congestion in the Fresno area are significant, and outpaced only by the Path 42 IID-SCE and PG&E/TID Exchequer Branch Groups in the Sensitivity 1 portfolio, and only PG&E/TID Exchequer in the Sensitivity 2 portfolio. Clearly, the magnitude of congestion hours in the Fresno area warrants further study. The proposed economic study of the Fresno Avenal area upgrade is an important first step in addressing the long duration/frequency of congestion, which has a commercial impact on generation in the area.</p>	The comment has been noted.

6. Horizon West Transmission (Horizon West) Submitted by: Marcos Mora		
No	Comment Submitted	CAISO Response
6a	<p>Red Bluff - Mira Loma 500 kV Transmission Project To improve reliability, mitigate thermal overloads of the existing 230 kV transmission network in the West of Devers area, and to address the growing deliverability constrained Desert Area, Horizon West submitted the Red Bluff-Mira Loma 500 kV Transmission Project into the 2019-2020 cycle. The Project consists of a new 139-mile 500 kV transmission line from Mira Loma 500 kV substation to Red Bluff 500 kV substation with 50% compensation with an estimated cost of \$850 MM and expected in-service date of December 1, 2024.</p> <p>CAISO reviewed the proposal and informed Horizon West that the Red Bluff-Mira Loma 500 kV Transmission Project does not meet a reliability need, however it may consider the project in the evaluation of the economic study requests. During the November 18th stakeholder meeting the CAISO did not identify the Red Bluff-Mira Loma 500 kV Transmission Project on the list of high priority study areas to receive detailed consideration.</p> <p>Horizon West appreciates the ISO's detailed evaluation, and would like to encourage CAISO to consider evaluating the project in the following studies in the current TPP cycle:</p> <ol style="list-style-type: none"> 1. The economic evaluation of the Red Bluff-Mira Loma 500 kV Transmission Project should include an increased level of SCE Eastern area renewables in the post project cases, as one of the goals of the Project is to enable renewables to interconnect to the system. During the November 18th stakeholder meeting the CAISO indicated that the economic evaluation of the Pacific Transmission Expansion (PTE) will include offshore wind in the post-project cases. Horizon West believes that the economic evaluation of the Red Bluff-Mira Loma 500 kV Transmission Project should make similar assumptions regarding increased renewables in the post-project cases. 2. Consistent with Transmission Economic Analysis Methodology (TEAM), test the effectiveness of the project in economic studies and calculate the benefit to cost ratio for the project as part of the economic and policy assessment. CAISO performed an economic evaluation of the project in 2018-19 TPP cycle but noted that conservative values were applied for the 	<p>The development of the renewable portfolios that are assumed in the ISO transmission planning analysis are developed in the CPUC Integrated Resource Planning Process. Horizon West can provide this input to that process.</p> <p>The ISO is evaluating the PTE project without including offshore wind because there is no offshore wind in the CPUC portfolios at this time.</p> <p>At this time the CAISO does not have new information needed to update the values applied for the local capacity and system capacity cost differences.</p>

No	Comment Submitted	CAISO Response
	<p>local capacity in the LA Basin area due to the uncertainty regarding future system requirements for the gas-fired generation fleet in the area and the need for further coordination with the CPUC's IRP process. Hence, Horizon West requests that the ISO consider performing the near-term local capacity studies for 2020 – local capacity area technical study, and 2024 – mid-term local capacity requirements studies, and to assess the benefits of the proposed Red Bluff – Mira Loma 500 kV transmission project, in the current 2019-2020 TPP cycle.</p>	
6b	<p>Lopez – Divide 230 kV Transmission Project The CAISO's 2019-2020 Reliability Assessment – Preliminary Study Results for Central Coast Los Padres identified a number of contingencies that generated potential overloads. The project, which was initially approved by CAISO in the 2012-2013 TP process, PG&E's Midway – Andrew 230 kV, is currently on hold with its original in-service date of 2019. This in-service date was critical due to the reliance on the Mesa and Santa Maria Special Protection Systems (SPS) as an interim solution to avoid voltage collapse following several outages in the area, including a P2 stuck breaker outage at the Mesa 115 kV bus. The interim solution also relied on the Divide SPS to trip load following a P6 outage in the area.</p> <p>The proposed Horizon West Transmission solution, Lopez – Divide 230 kV, fully mitigates the thermal overloads and voltage collapse problems observed by the CAISO in the 2019-2020 preliminary reliability results and solves the issues previously determined to be solved by the Midway - Andrew 230 kV Project and the North of Mesa Project at much lower cost (\$85 MM).</p> <p>Horizon West encourages the CAISO to evaluate the Lopez – Divide 230 kV project as a potential solution to the North of Mesa constraints and consider issuing the project for competitive solicitation.</p>	<p>The ISO has recommended to leave the North of Mesa project on hold and will continue to assess in future planning cycles.</p>
6c	<p>Weber – Manteca 230 kV Transmission During the November 18th Stakeholder meeting the CAISO presented the 2019-2020 Transmission Planning Process Less than \$50 Million Project Recommendations – PG&E Area. The projects recommended for approval included the East Shore 230 kV Bus Terminals Reconfiguration (Greater Bay</p>	<p>The ISO has recommended an SPS to address P2-4 contingency at Bellota 230 kV substation. The recommended SPS trips the 115 kV lines connected to the Bellota 115 kV bus following the P2-4 contingency. Considering that the monitoring and tripping actions of</p>

No	Comment Submitted	CAISO Response
	<p>Area), the Newark 230/115 kV Transformer Bank #7 Circuit (Greater Bay Area), the Moraga 230 kV Bus Upgrade (Greater Bay Area), the Wilson Ora Loma 115 kV Line Reconductoring (Greater Fresno Area), the Borden 230/70kV TB #1 Capacity Increase (Greater Fresno Area), and the Tulucay-Napa #2 60kV: Remove Limiting Element Project (North Coast & North Bay Area). A comparison was drawn between the CAISO's recommended approval list and the PG&E Presentation "PG&E's 2019 Request Window Proposals" from the September 25-26th meeting. The only PG&E proposed project less than \$50 MM not on the recommended list for approval is the Bellota 230 kV Bus Upgrade.</p> <p>It appears that a reliability solution in this area is still under consideration. Therefore, Horizon West would like to highlight that the proposed Weber-Manteca 230 kV Project is a competitor to the Bellota 230 kV bus upgrade project and believes it offers an effective reliability solution at a lower cost. In order to achieve the same reliability benefits as the Weber-Manteca 230 kV Project, PG&E would require the bus upgrade at Bellota 230 kV (protect against P2 Bellota 230 kV Section 1E & 2E), as well as a bus upgrade at Tesla 230 kV (protect against P2 Tesla 230 kV Section 2E & 1E) and Tesla 115 kV (protect against P2 Tesla 115 kV Section 1D & 2D), and install a third 230/115 kV transformer at Bellota (protect against P6 Bellota 230/115 kV Transformers #1 & #2). A full cost breakdown was included in the Request Window Submission and it was estimated that Weber- Manteca 230 kV Project cost was conservatively four (4) times less than the bus upgrades and transformer bank in order to achieve the same reliability benefits.</p> <p>Horizon West encourages the CAISO to look at the reliability needs in this area holistically by addressing the P2 outages at Bellota 230 kV, Tesla 230 kV and Tesla 115 kV, as opposed to approving a partial solution at Bellota. Horizon West believes that this comprehensive approach will meet the systems reliability needs while ensuring the least cost to ratepayers.</p>	<p>such SPS will be within Bellota substation, the ISO expects the SPS to be a cost effective solution to address the issue.</p> <p>The ISO is currently working with PG&E to evaluate an SPS or substation upgrade alternative to address P2-4 issues at Tesla substation. In the short term, the ISO's analysis indicated that P2-4 contingency at Tesla 115 kV substation will result in loss of load in the Tesla – Bellota area only and will not propagate to the rest of the system. The ISO will continue to assess in future planning assessments.</p>
6d	<p>San Francisco Long Term Reliability Horizon West appreciates the ISO's review of the 2019/2020 TPP Request Window Project submittals: New Horizon West Sub – Embarcadero 230 kV, and Sobrante – Embarcadero 230kV Transmission. Horizon West understands</p>	<p>The ISO conducted detailed analysis in the 2012-2013, 2013-2014 and 2015 Transmission Plans and concurred with PG&E capital maintenance plans and approved a reliability-driven project in the area</p>

No	Comment Submitted	CAISO Response
	<p>that both of the projects were found as not needed for reliability in the current TPP cycle. Horizon West would like to highlight that these projects were proposed to address extreme event contingencies not published in the preliminary reliability results, but were identified in CAISO's San Francisco Reliability Assessment Alternatives Presentation – August 2013 (available on CAISO's Market Portal under the 2012-2013 TPP Cycle). Horizon West believes it is of high importance to consider a long term transmission solution for the San Francisco Peninsula, for which the supply of safe and reliable energy would be at risk if exposed to an extreme event.</p> <p>As conveyed in our submission for both projects, the electric transmission system serving the San Francisco Peninsula faces a unique set of challenges and risks: high-density urban load area, is geographically surrounded by water on three sides, the most seismically active area in the United States amongst large urban areas, entirely dependent on electric imports, and has challenging restoration times.</p> <p>Per the ISO's Planning Standards (September 2018), the requirements of NERC TPL-001-4 requires Extreme Event contingencies to be assessed. Although the NERC standard does not require mitigation plans to be developed for these Extreme Events, Section 7.1 of the ISO planning standards identifies that the San Francisco Peninsula area has unique characteristics requiring consideration of corrective action plans to mitigate the risk of extreme events. The planning standards identify that the CAISO will consider the overall impact of the mitigation on the identified risk, and the associated benefits that the mitigation provides to the San Francisco Peninsula area.</p> <p>Previous CAISO TPP cycles (2012-2013, 2013-2014, 2014-2015) have included detailed reliability analyses of the San Francisco Peninsula area. These CAISO reliability analyses resulted in a credible list of key extreme events to be considered in future assessments of the San Francisco Peninsula, and a means for approving corrective action plans to mitigate the risks of these credible extreme contingencies. The results showed that under moderate to peak-load conditions, extreme event contingencies significantly reduced the transmission import capability into the San Francisco Peninsula. With all San Francisco Peninsula generation at Hunters Point and Potrero retired, extreme</p>	<p>to address the reliability needs of the area. The ISO continues to assess extreme event analysis and has not identified further needs for additional upgrades in area beyond the current plans.</p>

No	Comment Submitted	CAISO Response
	<p>events result in reliability issues including significant loss of load and/or voltage collapse. Additionally, many of the transmission facilities serving load in the San Francisco area could require restoration times of 4-8 weeks (or longer). Previous reliability assessments (2012-2015) examined several potential alternatives to address the identified extreme event performance concerns, including:</p> <ul style="list-style-type: none"> • No mitigation (unacceptable based upon assessment); • Expanded mobile and spare equipment contingency plans and strategy; • Modifications to 230 kV transmission supply; • Upgrades to 115 kV transmission system; • New 230 kV supply into North Peninsula Area (originally identified at Potrero and considered to be the most comprehensive and robust solution). <p>In this regard, Horizon West requests that, if possible, CAISO share the San Francisco Extreme Event assessment for the current 2019-2020 TPP cycle so that the results of extreme events are available for planning and analysis by proponents.</p>	
6e	<p>Oakland – Sobrante 230 kV Transmission Project</p> <p>In the 2018-2019, and 2019-2020 TPP cycle the CAISO indicates that they will continue to consider transmission, generation or non-transmission solutions as they revisit the assessment of Oakland area needs. CAISO's recent analysis for the Oakland Subarea (Load and Resources 2020, Slide 10, Economic and Policy Assessment, CAISO November 18 Stakeholders Meeting) shows significant increase in load in this pocket. As a result, the LCR deficiency was observed due to underlying Oakland 115 kV network being limited due to loss of the other 115 kV circuits in the area.</p> <p>In order to address the LCR deficiency in the Oakland area, one of the mitigation solutions discussed during the November 18th meeting was to continue transfer load following the first contingency. The existing Downtown/West Oakland Area is made up of two sub-areas, each fed by separate 115 kV networks. To meet the Planning Standards, the northern sub-area depends on aging local generation and SPS that drop load. The southern</p>	<p>The Oakland area load did increase compared to previous cycles. However, there is no LCR deficiency in the Oakland area. The near-term need is met by existing local generation. In the mid-term, once Oakland Clean Energy Initiative (OCEI) project becomes operational, will meet the need with some modifications made to the portfolio size based on this year's assessment. Long-term solution for Oakland area is still under evaluation. The ISO will continue to monitor the Oakland area load forecast and how the procurement part of the OCEI materialize in future. The PG&E proposed Northern Oakland Area Reinforcements includes scope driven by CPUC GO-95 compliance. The ISO will factor this as well in developing the long-term plan. In regards to the Horizon West proposed Oakland-Sobrante 230kV alternative, the project as proposed doesn't address all long-term reliability needs in the Oakland area. Hence, the ISO determined at this</p>

No	Comment Submitted	CAISO Response
	<p>area, while not dependent on local generation, depends on SPS to drop load. As the load continue increase, and the existing generation retire in the near term future, Horizon West strongly believes that this area will require the long term robust reliability solution.</p> <p>Horizon West believes that PG&E's recently proposed project, Northern Oakland Area Reinforcements, requiring multiple transmission upgrades to address the reliability in the northern sub-area is very costly and will require a very lengthy environmental and construction process. Therefore, Horizon West requests CAISO's consideration in performing a special assessment of the Oakland and East Bay area and to evaluate the recently submitted Horizon West project: Oakland – Sobrante 230 kV alternative against all other transmission and non-transmission alternatives being considered to determine the most reliable and 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 (a high-density urban area consisting of over 400 MW of load; Retirement of Oakland area combustion turbine (CT) generation; Elimination of the reliance on SPS or Remedial Action Schemes (RAS) in High Density Urban Load Area, Exposure and restrictions of transmission system topology). Finally, the analysis of extreme events including wildfires and earthquakes should be investigated as well and taken into consideration as part of the analysis.</p>	<p>point that the alternative is not appropriate solution to address long-term reliability needs in the Oakland area.</p>
6f	<p>Gamebird 230 kV Substation Transmission Project</p> <p>In this 2019 – 2020 TPP Reliability Submission Window the CAISO is recommending for approval the Gamebird 230/138 kV Transformer Upgrade project. Horizon West understands that it is not yet a resolved matter if this project should be considered an upgrade, since it is not clear that Valley Electric Association (VEA), which owns the Gamebird 138 kV substation, would be the PTO, as the project need and scope is in the 230 kV system (not the 138 kV), and VEA is not the owner of the 230 kV system. The 230 kV system is owned by GridLiance West (GLW), however, GLW is not the PTO of the Gamebird 138 kV substation, as it is owned by VEA; therefore, Horizon West</p>	<p>The ISO considers there are two different solutions proposed through the request window, submitted by GLW and by Horizon West.</p> <p>The former, the Gamebird 230/138 kV transformer upgrade project submitted by GLW is an upgrade to the existing Gamebird substation owned by VEA, an incumbent transmission owner. VEA is the incumbent Participating Transmission Owner, so the project would be assigned to VEA. The potential for VEA to agree to GLW to own and construct the project based on a preexisting agreement between those</p>

No	Comment Submitted	CAISO Response
	<p>believes the recommended project as a whole cannot be considered an addition or upgrade to VEA or GLW existing facilities, and should be released for competitive solicitation in the Phase 3 2019-2020 cycle.</p> <p>As neither VEA nor GLW is the single owner of both facilities connected by the project, the project would be a collaboration between two PTOs. The CAISO competitive solicitation process makes provisions for collaboration between entities, and the collaboration between VEA and GLW to construct the Gamebird Substation Project should be evaluated against other qualified potential project sponsors in accordance with CAISO's competitive solicitation process.</p> <p>Additionally, Horizon West understands that the project scope and cost extends beyond the 230 / 138 kV transformer and involves new 230 kV bus work, which will not fit within the existing substation's fence and will have a total cost well beyond the estimated ~\$5 MM. For all intents and purposes the entire project will be a "new" 230 kV substation.</p> <p>For the reasons stated above, Horizon West requests CAISO to reconsider its current recommendation and release this project for competitive solicitation in Phase 3 of this 2019-2020 TPP cycle.</p>	<p>two parties does not alter the Tariff requirement for the CAISO to assign the project to VEA. The upgraded substation would remain an integrated facility operating as a single substation. The looping in and out of the existing 230 kV transmission line is a modification to GLW-owned facilities and would be assigned directly to GLW. Our understanding is that the land for the expansion is already part of the existing site, notwithstanding the need to expand the existing fence line.</p> <p>The latter proposal by Horizon West is for a new substation, located in the vicinity of the existing substation. To this point, the ISO has not identified the need for and benefits of a separate facility that surpass the efficiency of an integrated upgraded substation operating as an integrated facility.</p>

7. LS Power Development (LS Power) Submitted by: Sandeep Arora		
No	Comment Submitted	CAISO Response
7a	<p>Economic Assessment: CAISO's Preliminary Economic Assessment shows congestion on the COI corridor between \$12m to \$61m per year and on Path 26 around \$19m. As clarified by CAISO at the Stakeholder meeting, COI congestion is in the North to South direction while Path 26 congestion is in the South to North direction. While not confirmed by CAISO, it appears that COI and Path 26 congestion issues show up during different hours in the day. We recommend CAISO investigate this and confirm. Further CAISO identified the list of high priority economic studies it is proposing to undertake in this TPP cycle. CAISO currently does not have any transmission solutions on its high priority economic studies list that would address COI corridor and Path 26 congestion. We strongly recommend that CAISO include the SWIP-North transmission project as a solution to COI corridor and Path 26 congestion issues. As a parallel path to both COI and Path 26, SWIP-North provides an alternate path for economic energy from the Pacific Northwest to flow into California, especially during evening peak, and allows exports out of CAISO during middle of the day oversupply conditions which would help reduce renewable curtailments.</p> <p>Prior studies conducted by LS Power (through Consultants) show that SWIP-North transmission line allows for additional intra-day bidirectional flows by facilitating more imports into CAISO during evening peaks and more exports out of CAISO during oversupply middle of the day hours. This bidirectional flow pattern will not only help reduce COI congestion in the North to South direction, but also Path 26 congestion in the South to North direction. Not including SWIP-North on its high priority list will not allow CAISO to address these congestion issues.</p> <p>We recommend CAISO include SWIP-North as a high priority economic study. Further we recommend CAISO implement contract path modelling for its economic planning study so a "wheeling charge free" 1000 MW path from Midpoint to Eldorado that SWIP-North provides to CAISO can be correctly studied.</p>	<p>As shown in previous transmission plans, SWIP North did not have sufficient benefit to ISO ratepayers to warrant an economic solution.</p> <p>The transmission right model needs to be coordinated with the ADS PCM process, in which all transmission right across the WECC system will be consistently considered.</p> <p>The SWIP North project locates outside the current ISO footprint. The project is an interregional transmission project, the assessment of the project need to be considered in the ITP process.</p>

8. North Gila Imperial Valley 2 (NGIV2) Submitted by: Mark Etherton		
No	Comment Submitted	CAISO Response
8a	<p>NGIV2, LLC appreciates the opportunity to provide comments regarding the information provided by CAISO at your November 18, 2019 Stakeholder meeting, specifically related to the draft economic and LCR portions of the 2019-2020 Transmission Planning Process (“TPP”). Without being repetitive, we would like to reiterate our comments related to both the economic and LCR analysis submitted on October 10, 2019. Because of discrepancies noted previously, we would also reiterate our request for additional transparency while conducting the 2019-2020 economic analysis by providing GridView raw output files sooner at the “draft” analysis to assist in identifying data anomalies similar to the error noted previously with PDCI causing congestion on Path 26, or other confirmation of the conclusions.</p>	<p>The ISO follows its process to share preliminary congestion results with stakeholders in November stakeholder meeting. After that, the ISO continues on the production cost model development as the process and tariff required, and with incorporation of stakeholder comments. The ISO posts the production cost models when the draft TPP report is post.</p>
8b	<p><u>Economic Analysis Study Plan</u> There are several assumptions that NGIV2 considers critical to the assessment of the Project that we would like included in CAISO’s analysis and they are outlined below.</p> <p><u>Accurate NGIV2 Model:</u> Along with the corrected NGIV2 topology model submitted on October 10, 2019, the CAISO should include the associated incremental capacity on Path 46 an additional 1,250MW, and its associated benefits for relieving constraints, in its economic analysis of the Project. CAISO should also set the binding constraint for Path 46 to 12,450 MW for the post-NGIV2 economic case.</p> <p><u>70% CAISO/30% IID Analysis:</u> For the 2019-2020 Economic Assessment with NGIV2, we request that the analysis include a scenario that assumes 70% participation from a CAISO PTO and a 30% participation from a non-CAISO PTO. Please refer to the October 10, 2019 comments from the IID.</p> <p><u>Congestion on Path 42:</u> The analysis performed to date for the Scenario 1 and Scenario 2 portfolios show significant congestion on Path 42. With the NGIV2 interconnection to the IID Highline 230kV substation, we believe that the Path 42 congestion can be reduced under N-0 and N-1 conditions. The Highline 230kV station could also be used as an additional injection/delivery point for geothermal generation to help deliver to the CAISO and WestConnect regions.</p>	<p>The ISO evaluates and assesses economic study requests based on the models submitted by stakeholders, if available.</p> <p>The stakeholder needs to submit its project into the interregional transmission planning (ITP) request window if the project involves multiple planning regions, so that the project can be evaluated further in the ITP cycle.</p>

9. Nevada Hydro Company Submitted by: David Kates		
No	Comment Submitted	CAISO Response
9a	<p>Nevada Hydro has undertaken its own TEAM analysis to try and replicate the CAISO's results. Unfortunately, we have seen different results from our analysis compared to the findings the CAISO has published. In order to better comment on the TPP process, we request the following:</p> <ul style="list-style-type: none"> • Nevada Hydro has much different reliability results then the CAISO has shown. Please provide the specific Base Cases and assumptions used to develop the LEAPS reliability results for the San Diego and SCE areas. We have signed NDA's in place already. • Please provide the actual production cost data files to be used during the economic phase ahead of publishing the final evaluations. That way we can comment and correct inputs if so required prior to the release of final results. We, like everyone else, have no transparency into the actual analysis or possible mistakes in the analysis runs. • Due to the problems at the Aliso Canyon gas storage facility, we believe LEAPS should be studied as an alternative to that facility. <p>We are concerned about the CAISO's reliance on the RAS schemes, as we do not believe they solve the problems long term and question why, at the same time, area utilities are going out for reliability services.</p> <p>We hope with the future economic study methodology, the CAISO uses more realistic capacity numbers. Advanced pumped storage facilities like LEAPS provide "premium" services for both the full range of transmission benefits plus all five ancillary benefits. Many of these services can be produced simultaneously. (LEAPS should have a "premium capacity number" that reflects the true value for fast response full ancillary service, with multi benefit analysis).</p>	<p>It is not clear what is being referred to as the "LEAPS reliability results, as LEAPS has not been studied in this planning cycle. The CAISO will continue to support CPUC planning efforts regarding the Aliso Canyon storage facility.</p>

10. Public Advocates Office (PAO) Submitted by: Lina Khoury		
No	Comment Submitted	CAISO Response
10a	<p>On September 25 and 26, 2019, the California Independent System Operator (CAISO) held a stakeholder meeting to present the preliminary study results of the 2019-2020 Transmission Planning Process (TPP). At that time, the Public Advocates Office submitted comments and recommended the CAISO not approve Pacific Gas and Electric Company's (PG&E) proposed Northern Oakland Area Reinforcement Project (NOARP).</p> <p>On November 18, 2019, the CAISO held another 2019-2020 TPP stakeholder meeting. The Public Advocates Office also participated in this meeting and recommends that the CAISO not approve the Moraga 230 kilovolt (kV) Substation Bus Upgrade, which may be part of the NOARP. The reasons for our recommendation are provided below.</p> <p>Recommendations for the CAISO Reliability Projects < \$50 Million</p> <p>The CAISO Board should not approve the PG&E proposed Moraga 230 kV Bus Upgrade (Greater Bay Area) Project in the current TPP cycle. The CAISO recommends approval of the Moraga 230 kV Substation Bus upgrade to mitigate the North American Electric Reliability (NERC) P2 contingency that may occur starting in 2021. However, it is not clear whether the upgrade to the Moraga 230 kV Substation Bus is a stand-alone project or part of the whole NOARP. The scope of the NOARP may include an upgrade to the Moraga 230 kV Substation Bus. If the project is part of the NOARP, the CAISO should not consider it separately. Stakeholders and the CAISO cannot effectively develop comprehensive solutions to the Northern Oakland area's reliability issues if projects, such as the Moraga 230 kV Substation Bus upgrade, are considered in a piecemeal approach. The CAISO should provide sufficient information on this proposed project so the CAISO Board and stakeholders can make informed decisions.</p> <p>The Public Advocates Office also notes that PG&E did not provide any comprehensive alternatives to the Moraga 230 kV Bus Upgrade project. The Public Advocates Office recommends that the CAISO evaluate all transmission alternatives and preferred resources, including storage, demand response, and</p>	<p>The ISO is recommending approval of the Moraga 230kV bus upgrade as a separate project from PG&E's NOAR project. PG&E included this as part of the NOAR project as it addresses long-term overloads in the Oakland area due to the P2 (breaker) contingency at Moraga 230kV. However, there are near-term reliability issues in the Diablo division also caused by the same Moraga 230kV P2 contingency. As such, the ISO is recommending approval of the Moraga 230kV bus upgrade as a separate project. The long-term plan for Northern Oakland area is under evaluation for which the ISO will continue to monitor load growth in the area along with how the procurement part of the OCEI materialize in future.</p>

No	Comment Submitted	CAISO Response
	<p>energy efficiency programs, before it considers spending \$17 to \$34 million of ratepayer funds for the PG&E's Moraga 230 kV Substation Bus Upgrade project.</p> <p>Finally, the Public Advocates Office urges the CAISO to monitor load growth in the Northern Oakland area, and assess the robustness and cost-effectiveness of the Moraga 230 kV Substation Bus Upgrade project relative to other mitigation solutions. The CAISO already approved the Oakland Clean Energy Initiative project in the 2017-18 TPP (subsequently modified in the 2018-19 TPP) to address the near-term needs of the Northern Oakland area. In addition, the incremental upgrades proposed by PG&E under the NOARP are not expected to be built until at least by August 2024.⁴ Long-term reliability needs may change and render the Moraga 230 kV Substation Bus Upgrade project unnecessary.</p>	

11. Smart Wires
Submitted by: Jenna Hermann

No	Comment Submitted	CAISO Response																																																																
11a	<p>1) Smart Wires is supportive of efforts to identify Power Flow Control solutions but requests that CAISO use a generic term when describing solutions that involve Power Flow Control</p> <p>The term “series reactors” has been used in some proposed project solutions. We suggest that as a general rule, the CAISO should focus on the function and not a specific type of equipment. We understand that series reactors are an existing technology, and the term is very often used as a shorthand to denote a piece of equipment that adds reactance to a line. However, as newer technologies become available, such shorthand could be too confining. Just as we moved from using the term “shunt capacitors” to “shunt compensation” or “voltage support devices”, we should also move from “series reactors” to the more generic term, “series compensation”, “power flow control devices” or similar.</p>	<p>The comment has been noted.</p>																																																																
11b	<p>2) CAISO should evaluate power flow control devices as a solution for El Nido and Western LA Basin LCR reduction</p> <p>From what we understand, the CAISO assessed 7 project alternatives to understand their impact on LCR for the El Nido and Western LA Basin Subareas, as shown below in Figure 1.</p> <div style="border: 1px solid #4F81BD; padding: 10px; margin: 10px 0;"> <p style="text-align: center; color: #4F81BD; font-weight: bold;">CAISO-Considered LCR Reduction Solutions and Request Window Project Submittal</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr style="background-color: #D3D3D3;"> <th>Name of Solutions</th> <th>Submitter</th> <th>Submission date</th> <th>Target LCR reduction areas</th> <th>500kV Voltage</th> <th>230kV Voltage</th> <th>DC Voltage (±25kV)</th> <th>Estimated costs (\$ million)</th> </tr> </thead> <tbody> <tr> <td>1. Install 350 MW BESS in El Nido subarea</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 581</td> </tr> <tr> <td>2. Upgrade La Fresa – La Cienega 230kV line (12 mi.)</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 104</td> </tr> <tr> <td>3. Install 350 MW BESS in Nido and 350 MW in Western LA Basin subareas</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido, Western LA Basin</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 1,162</td> </tr> <tr> <td>4. Install BESS in Nido and Upgrade Mesa – Laguna Bell 230kV line</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido, Western LA Basin</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 631</td> </tr> <tr> <td>5. Install 350 MW BESS in Nido subarea and install 3 Ω Line Series Reactor on the Mesa-Laguna Bell 230kV line</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido, Western LA Basin</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 598</td> </tr> <tr style="border: 2px solid yellow;"> <td>6. Upgrade La Fresa – La Cienega 230kV line and install 3 Ω Line Series Reactor on the Mesa – Laguna Bell 230kV line</td> <td>CAISO</td> <td>2019-20 TPP</td> <td>El Nido, Western LA Basin</td> <td></td> <td style="text-align: center;">√</td> <td></td> <td>\$ 119</td> </tr> <tr> <td>7. Pacific Transmission Expansion HVDC Project</td> <td>Western Grid Development, LLC</td> <td>10/15/2019</td> <td>Big Creek/Ventura LCR area and Western LA Basin</td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> <td></td> <td>\$ 1,850</td> </tr> </tbody> </table> <p style="font-size: 8px; margin-top: 5px;"> California ISO ISO Public Page 12 </p> </div>	Name of Solutions	Submitter	Submission date	Target LCR reduction areas	500kV Voltage	230kV Voltage	DC Voltage (±25kV)	Estimated costs (\$ million)	1. Install 350 MW BESS in El Nido subarea	CAISO	2019-20 TPP	El Nido		√		\$ 581	2. Upgrade La Fresa – La Cienega 230kV line (12 mi.)	CAISO	2019-20 TPP	El Nido		√		\$ 104	3. Install 350 MW BESS in Nido and 350 MW in Western LA Basin subareas	CAISO	2019-20 TPP	El Nido, Western LA Basin		√		\$ 1,162	4. Install BESS in Nido and Upgrade Mesa – Laguna Bell 230kV line	CAISO	2019-20 TPP	El Nido, Western LA Basin		√		\$ 631	5. Install 350 MW BESS in Nido subarea and install 3 Ω Line Series Reactor on the Mesa-Laguna Bell 230kV line	CAISO	2019-20 TPP	El Nido, Western LA Basin		√		\$ 598	6. Upgrade La Fresa – La Cienega 230kV line and install 3 Ω Line Series Reactor on the Mesa – Laguna Bell 230kV line	CAISO	2019-20 TPP	El Nido, Western LA Basin		√		\$ 119	7. Pacific Transmission Expansion HVDC Project	Western Grid Development, LLC	10/15/2019	Big Creek/Ventura LCR area and Western LA Basin	√	√		\$ 1,850	<p>Thank you for your comments. As mentioned at the stakeholder meeting on November 18, 2019, the ISO also evaluated the effectiveness of installing a line series reactor on the La Fresa – La Cienega 230kV line for the El Nido subarea. However, since the El Nido subarea is at the load side of the 230kV transmission lines, installing line series reactors does not help mitigate line overloading concern as power still needs to go through these lines to be delivered to the load area. The loading on the overloaded line (La Fresa – La Cienega 230kV line) is unchanged even with the installation of the line series reactor due to power is delivered on a radial system to the load area.</p> <p>The ISO will investigate further the potential various power flow controller options, including line series reactors at an appropriate time in the future after the low system capacity concern is addressed via the CPUC procurement process. Planning for the local capacity area needs to be coordinated with the assessment of system need to avoid causing system resource adequacy concern.</p>
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No	Comment Submitted	CAISO Response
	<p>We've highlighted one submission, Alternative 6: La Fresa – La Cienega 230 kV line upgrade with a series reactor on Mesa – Laguna Bell 230 kV. In comparison to Alternative 2, the series reactor adds a considerable amount of benefit and positions Alternative 6 to be the only alternative with a BCR greater than 1. It appears to us that an assessment of optimally placed power flow control devices in this area on the La Cienega 230 KV line and/or Mesa Laguna Bell 230 KV line would show even higher BCR ratios. We encourage the CAISO in continuing its investigation into power flow control solutions to optimize use of the transmission system going into the El Nido and Western LA Basin load areas.</p>	