

The CAISO received comments on the topics discussed at the February 7, 2020 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. [GridLiance West \(GLW\)](#)
6. [Horizon West Transmission \(Horizon West\)](#)
7. [Imperial Irrigation District \(IID\)](#)
8. [Large-sale Solar Association \(LSA\) and Solar Energy Industries Association \(SEIA\)](#)
9. [Pacific Gas & Electric \(PG&E\)](#)
10. [Smart Wires](#)
11. [Transmission Agency of Northern California \(TANC\)](#)
12. [Western Grid Development \(Western Grid\)](#)

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 CAISO's responses to the comments.

1. American Wind Energy Association of California (AWEA-California) Submitted by: Caitlin Liotiris		
No	Comment Submitted	CAISO Response
1a	AWEA-California appreciates the opportunity to comment on the 2019-20 Draft Transmission Plan prepared as part of CAISO's annual Transmission Planning Process (TPP). AWEA-California thanks CAISO for the significant efforts that were expended to develop the 2019-20 Transmission Plan, including the extra time and effort CAISO put forward to conduct various sensitivity analyses of the public policy sensitivity cases transmitted by the California Public Utilities Commission's (CPUC) based on results from the Integrated Resource Planning (IRP) process. In addition to the sensitivity analyses, the 2019-20 TPP represents the first time that the CAISO has, on a "base case" basis, studied a Renewable Portfolio Standard (RPS) above 33%. This marks a significant milestone for transmission planning in California. And while AWEA-California continues to believe there are areas of IRP and TPP coordination that could be improved to further efficient transmission and generation planning in the state, the results of the 2019-20 TPP provide useful information regarding the ability of the existing transmission system to accommodate significantly higher levels of renewable resources, including regional wind resources.	The comment has been noted.
1b	The 2019-20 TPP included analysis of two public policy sensitivity cases, which would both achieve a higher RPS (of ~71%) and move closer to achievement of California's long-term climate goals. Sensitivity #2, includes significant amounts of wind resources in Wyoming and New Mexico that contribute to a 71% Renewable Portfolio Standard (RPS) in this case, while Sensitivity #1 is more heavily weighted toward solar resources. CAISO's analysis of Sensitivity #2, while lacking consideration or analysis of the regional transmission that would be needed for these resources to deliver to CAISO's borders, still offers some important insights and illustrations of the benefits of diverse renewable procurement in achieving California's clean energy goals.	The comment has been noted.
1c	CAISO's analysis demonstrated that, for both Sensitivity #1 and Sensitivity #2, there was an increased likelihood for reinforcement of the transmission system, but no major transmission expansion requirements were identified to accommodate these portfolios. CAISO's analysis also found that the resources selected were generally deliverable to load under both sensitivity cases. For Sensitivity #2 this helps illustrate that, if regional wind is transmitted to CAISO	The comment has been noted.

No	Comment Submitted	CAISO Response
	<p>in the quantities analyzed in this study, the existing and planned system appear sufficient to accommodate them.</p>	
1d	<p>Additionally, the production cost modeling analysis of Sensitivity #2, even while utilizing modeling constructs that serve to limit the benefits that would accrue with the construction of new transmission lines to deliver resources to the CAISO, shows that a more diverse renewable portfolio (such as that studied in Sensitivity #2) can reduce renewable curtailment and provide associated benefits to ratepayers. CAISO's assessment shows that, relative to Sensitivity #1, Sensitivity #2 reduces curtailment by 610,000 to 640,000 MWh/year and provides an additional <math>\approx 2,700</math> GWh of GHG-free, renewable generation to the grid. If the "value" of reduced curtailment associated with this sensitivity is in the \$20-\$30/MWh range, the benefit of avoided curtailment associated with Sensitivity #2 (relative to Sensitivity #1) is between about \$12M- \$19M/year. This study framework does not fully capture the benefits of diverse renewable resources, but does illustrate some of the benefits and CAISO's analysis also illustrates that regional renewable resources, if delivered to CAISO can be reasonably accommodated and delivered to CAISO load, which are important findings the CAISO should highlight for stakeholders.</p>	<p>The comment has been noted. The CAISO has encouraged consideration of the benefits of resource diversity in the CPUC's Integrated Resource Planning (IRP) proceedings, and sees the IRP proceeding to be the appropriate forum for stakeholders to raise these concerns.</p>
1e	<p>In previous comments in the 2019-20 TPP and in the IRP proceeding, AWEA-California has noted the need for improvements in the coordination of the TPP and IRP processes. Some of these improvements are relatively easy to implement, such as improving RESOLVE's transmission constraints to more accurately reflect diverse resource delivery to renewable zones and to reflect the expected implementation of the new deliverability methodology, but others will require a more comprehensive review and consideration of restructuring of the IRPTPP interaction. AWEA-California encourages CAISO to be open to exploring manners in which the IRP-TPP coordination process can be improved as conversations in the state evolve.</p> <p>AWEA-California appreciates CAISO's consideration of these comments and CAISO's efforts to complete the 2019-20 Draft Transmission Plan. We look forward to continuing to work in collaboration with the CAISO on transmission planning process improvements in the upcoming (2020-21) cycle and beyond.</p>	<p>The comment has been noted. The CAISO will continue to explore opportunities for improved coordination with resource planning processes with the CPUC.</p>

2. Bay Area Municipal Transmission group (BAMx) Submitted by: Paulo Apolinario		
No	Comment Submitted	CAISO Response
2a	<p><b>Policy-Driven Assessment</b>            BAMx supports the CAISO’s decision of not recommending the approval of any policy-driven projects, where the need for the project is based upon 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.<sup>2</sup> 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.<sup>3</sup> 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 that could be avoided simply by changing the intra-zonal generation resource mapping distribution</p>	<p>The comment has been noted.</p>
2b	<p><b>CPUC IRP and CAISO TPP Feedback Loop</b>            Historically, BAMx has expressed 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 40TWh,<sup>5</sup> whereas the comparable 42MMT base portfolio in the latest 2019-2020 TPP shows a much lower renewable curtailment, that is, 12.12TWh.<sup>6</sup> 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 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</p>	<p>The comment has been noted and the CAISO is continuing to support the CPUC and CEC mapping exercises.</p>

No	Comment Submitted	CAISO Response
	<p>TPP need to identify the locations of the storage capacity with some degree of 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.<sup>7</sup> 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. Although the need for energy storage is driven by system needs, such storage presents a major opportunity to reduce the need for future transmission. With the recognized goal of decreasing the need for gas-fired generation, it is important to find locations in load pockets that will allow for its replacement without driving the need for expensive transmission solutions. BAMx encourages the CAISO to engage stakeholders with further related discussions in the 2020-2021 TPP and through the CAISO's continued participation in the CPUC IRP process.</p>	
2c	<p><b>Flexible Capacity Deliverability and LCR Reduction Studies</b>            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 TPP8 - as summarized in Table 1 - could provide a good guideline for the CPUC in locating the selected 2019 IRP storage resources in different <i>generation pockets</i>.</p>	<p>The comment has been noted.</p>
2d	<p>Similarly, the CAISO's LCR Economic Assessments should inform the amount of battery storage that could be located in the various load pockets. The ability of storage to reduce the reliance on existing gas-fired resources in the local areas and sub-areas needs to be a priority when locating the storage resources. Another important consideration to map storage resources is to site them, to the extent possible, at the same location as the existing or new renewable resources while ensuring that the total of the qualifying capacities of the renewable resource and battery does not exceed the capacity at the point of interconnection. BAMx observes that nearly 60% of storage capacity currently in the queue is hybrid, i.e., coupled with either solar or wind resources.</p>	<p>CAISO is coordinating with the CPUC staff on providing insights from the LCR studies for the purpose of storage mapping in the IRP process. While the CAISO is seeing active interest in locating storage where solar resources have developed or are developing, the reverse has not generally been the case, as battery storage has a much smaller footprint and is not impacted by the host of considerations that influence solar resource siting and procurement.</p>

No	Comment Submitted	CAISO Response
	<p>Therefore, it is highly likely that such storage mapping would be consistent with commercial interest. The LCR reduction studies are also very informative in identifying the attributes of the required storage resources. The CAISO should provide guidance on defining an adequate amount of utility-side (front-of-the-meter) solar resources which could be co-located with storage resources 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>	
2e	<p>BAMx appreciates the CAISO's significant efforts on the LCR Reduction study included in the draft 2019-2020 Transmission Plan. BAMx finds these informational studies to be very helpful in reviewing the options to maintain local reliability. We endorse the CAISO's comprehensive approach that not only considers (i) the reliability benefits of competing mitigation solutions including transmission and storage resources,<sup>10</sup> but also assesses (ii) the production benefits and (iii) the local capacity benefits. BAMx also supports the consideration of preferred resources and energy storage as mitigation solutions for potential reliability issues in all LCR areas and sub-areas. In particular, we found that the distributed generation, existing and planned fast-response demand response and storage were used in all LCR areas studied in the current TPP cycle, but not in the remaining LCR areas/sub-areas (except for San Diego Imperial Valley Area and San Diego subarea) studied in the 2018-2019 TPP. BAMx requests that such demand-side options be considered in all areas where such measures would address the identified reliability constraints.</p>	<p>Going forward all resources, that are modeled and can mitigate the reliability need, may be used as necessary. This includes distributed generation, existing and planned fast-response demand response and storage.</p>
2f	<p><b>Recommended Reliability-Driven Projects</b>  <b>Tulucay-Napa #2 Circuit</b>            The Draft Transmission Plan recommends for approval of the Tulucay-Napa 60kV #2 Circuit upgrade. The scope of the project is to replace the limiting jumpers and switches in order to increase the rating of the circuit. BAMx has submitted comments suggesting the CAISO should evaluate an operating solution of closing the second Tulucay-Napa 60kV circuit, which could relieve the identified overload. The CAISO's response was that "Closing the normally open switch addresses the P0 contingency but results in reliability constraints under P1 contingencies.<sup>11</sup>" BAMx appreciates CAISO staff taking the time to</p>	<p>Closing the normally open switch between Tulucay and Basalt Substation relieves the identified P0 overloads, but results in overloads for P1 contingencies.</p> <p>In the interim, until the upgrade is in place the CAISO is working with PG&amp;E to exploring closing the normally open switch under limited conditions to operate the local system reliability.</p>

No	Comment Submitted	CAISO Response
	<p>review the BAMx proposed configuration. However, BAMx believes that with the CAISO's proposed configuration of keeping the Tulucay JCT switch normally open, the entire Basalt Substation will be completely de-energized for the loss of Tulucay-Napa #2 circuit. Although these circuits are not considered to be part of the Bulk Electric System (BES) and load dropping is allowed following a single (P1) contingency event, a more cost-effective solution could be to close the normally open switch on Basalt-Tulucay #1 circuit, and operate Basalt Substation split so some of the load is served via Tulucay-Napa #1 and the rest from the Tulucay-Napa #2 circuit. Under this configuration, neither circuit will overload under normal (P0) condition and the entire Basalt Substation will not be lost for an outage of Tulucay-Napa #2 circuit.</p>	
2g	<p><b>Maintenance Projects</b>            BAMx very much appreciates that the CAISO will review the assumptions used for the escalation of O&amp;M costs and capital maintenance as a percentage of gross plant, in addition to other capital costs that do not require CAISO approval as part of their efforts of updating the HV TAC estimating tool. BAMx observes that the share of maintenance-related capital projects that are not subject to the CAISO-approval is ever-increasing. For instance, BAMx calculation of the PG&amp;E TO 20 capital forecast breakdown for combined years 2018 and 2019 indicate that roughly 70% of PG&amp;E's forecasted electric transmission capital expenditures receive no external review.<sup>13</sup> BAMx has also noticed that some of the PTO request window projects that were not approved in the Draft Plan are now being classified as maintenance projects.</p> <p>BAMx believes that the distinction between maintenance projects and capital improvement projects is not well defined. All capital projects affect maintenance costs. And many, if not most, projects being defined by PTOs as maintenance projects have major implications in terms of load-serving capability, an attribute of most capital improvement projects proposed to the CAISO to mitigate reliability issues. Therefore, it is incumbent on the CAISO to review all maintenance projects or at least those that have load-serving capability implications.</p>	<p>The CAISO confirms each year with the PTOs the assumptions the PTOs wish to see for these parameters – the CAISO is not independently assessing the assumptions. Expansion-related planning led by the CAISO, and capital maintenance activities led by the PTOs are delineated by the need for the capital expenditure, not by volume or expected percentage of overall expenditure. Concerns with the PTOs' capital maintenance activities can be explored with the PTOs in their processes and proceedings.</p> <p>The CAISO does not agree with this comment. The issue has been explored in several venues, and the CAISO clearly does not have a role in reviewing all maintenance projects conducted by the PTOs. The CAISO will continue to coordinate with the PTOs and concerns regarding individual projects can be explored on a case by case basis.</p>



No	Comment Submitted	CAISO Response
	<p>Even though the TPP is a CAISO-led process, the PTOs are important stakeholders in that process. So even though it is the CAISO that approves increases in the capability of the control area transmission system, the PTOs also identify deficiencies in the load-serving capability of the existing transmission system and suggest projects through request window submissions to mitigate any deficiencies of the existing grid. The PTOs, therefore, have a major role in what gets approved by the CAISO in its TPP. The PTOs use that approval in their justification to FERC for cost recovery for those capital improvement projects the PTO constructs. BAMx contends that the CAISO should have no less of a role in defining maintenance projects that the PTOs ultimately apply to FERC for cost recovery.</p>	<p>The CAISO does not agree with the contention. PTOs – who are NERC-registered Transmission Planners – have a role in the CAISO’s transmission planning process. That has no bearing on the maintenance activities and the CAISO not having a role in reviewing maintenance activities.</p>
2h	<p>Conclusion            BAMx appreciates the opportunity to comment on the CAISO Draft 2019-2020 Transmission Plan. BAMx also supports the CAISO being cautious in considering seeking project approval, where the need for the project is subject to change based upon the assumptions that are expected to change, such as the revised deliverability assessment and resource to busbar mapping in the renewable portfolios including energy storage. BAMx urges the CAISO to play a more active role in the review of maintenance projects. BAMx also appreciates the CAISO staff’s openness and willingness to work with the stakeholders in the process. We look forward to working with the CAISO staff to continue to improve the TPP.</p>	<p>Please refer to the above comment.</p>



3. (CEERT) Submitted by: Paulo Apolinario		
No	Comment Submitted	CAISO Response
3a	CEERT appreciates the CAISO's work in this TPP cycle to begin to look at policy driven resource portfolios beyond a 50% RPS and 2030. Although we believe that the 42 MMT/yr resource portfolio is still too conservative given the statewide policy trajectory, and the analysis should be based instead on, at a minimum, the 30 MMT/yr scenario, that may be for next year's TPP cycle. Still, however, CAISO should at least spot check the 30 MMT/yr scenario for any new transmission related issues so that a proper comparison of the generation portfolios can be made in this year's CPUC IRP cycle.	Transmission related issues observed in the 30 MMT portfolio have been documented in the 2019-2020 Transmission Plan. The comment has been noted.
3b	<p>CEERT believes the lessons from the examination of the 42 MMT/yr scenario include the following that should be included for discussion in the Draft 2019-2020 TPP:</p> <ul style="list-style-type: none"> <li>- The indicated new 230/500 kv transformer at Midway should be at least conditionally approved in this year's TPP. The need for this transformer arises because the Diablo Canyon energy arrives at Midway at 500 kv while its replacement energy (principally Central Valley solar) arrives at 230 kv. CEERT maintains that there is a significant risk that one or both Diablo Canyon units will not operate until the planned retirement dates of 12/2024 and 12/2025. The history of these units with unplanned CAPEX expenditures to repair 50 yr old components that fail "prematurely" is rich. This facility is deeply underwater today and getting worse by the day as wholesale energy prices continue to decline. PG&amp;E has been deferring maintenance since at least the retirement decision in 2016 given the short cost recovery lifetime. Given the tight supply/demand situation for capacity related system resources at this point in time, it would seem to be prudent to replace Diablo capacity before retirement. While this is a CPUC decision, it would be foolish to have the timeline set by the lack of a 230/500 kv transformer.</li> </ul>	As part of sensitivity 1 portfolio, 1,400 MW of generation was mapped to, and modeled, at the Gates 500 kV bus. Under this assumption, no need for an upgrade was identified. The CAISO tested the impact of modeling this generation on the 230 kV system as a separate scenario (SENS 01a) because most of the commercial interest near Gates is limited to 230 kV system in the CAISO interconnection queue. This upgrade was not found to be needed in any of the portfolios as transmitted by the CPUC.
3c	The significant economic benefit of the reliability driven \$15M reinforcement of the Sylmar/Pardee line raises interesting questions. First and foremost, CEERT applauds the recommendation to accelerate the COD for this project. However, we ask two questions that could be answered in this Draft TPP. Why did this project not show up in the economic assessment of opportunities to reduce	Approximately half of the LCR areas and sub-areas were studied in the 2018-2019 TPP and the other half were studied in the 2019-2020 TPP. The overall Big Creek/Ventura area was studied in the 2019-2020 TPP.

No	Comment Submitted	CAISO Response
	<p>LCR needs in the Big Creek/Ventura load pocket in last year's TPP? What impact might this project have on the economics of PDCI expansion that was studied two TPP cycles ago?</p>	<p>The PDCI expansion studied in the past was focused on increasing the north to transfer capability and the benefits of that project would not be expected to be impacted or enhanced by the Sylmar-Pardee upgrade. The congestion on the Sylmar-Pardee circuits observed in the production simulation analysis was due to south to north flows due to high renewable generation production in the south. However, the upgrade will be modeled in future production cost analysis, so the impact on PDCI congestion, if any, will be captured.</p>

4. California Public Utilities Commission – Staff (CPUC-Staff) Submitted by: David Withrow		
No	Comment Submitted	CAISO Response
4a	<p><b>Overview</b>            This is the first TPP assessment that utilized a 60 percent RPS portfolio base case with a greenhouse gas (GHG) reduction target of 42 million metric tons (MMT) by 2030. The CAISO also assessed two sensitivities that track a more aggressive 32 MMT target with a 71 percent RPS portfolio. One of these sensitivity studies utilized only existing transmission available to interconnect out-of-state (OOS) resources and the other allowed new transmission build to interconnect up to 4,250 MW of New Mexico and Wyoming wind.</p> <p>Notably, the CAISO did not identify any policy-driven transmission upgrades in the base case or sensitivity assessments, though the need for Remedial Action Schemes (RASs) and congestion management was evident in several zones. The CAISO's analysis does assume significant reliance on curtailment in several zones that were identified with curtailment levels above 20% of renewable output, depending upon the assumed export limits for those zones.</p> <p>CPUC Staff recognizes these zonal export limits provide valuable information on the level of system-level renewable curtailments and are not intended to reflect hard transmission constraints. Nonetheless, in future studies the CAISO might consider a more refined analysis of what amount of power is truly exportable in order to better inform stakeholders regarding the possible levels of renewable curtailments.</p>	<p>The comment has been noted. Also, while the levels of curtailment may still enable achieving overall GHG reduction and RPS goals, the material level of curtailment may drive the need for economic driven transmission in future planning cycle.</p>
4b	<p>CPUC Staff also recognizes the curtailment alternative is generally lower cost than many of the more expensive renewable integration options. A RESOLVE sensitivity analysis conducted in the last IRP cycle assumed a "zero curtailment" scenario and the results revealed extremely high costs and near-impossible procurement needs for battery storage resources.</p> <p>CPUC Staff observes that for the near-term at least, curtailment of solar PV is a lower-cost integration solution than new capital investments in other new</p>	<p>The comment has been noted.</p>

No	Comment Submitted	CAISO Response
	resources. CPUC Staff commends the CAISO for highlighting this option within this TPP and encourages deeper analysis in the next TPP cycle.	
4c	<p>Overall, the draft 2019-2020 transmission plan includes a modest increase in the number of new reliability-based projects. Seven of these transmission projects are in the Pacific Gas &amp; Electric Company (PG&amp;E) service territory. One project is in Southern California Edison Company (SCE) service territory and one project is on the Valley Electric Association (VEA)/Gridliance West, LLC (GLW) system. The estimated total cost of these projects is \$141.7 million. The cost of each of the nine projects identified is under \$50 million and thus were able to be approved directly by CAISO management.</p> <p>CPUC Staff recognizes this TPP 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.</p> <p>CPUC Staff also looks forward to continued collaboration with the CAISO in the next TPP to develop clear, transparent busbar mapping methodologies for energy storage as well as hybrid resources.</p>	The comment has been noted.
4d	<p><b>Comments on Modeling Cases</b>            CPUC Staff has noticed two model cases that may result in reliability issues, as these appear to not have any tangible mitigation solutions.</p> <p><b>Loss of the Control East or West Bus (P2) Causing High Voltage at Inyo.</b>            According to Appendix C of the TPP, loss of the Control East or West Bus causes high voltages at the Inyo 115kV bus. High voltages were deduced in the 2021, 2024, and 2029 summer peak cases, 2024 spring off-peak case and 2021 summer peak sensitivity case. Post-contingency voltages at the Inyo 115kV bus ranged from 1.1012 PU to 1.1204 PU. Post-contingency voltages above 1.1 PU are considered criteria violations. There are no ISO-approved projects or potential mitigation solutions. The CAISO discusses the above</p>	As a temporary mitigation, the high voltages at the Inyo 115 kV bus are currently being addressed by operating solutions, as well as RAS. The ISO is working with SCE on finding a permanent mitigation.

No	Comment Submitted	CAISO Response
	<p>reliability problem in the TPP Reliability Assessment (Appendix B). The CAISO states:  <i>"The Inyo 115 kV bus voltage was observed above 1.052 p.u. following a Category P2 following an outage of the Control West Bus or the Control East Bus in the 2021, 2024 and 2029 summer peak scenarios as well as the 2024 spring off-peak scenario. SCE is working with the ISO to complete further analysis."</i></p> <p><b>Loss of the Lugo 500/230kV Transformers (p6) Causing Transient Stability Criteria Violations</b>            The CAISO's solution in Appendix C is to "work with SCE on further analysis."            The CPUC Staff encourages this analysis and suggests the CAISO identify the timeframe and steps will be taken to ensure reliability in this area.</p> <p>According to Appendix C of the TPP, loss of the Lugo 500/230kV Transformers causes one or more generating units to become unstable in the 2024 summer peak, 2029 summer peak, and a 2024 sensitivity cases. The CAISO also modeled the same outage with a RAS. The RAS is referred to as the "HDPP RAS," so it is assumed the RAS trips one or more units at the High Desert Power Plant. Even when the HDPP RAS is modeled, the loss of the Lugo 500/230kV Transformers causes a WECC transient stability criteria violations in the 2024 summer peak and 2024 sensitivity cases.            The CAISO discusses the above reliability problem in the 2019-2020 TPP Reliability Assessment (Appendix B). The CAISO states:  <i>"The North of Lugo area stability assessment identified bus voltages that didn't meet WECC criteria following a Category P6 outage with a RAS scheme. The list of stability contingencies simulated for the NOL area along with the simulation results are documented in Appendix C."</i>  <i>"WECC criteria not met (P6)"</i>  <i>"For the loss of the two Lugo 500/230 kV transformer banks, loss of the two Kramer-Inyokern-Randsburg 115 kV lines, loss of the two Kramer-Victor 230 kV lines, or loss of the two Control-Inyokern 115 kV lines the system failed to recover to 80% of pre-contingency voltages and voltages dipped over 20% for</i></p>	<p>The loss of the Lugo 500/230kV transformers is a P6 outage. The CAISO recommends utilizing generation redispatch after the first contingency and the existing RAS to prevent transient stability system performance concerns. Some clarifying edits have been added to Appendix C.</p>

No	Comment Submitted	CAISO Response
	<p><i>longer than 2 seconds following the clearing of the three-phase line-to-ground fault. The recommendation is to rely on existing RAS, and generation redispatch (Note 1) after the first contingency."</i></p> <p><i>The CAISO did not perform transient stability studies with a 2021 case in the 2019-2020 TPP. As a consequence, the 2019-2020 TPP doesn't provide any information regarding this reliability issue in the near term. To determine if the reliability issue is present in the near term, Appendix C of the 2018-2019 TPP was reviewed. The 2018-2019 TPP indicated the loss of the Lugo 500/230kV Transformers causes one or more generating units to become unstable in a 2020 summer peak case. When the HDPP RAS is modeled, the outage still results in WECC criteria violations.</i></p> <p><i>CPUC Staff recommends that the CAISO model the case for 2021 (to ensure near term reliability is met) and develop mitigation strategies in the event that the reliability criteria is violated.</i></p>	
4e	<p><b>Comment on Analysis of Storage Options</b></p> <p>Per discussion with CAISO staff during the stakeholder presentation on the economic assessment of the Draft 2019-2020 Transmission Plan on February 7, 2020, it was revealed that energy storage was not considered as an alternative to address congestion in the identified PG&amp;E congestion areas in Fresno, California. These congestion areas include: (1) Fresno Avenal Area – Gates to Tulare Lake 70 kV Line, (2) Huron to Calflax 70 kV Line and (3) Oro Loma to El Nido 115 kV Line.<sup>2</sup> The reported congestion in these areas "occurs mainly in the hours when solar generation output is high, especially in the months when the summer rating of the line is applied."<sup>3</sup></p> <p>CPUC Staff encourages additional analysis to determine whether the pairing of energy storage with the solar installations in the identified Fresno area would address the reported congestion and provide any additional benefits. More generally, CPUC Staff encourages the CAISO in future TPP economic studies to incorporate assumptions on energy storage such as the assumed lifecycle, costs and the potential for dual use/multiple revenue streams.</p>	The comment has been noted.

5. GridLiance West (GLW) Submitted by: Casey Petty		
No	Comment Submitted	CAISO Response
5a	<p><b>Request for Clarification of Use of Curtailment to Mitigate P0 Events in Policy Assessment</b></p> <p>GLW would appreciate if CAISO clarified some of what was presented regarding the 2019-2020 TPP Policy-Driven Assessment. Specifically, slide 18 of Mr. Barave’s presentation states that the use of “modest renewable curtailment (30 to 150 MW) will mitigate these issues” on the GLW/VEA transmission system. The application of curtailment of renewable generation for a base case event in a policy study seeking to deliver renewable generation at levels determined appropriate by the CPUC to CAISO rate payers appears out of step with the purpose of the policy assessment. Additionally, while the use of RAS and congestion management for P1+ events is allowable under CAISO processes, GLW questions whether this approach will result in the best outcome for California consumers. The benefit of more cost-effective renewable generation in the GLW/VEA area fully deliverable to CAISO rate payers will significantly exceed the cost of transmission upgrades in the GLW/VEA area.</p>	<p>Renewable generation curtailment is not inconsistent with the purpose of the policy assessment. First, as noted in the CPUC comments above, “CPUC staff recognizes the curtailment alternative is generally lower cost than many of the more expensive renewable integration options”.</p> <p>Further, the potential mitigation described on slide #18 was only required in the snapshot assessment. Curtailment driven by base case overloads was not identified in the deliverability assessment.</p> <p>The hours studied for the base portfolio was Hour Ending 12. Some amount of curtailment during this hour does not adversely affect deliverability of resources and their ability to be counted towards resource adequacy.</p> <p>Renewable generation identified in the commission-developed portfolios in this zone were found to be fully deliverable.</p>
5b	<p><b>Request for Clarification of the Need to Mitigate Impacts to Affected Systems in Economic Assessment</b></p> <p>GLW would appreciate if CAISO clarified the need to consider Affected Systems in its Economic Project Assessments. Specifically, the CAISO added, as an Alternative 2 to GLW’s Economic Project submission, phase shifters to “help limit the loop flow between the NVE and CAISO systems” based on CAISO prior interconnection studies.<sup>1</sup> The adjustments the CAISO made to the project adversely affected the Economic Benefits measured by more than 50%. GLW seeks clarification regarding the obligation of the CAISO to minimize impacts on neighboring systems, especially when doing so harms the CAISO and potentially harms the overall WECC benefits.</p>	<p>Adjacent utility owned transmission systems are interconnected when it creates reliability and economic benefits. However, loop flow is an unavoidable result. In extreme situations in the past, loop flow mitigation has been implemented in the WECC.</p> <p>The process for handling affected system impacts caused by generation interconnections is described in the CAISO tariff and BPM for generation interconnection. However, generally, loop flow is not considered an affected system impact that is addressed by transmission upgrades.</p>



No	Comment Submitted	CAISO Response
5c	<p><b>Request for Clarification of the Deliverability Values for Southern California</b></p> <p>The CAISO provided in its draft report Table 3.8-1 showing Deliverability Area Constraints in Southern California. In this table the CAISO indicates a deliverability value of 790 MWs for GLW. In the prior IRP cycle the CAISO provided a limit of 802 MWs to the CPUC for the GLW/VEA area. GLW requests that the CAISO clarify its proposed value of 790 MWs, in particular indicating the basis for the reduction. GLW further seeks clarification as to whether this 790 MW proposed value is based on the pre-existing generation interconnection study methodology or the impending revised generation interconnection study methodology?</p>	<p>The reduction of 12 MW of deliverability out of ~800 MW is most likely due to modeling changes that have occurred since the prior study. Modeling changes include but are not limited to system topology changes and generation mapping changes.</p> <p>The deliverable amount is based on the deliverability methodology existing at the time of the studies.</p>
5d	<p><b>Request for CAISO Consideration of Increased Energy-Only IRP Limit for IRP</b></p> <p>The Draft TPP report suggests that the GLW/VEA area congestion associated with the base portfolio is relatively minimal as compared with the congestion in other subareas constrained within IRP. Table 3.6 -1 shows that the congestion in the GLW/VEA area is approximately \$5M per year for the 2000 MW per year in the export limited case. This modest level of congestion suggests that GLW/VEA could support at least some of level of additional Energy-Only resources. Based upon the CAISO's analysis in this 2019/2020 TPP, GLW encourages the CAISO to offer a non-zero Energy Only limit to the CPUC for its next IRP cycle.</p>	<p>CAISO has provided relaxed energy-only transmission capability estimates to the CPUC for use in the CPUC's future IRP processes.</p>

6. Horizon West Transmission (Horizon West) Submitted by: Marcos Mora		
No	Comment Submitted	CAISO Response
6a	<p><b>Central Coast Los Padres Reliability Issues and Lopez – Divide 230 kV Transmission Solution</b></p> <p>The CAISO's 2019-2020 draft transmission plan includes one previously approved active project<sup>1</sup> in the Central Coast/Los Padres area that is not modeled in the study cases due to constructability issues, cost increase or misalignment of scope of the project with the nature of the identified need. The 2019-2020 Reliability Assessment and the draft plan confirm in this cycle severe P2 and P6 thermal overloads in the 115 kV system supplied from the Mesa substation, thus indicating that mitigation is still required.</p> <p>1 The CAISO's recommendation to solve the reliability need is the North of Mesa upgrade (which consists of building Andrew 230/115 kV substation, energizing Diablo – Midway 500 kV line at 230 kV and connecting to Andrew substation, and looping-in the SLO – Santa Maria 115 kV line to Andrew and Mesa substations). At the February 7<sup>th</sup> Stakeholder Conference, CAISO recommends the North of Mesa upgrade to remain on hold so further study assessments could be performed. CAISO indicated at the February 7<sup>th</sup> meeting that more time is needed to reevaluate the generation retirement (Diablo Canyon), reassess repurposing Diablo – Midway 500 kV line, and to better understand the integration of new renewable resources into the area. In addition, CAISO confirmed in the draft plan TPP 2019-2020, that Horizon West Transmission solution, Lopez – Divide 230 kV, mitigates the same reliability issues as the North of Mesa Upgrades.</p> <p>Based on Section 24.6.2 of the CAISO Tariff<sup>2</sup>, Horizon West is requesting a special study to expedite a transmission solution for this area, rather than waiting to evaluate it in the next TPP (2020-2021) as the consequences of an SPS failure will result in unacceptable outcomes according to CAISO Planning Standards, specifically, ISO SPS4.</p>	<p>The CAISO is continue to reassess the conversion of one of the 500 kV lines and bulk system impacts. From the system reliability perspective there is an existing SPS in the area to address the performance needs. With respect to the maintenance outages, the current project is still the recommended mitigation; however has recommended that the project remain on hold for further review for the 500 kV conversion to 230 kV to supply the new substation and meet the long-term needs of the BES.</p>

No	Comment Submitted	CAISO Response
6b	<p><b>Bellota and Tesla Reliability Issues and Weber – Manteca 230 kV Transmission Solution</b></p> <p>Horizon West encourages the CAISO to take a broader look at the reliability needs at Bellota and Tesla 230 kV and 115 kV and to perform a comprehensive cost/benefit assessment prior to recommending the most optimal long term reliability plan for both areas.</p> <p>At the February 7<sup>th</sup> stakeholders meeting, CAISO 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. In addition, CAISO indicated that it is currently working with PG&amp;E to evaluate an SPS or substation upgrade alternative to address P2-4 issues at Tesla substation. However, it is the opinion of Horizon West, that the proposed Weber-Manteca 230 kV Project offers a reliability solution in this area at a much lower cost than the proposed Bellota 230 kV and Tesla SPS and Bus upgrades.</p> <p>In order to achieve the same comprehensive reliability benefits as the Weber-Manteca 230 kV Project, PG&amp;E would require the bus upgrade at Bellota 230 kV (protect against P2 Bellota 230 kV Section 1E &amp; 2E), as well as a bus upgrade at Tesla 230 kV (protect against P2 Tesla 230 kV Section 2E &amp; 1E) and Tesla 115 kV (protect against P2 Tesla 115 kV Section 1D &amp; 2D) and install a 3<sup>rd</sup> 230/115 kV transformer at Bellota (protect against P6 Bellota 230/115 kV Transformers #1 &amp; #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 believes that a broader approach will meet the systems reliability needs, while ensuring the least cost to rate payers, and will demonstrate adherence to the ISO's planning standards.</p>	<p>In this planning cycle, the CAISO evaluated substation upgrades and the SPS to address the P2-4 contingency at Bellota substation and recommended the SPS to address the issue as it was the most cost-effective solution to meet performance requirements.</p> <p>Currently the CAISO is working with PG&amp;E to evaluate substation upgrade and SPS options to address P2-4 issues at Tesla substation. The CAISO is planning to perform a comprehensive review of different alternatives to address the P2-4 issue at Tesla substation and propose the preferred alternative in the next planning cycle. If feasible the SPS or substation upgrades at Tesla appear to be the least cost solution to satisfy the performance requirements.</p>

No	Comment Submitted	CAISO Response
6c	<p><b>Oakland Reliability Issues and Oakland – Sobrante 230 kV Transmission Solution</b></p> <p>In the 2018-2019, and 2019-2020 TPP cycle, the CAISO indicates that it 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. At the February 7<sup>th</sup> stakeholders conference, CAISO confirmed that the Oakland area load did increase compared to previous cycles. Near term needs are being met by existing local generation. In the mid-term, the Oakland Clean Energy Initiative (OCEI) project may meet mid-term reliability objectives with some modifications made to the portfolio size. CAISO also confirms that the long-term solution for Oakland area is still under evaluation and that the CAISO will continue to monitor load growth in the area along with how the procurement of the OCEI materializes in the future.</p> <p>Horizon West believes that the Northern Oakland Area Reinforcement Project, recently proposed by PG&amp;E, requires multiple transmission upgrades to address the identified reliability issues, is very costly, and will require a very lengthy environmental and construction process. Therefore, Horizon West seeks CAISO's consideration in performing a special assessment of the Oakland and East Bay area and to evaluate portfolio of existing system reinforcement, new transmission elements (such as the Horizon West proposed Oakland –Sobrante 230 KV alternative) in combination with minor upgrades in the Oakland area and/or energy storage solutions, in order to determine the most robust and cost effective long term reliability solution. Detailed cost/benefit assessment should be undertaken to determine the best solution between upgrading the existing grid and new greenfield transmission solutions that will connect the load to strong generation sources.</p>	<p>For the long-term needs in the Oakland area the CAISO will continue to monitor various factors including load growth, DER and local resources development, and effectiveness of the OCEI portfolio. As such, the CAISO didn't approve the component of the PG&amp;E proposed Northern Oakland Area Reinforcement Project that was targeted to address the long-term need in the area. The CAISO also reviewed components of Northern Oakland Area Reinforcement Project that are driven by CPUC GO-95 requirements and found that the scope of work aligns with long-term needs in the area.</p>

7. Imperial Irrigation District (IID) Submitted by: Jesus Martinez		
No	Comment Submitted	CAISO Response
7a	<p>The Imperial Irrigation District (“IID”) thanks the CAISO for the opportunity to provide written comments on the topics presented in the CAISO’s February 7, 2020 stakeholder meeting as part of the 2019-2020 Transmission Planning Process (“TPP”). In these comments, IID responds to the Imperial Smart Wire Solution and the need for further coordination with CAISO concerning potential future geothermal interconnections. IID reserves the right to comment on any other matter that is part of or becomes part of the 2019-2020 TPP.</p> <p>With regard to the Imperial Smart Wires Solution the CAISO indicated that this proposed solution “... may show an encouraging benefit to cost ratio for reducing the LCR need” when compared to the S-Line Series Reactor Project which was included in the CAISO’s 2018-2019 Transmission Plan. As was stated, IID understands that this solution will be considered in the future once the design and configuration of the 230kV S-line upgrade project is finalized. The CAISO’s previous response to IID’s prior comments lists a number of alternative Local Capacity Requirements (“LCR”) reduction options, which were discussed during the previous Transmission Plan development (2018-2019). IID urges the CAISO to continue considering all other identified alternatives and to share with its stakeholders additional details regarding its analyses.</p>	The comment has been noted.
7b	<p>IID would still like to propose the further analyses of additional dynamic solutions, such as phase shifting, which would offer greater operational flexibility than a static solution such as the previously proposed series reactors. As the 230kV S-line flow limiting project (Either Smart Submitted by Wire or series reactor) analysis is focused on benefits to the CAISO ratepayer, IID would need to assess the project for potential impacts to its area. IID looks forward to working with the CAISO in the further analysis of this proposal as well as the development and evaluation of potential of alternatives.</p>	The comment has been noted.
7c	<p>IID was pleased to see that its recommendation as to the likely location of future geothermal resources within the IID BA provided during the base case building process was fulfilled. As stated the location was chosen based on the multiplication of existing IID queue projects. With it being a multiplication of studied projects not all infrastructure needs were assessed at the time of the</p>	The comment has been noted.

No	Comment Submitted	CAISO Response
	<p>base case submittals to CAISO. Since then IID has performed preliminary assessments as to the required network upgrades and Remedial Action Schemes necessary to bring those additional geothermal interconnections online within its BA area. IID looks forward to coordination with the CAISO on the detailed assessments regarding the mapping and implementation of geothermal resources out of the Imperial Valley area to meet the Integrated Resource Plan (IRP) portfolios. It is further noted that the CAISO has indicated its support of the utilization of geothermal resources located in the Salton Sea Geothermal region.</p>	

**8. Large-scale Solar Association (LSA) and Solar Energy Industries Association (SEIA)**  
**Submitted by: Susan Schneider, Consultant to LSA and SEIA on this matter**

No	Comment Submitted	CAISO Response												
8a	<p>Deliverability assumptions in Deliverability Assessment</p> <p>The generation-capacity portfolio numbers regarding Full Capacity Deliverability Status (FCDS) in the TPP studies are shown below.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr style="background-color: #e1eef6;"> <th style="text-align: center;">TPP STUDY</th> <th style="text-align: center;">BASE</th> <th style="text-align: center;">SENSITIVITY 1</th> <th style="text-align: center;">SENSITIVITY 2</th> </tr> </thead> <tbody> <tr> <td>Deliverability Assessment (FCDS)</td> <td style="text-align: center;">5,200 (54%)</td> <td style="text-align: center;">9,290 (50%)</td> <td style="text-align: center;">7,714 (46%)</td> </tr> <tr> <td>Production-cost modeling (PCM)/snapshot study capacity</td> <td style="text-align: center;">9,861</td> <td style="text-align: center;">18,383</td> <td style="text-align: center;">16,822</td> </tr> </tbody> </table> <p>It appears that only about half the new capacity in these portfolios is assumed to be FCDS. This assumption simply does not reflect reality in the procurement market today.</p> <p>Virtually every LSE competitive solicitation requires FCDS. Several large LSEs claim to have contracted enough renewable supply to meet the 50% Renewables Portfolio Standard (RPS) requirement, and nearly all the competitive solicitations resulting in those contracts required FCDS. Projects contracted as a result of those competitive solicitations that fail to acquire FCDS can face severe financial penalties and/or cancellation of their Power Purchase Agreements (PPAs).</p> <p>The Solar Companies understand that the portfolios used by the CAISO are largely based on those provided by the CPUC, and that it is unlikely that the CAISO will completely re-do its analyses at this late stage of this cycle. However:</p> <ul style="list-style-type: none"> <li>• The CAISO is not legally obligated to use the CPUC portfolios as is and, in fact, has occasionally adjusted those assumptions in the past.</li> <li>• LSA has pointed out this problem in the past, but the CAISO does not seem to have made any public effort to work with the CPUC to develop more realistic assumptions.</li> </ul>	TPP STUDY	BASE	SENSITIVITY 1	SENSITIVITY 2	Deliverability Assessment (FCDS)	5,200 (54%)	9,290 (50%)	7,714 (46%)	Production-cost modeling (PCM)/snapshot study capacity	9,861	18,383	16,822	<p>The portfolios used by the CAISO are not just “largely based” on those provided by the CPUC, they are precisely the portfolios transmitted by the CPUC.</p> <p>The CAISO relies on portfolios provided by the CPUC cognizant of the CPUC’s leadership role in resource planning, and accordingly, in accordance with the May 2010 memorandum of understanding between the CAISO and the California Public Utilities Commission (CPUC), and in coordination with the California Energy Commission (CEC), the CPUC develops the resource portfolios to be used by the CAISO in its annual transmission planning process (TPP).</p> <p>The FCDS resources were identified as part of the portfolios transmitted by the CPUC. The CPUC’s IRP process is the appropriate forum to address concerns and elevate comments about the amount of FCDS resources that should be planned.</p>
TPP STUDY	BASE	SENSITIVITY 1	SENSITIVITY 2											
Deliverability Assessment (FCDS)	5,200 (54%)	9,290 (50%)	7,714 (46%)											
Production-cost modeling (PCM)/snapshot study capacity	9,861	18,383	16,822											



No	Comment Submitted	CAISO Response
	<p>Unrealistically low FCDS assumptions are likely already leading to unrealistic estimates of the transmission needed to accommodate LSE-procured resources (see below), meaning that area constraints requiring mitigation for required deliverability will simply not be mitigated.</p> <p>This issue will be even more critical going forward, assuming FERC approval of the CAISO's new deliverability methodology, since that will lower resource-dispatch assumptions further in the Policy-Driven analyses. It is important to address this issue promptly in the next TPP cycle to avoid exacerbating the transmission need under-assessment problem.</p>	
8b	<p><b>Criteria for recommending Policy-Driven transmission upgrades</b></p> <p>The Solar Companies are very concerned that the CAISO studies in this TPP cycle identify numerous overloads without even one CAISO recommendation for mitigation other than increased curtailment of renewables. Specifically, the Plan analyses revealed very high levels of forecasted curtailments in most areas, even under the optimistic 2,000 MW Export scenarios, and the Solar Companies believe that these analysis results warrant designation of Category 1 and/or 2 transmission upgrades to address them.</p> <ul style="list-style-type: none"> <li>• <b>The Deliverability Assessment</b> (FCDS resources only) curtailment summary by zone is shown below. The 2,000 MW net export scenarios show 15-22% curtailment in half of the renewables areas studied, including the top three areas with highest expected renewable-capacity development (shown in yellow highlight). The sensitivity cases for this export assumption show curtailments in the 23-42% range in these key regions.</li> </ul>	<p>The comment inaccurately refers to “the deliverability assessment curtailment summary”. Deliverability assessment did not capture any curtailment. The production cost modeling (PCM) simulations identified the curtailment shown in the comment.</p> <p>First, the benefits of mitigating curtailment observed in the base portfolio are assessed as part of the economic assessment in the TPP.</p> <p>Second, the areas highlighted in the comment demonstrate that the relaxation of net export limit resulted in significantly lower percentage curtailment. This is a good indicator of transmission limitations not being the dominant driver of curtailment in these zones.</p> <p>The CAISO recognizes that the amount of curtailment in certain zones was significantly high as shown in the table presented in the comment. In response to this observation, the CAISO notes that it has committed to study a high Energy Only (EO) portfolio as a sensitivity to evaluate curtailment and corresponding mitigation options during the 2020-2021 TPP policy assessment.</p>

No	Comment Submitted						CAISO Response	
	TRANSMISSION ZONE	BASE		SENS-01		SENS-02		
		2k MW net export limit (13%)	Export limit relaxed (3%)	2k MW net export limit (22%)	Export limit relaxed (7%)	2k MW net export limit (21%)		Export limit relaxed (6%)
	Northern California	2%	0%	9%	0%	9%	1%	
	Solano	1%	0%	3%	0%	3%	0%	
	Central Valley/Los Banos	9%	11%	20%	29%	16%	26%	
	Westlands	12%	5%	24%	15%	21%	11%	
	Greater Carrizo	16%	8%	21%	15%	19%	15%	
	Tehachapi	13%	4%	21%	9%	20%	11%	
	Kramer/Inyokern (Greater Kramer)	21%	12%	32%	25%	32%	22%	
	Riverside East and Palm Springs	15%	0%	30%	1%	30%	1%	
	Greater Imperial	20%	0%	41%	7%	42%	8%	
	Southern NV/Eldorado/Mtn. Pass	22%	6%	23%	11%	27%	8%	
8c	<p>The analysis details further identify many areas with specific serious base-case overloads that only worsen under sensitivity assumptions, including:</p> <ul style="list-style-type: none"> <li>➤ <b>Greater Kramer</b>, where the worst overloads are on the Lugo 500/230 kV transformer bank 1 or 2, with an outage of the other bank – 123% Base-case loading, 179% Sensitivity 2 loading. The Plan says “mitigating Base Portfolio contingency overloads...would require pre-contingency curtailment of renewable resources in this zone” under study conditions.</li> <li>➤ <b>Southern NV/Eldorado/Mountain Pass</b>, where serious overloads include: <ul style="list-style-type: none"> <li>Mercury-Northwest 138 kV line, with an outage of the Northwest-Desert View 230 kV line (246% Base-case loading, 268% Sensitivity 1 loading); and</li> <li>Pahrump 230/138 kV transformer bank 1 &amp; 2, with outages of the Pahrump 230/138 kV transformer bank and Pahrump-Innovation 230 kV line (149% Base-case loading, 132% Sensitivity 2 loading)</li> </ul> </li> <li>➤ <b>Solano/Northern California</b>, where the Plan states that Vaca Dixon-Lambie 230 kV line overloads are “likely to result in increased existing renewable curtailment because curtailment of non-renewable generation would not be adequate to mitigate the issues.”</li> </ul>						<p>Contrary to what the comment states, the analysis that resulted in overloads mentioned in the comment did model and dispatch Energy Only generation. These overloads were observed in the snapshot assessment which looked at hours that represent high renewable potential. Therefore, the statement about the analysis not assuming dispatch of nearly half of the renewable portfolio is not correct.</p> <p>Please refer to the response to comment 8b for the CAISO’s response regarding curtailment observed in the PCM.</p>	

No	Comment Submitted	CAISO Response																											
	<p>Finally, since this analysis does not assume any dispatch of Energy Only generation – which comprises nearly half the CPUC renewables portfolio – these numbers undoubtedly underestimate the total renewables curtailment under these study assumptions.</p> <ul style="list-style-type: none"> <li>• <b>The PCM analyses</b>, which consider both FCDS and Energy Only resources, likewise show significant renewables curtailments (15-27%) under 2,000 MW export scenarios, as seen below.</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">SCENARIO</th> <th colspan="2">BASE</th> <th colspan="2">SENS-01</th> <th colspan="2">SENS-02</th> </tr> <tr> <th>2k MW net export limit</th> <th>Export limit relaxed</th> <th>2k MW net export limit</th> <th>Export limit relaxed</th> <th>2k MW net export limit</th> <th>Export limit relaxed</th> </tr> </thead> <tbody> <tr> <td>Total Wind &amp; Solar Generation (TWh)</td> <td>81.42</td> <td>91.21</td> <td>91.21</td> <td>109.30</td> <td>93.88</td> <td>112.00</td> </tr> <tr> <td>Total Curtailment (TWh)</td> <td>12.12 (15%)</td> <td>2.34 (3%)</td> <td>25.77 (28%)</td> <td>7.68 (7%)</td> <td>25.16 (27%)</td> <td>7.04 (6%)</td> </tr> </tbody> </table> <p>Curtailments are considerable in several high-renewables areas. Over 2,500 MW of generation is shown as curtailed under the 2,000 MW net export scenario for each of the SCE Tehachapi and SCE East of Lugo areas (over 4,000 MW each under sensitivity conditions), and curtailments are also significant for the SCE Eastern and PG&amp;E Westlands-Fresno-Kern areas under both base and sensitivity conditions.</p>	SCENARIO	BASE		SENS-01		SENS-02		2k MW net export limit	Export limit relaxed	2k MW net export limit	Export limit relaxed	2k MW net export limit	Export limit relaxed	Total Wind & Solar Generation (TWh)	81.42	91.21	91.21	109.30	93.88	112.00	Total Curtailment (TWh)	12.12 (15%)	2.34 (3%)	25.77 (28%)	7.68 (7%)	25.16 (27%)	7.04 (6%)	
SCENARIO	BASE		SENS-01		SENS-02																								
	2k MW net export limit	Export limit relaxed	2k MW net export limit	Export limit relaxed	2k MW net export limit	Export limit relaxed																							
Total Wind & Solar Generation (TWh)	81.42	91.21	91.21	109.30	93.88	112.00																							
Total Curtailment (TWh)	12.12 (15%)	2.34 (3%)	25.77 (28%)	7.68 (7%)	25.16 (27%)	7.04 (6%)																							
8d	<p>Despite these considerable overloads even under base-case conditions, the Plan does not recommend any Condition 1 or even Condition 2 upgrades. Instead, the Plan uniformly recommends only increasing curtailments (including renewables curtailments) to address these situations, e.g., observing that a higher need for “portfolio resources to participate in RASs and/or experience congestion management was evident in several zones.”</p> <p>There was no attempt in the Plan to determine whether the significant curtailments identified could impair California’s ability to meet its greenhouse-gas (GHG) targets. The CPUC portfolios were developed specifically to attain those goals, and it’s hard to see how that would be possible if a large portion of that capacity is curtailed a large portion of the time.</p> <p>The CAISO offered several reasons in the stakeholder-meeting discussion for not recommending any upgrades despite the numerous indications that upgrades are needed. Some of those reasons are described below.</p>	Please see response to 8b.																											

No	Comment Submitted	CAISO Response
8e	<p>The relaxed-export limit scenarios show fewer curtailments for most areas. LSA has long argued that even the 2,000 MW export limit is overly optimistic, and any assumption of no limits other than physical are even more unrealistic.</p> <p>The CAISO remains highly import-dependent, i.e., there is no sign yet that the very significant market transformations needed to convert CAISO markets into anything close to a typical 2,000 MW net export position have yet begun. Moreover, a very large proportion of the new generation under consideration and/or development outside California is intended to serve the California market; the Solar Companies know of no jurisdictions that include in their resource planning widespread (or any) renewable or other generation imports from California.</p> <p>The Solar Companies believe that the severe results from the 2,000 MW export scenarios call for Category 1 recommendations or, at a minimum, some Category 2 designations that can be examined more closely in the next cycle.</p> <p>- <b>“Things might change.”</b> Of, course, things might always change, and there are no certainties in these analyses. Most notably, implementation of the CAISO’s new deliverability methodology might improve results of the Deliverability Assessment.</p> <p>Nevertheless, these analyses are performed so that the results can be used for reasoned decision-making. The CAISO said itself that implementation of the new deliverability methodology might not free up that much deliverability given the high volume of recent energy storage addition requests, and associated deliverability transfers from variable-resource capacity to that added storage. Moreover, the new deliverability methodology would not improve results of the PCM assessment.</p> <p>The CAISO has not released any figures from these recent submittals but, particularly if the capacity involved is considerable (and, therefore, the revised deliverability methodology might not impact Deliverability Assessment results significantly), then Category 1 and/or 2 upgrade recommendations are warranted here, based on both study types.</p>	<p>The comment has been noted.</p> <p>The CAISO will review the assumption of the 2000 MW export limit in future planning cycles based on updated historical data and market operation.</p>

No	Comment Submitted	CAISO Response
8f	<p>The CAISO might consider those upgrades in the economic analyses. However, the CAISO does not perform its economic analyses in this manner – e.g., examine areas with the most severe renewables curtailments to see if mitigation would be cost-effective. Instead, the CAISO generally identifies economic studies by examining transmission paths with the highest overall congestion costs. The CAISO's economic analyses in the Plan, for example, did not appear to include any of the areas identified above with the most severe expected renewables curtailments</p>	<p>Contrary to what is stated in the comment, the CAISO's economic analysis included all the areas with the most severe expected curtailment mentioned in the earlier comments (8b and 8c). The CAISO, modeled the base portfolio transmitted by the CPUC in the economic assessment. However, as mentioned in response to 8b, the CAISO plans to expand the scope of its analysis in the next planning cycle.</p>

9. Pacific Gas & Electric (PG&E) Submitted by: Matt Lecar		
No	Comment Submitted	CAISO Response
9a	<p>Plan states: "Rebuilding of [the] Moraga-Oakland X 115 kV four-line path with three lines and reconductoring of the Moraga-Claremont #1 &amp; #2 115 kV lines are primarily driven by CPUC GO-95 compliance and the work will be performed under PG&amp;E's maintenance budget. The ISO reviewed and concurs [with] the proposed scope of work.</p> <p>PG&amp;E agrees that these project elements fit the definition of safety and maintenance projects that replace existing grid facilities and equipment due to age, conditions, or similar reasons, and that CAISO's role in such cases is to study and concur with the proposed scope. However, PG&amp;E notes that the Moraga-Oakland X project as recommended is not a simple "like-for-like" upgrade of the existing facilities, as the project entails work that will result in changes to grid topology, by removing one of the four lines, and changes to the capacity of two other lines that run in parallel. Changes to topology and capacity can impact the Bulk Electric System (BES). Therefore, while PG&amp;E thanks CAISO for its concurrence with the proposed scope, PG&amp;E requests that CAISO confirm that it has reviewed the new proposed capacity and system topology to ensure that they meet all applicable NERC Bulk Electric System (BES) reliability standards.</p>	<p>The CAISO will model the proposed scope in the subsequent cycles starting 2020-2021 TPP and will continue to assess its impact on the BES performance.</p>

10. Smart Wires Submitted by: Chris Ariante		
No	Comment Submitted	CAISO Response
10a	<p>For the Greater Bay Area Contra Costa Sub-area Local Capacity Reduction Study, section 4.10.9:</p> <p>We are asking CAISO to recommend this year, in this 2019-20 TPP cycle, Smart Wires' proposed project to mitigate the Greater Bay Area Contra Costa Sub-area Tesla-Delta Switchyard 230 kV LCR constraint, contingent upon the results of the already underway 2021 LCR Study for the Contra Costa Sub-area. Smart Wires also requests that the CAISO adjust the capital cost estimate for the line reactance solution proposed, shown in table 4.10-23, to reflect the cost estimate previously submitted and to update the solutions B/C ratio accordingly in the final report.</p>	<p>The capital cost estimate for the line reactor and the B/C ratio have been revised to reflect the cost estimate previously submitted. Regarding the overall benefit from the line reactor is currently being evaluated as part of the 2021 LCR study considering the need of resources from this local area to satisfy the overall Greater Bay Area requirement and for black start purpose.</p>
10b	<p>For sections 2.4.5 and 2.4.6 of the draft report, regarding the COI reliability assessment, we are asking CAISO to:</p> <ol style="list-style-type: none"> <li>a. Share with stakeholders the cost estimates for the recommended reliability mitigation measure of implementing an SPS to bypass series capacitors on the Round Mountain-Table Mountain 500 kV lines #1 and #2 upon the loss of one of these lines, and</li> <li>b. Recognize that the recommended reliability mitigation measures as mentioned in Section 2.4.6, have economic implications and should be included in an economic evaluation along with all other proposals for alleviating COI overloads before implementation.</li> </ol>	<p>The CAISO's recommended mitigation is for upgrades to an existing for the reliable operation of the grid as opposed to adding additional reactive devices and infrastructure to the system. With this PG&amp;E is responsible for the recommended protection systems and the CAISO will continue to work with PG&amp;E and provide updates in the next planning cycle.</p>
10c	<p><b>Greater Bay Area Contra Costa Sub-area Local Capacity Reduction Study - Section 4.10.9 Final Draft Report</b></p> <p>We ask the CAISO to recommend Smart Wires' proposed solution for the Contra Costa Sub-area in the 2019-20 TPP final report, contingent upon the results of the 2021 LCR Study.</p> <p>Smart Wires proposed a line reactance project in the 2019-20 TPP which the CAISO found could displace 1,275 MW of LCR in the Contra Costa Sub-area. In the draft TPP report, the CAISO calculated the benefit to cost ratio for this project using a total capital cost estimate of \$14.4M. However, Smart Wires</p>	<p>Please see response to 10a.</p>



No	Comment Submitted	CAISO Response
	<p>believes this number was mistakenly utilized, as the capital cost estimate initially submitted was \$4 - \$5.4M. Upon re-calculating the BC ratio with the most conservative cost estimate of \$5.4M, and applying the scaling factor to convert to total capital cost per the TEAM, the BC ratios are found to be 2.1 and 3.9 based on NP26 and SP26 system capacity costs respectively. Smart Wires requests that the CAISO update the final TPP report to reflect these costs and the BC ratio accordingly.</p> <p>Smart Wires also recognizes that the ongoing 2021 LCR Study will provide additional insight into the LCR requirements as CAISO stated on page 291 of the draft report. We anticipate the 2021 LCR study will, among other things, identify the number of MW of the Contra Costa Sub-area LCR that could be displaced by a near-term transmission solution.</p> <p>2.1 and 3.9 based on NP26 and SP26 system capacity costs respectively. Smart Wires requests that the CAISO update the final TPP report to reflect these costs and the BC ratio accordingly.</p> <p>Smart Wires also recognizes that the ongoing 2021 LCR Study will provide additional insight into the LCR requirements as CAISO stated on page 291 of the draft report. We anticipate the 2021 LCR study will, among other things, identify the number of MW of the Contra Costa Sub-area LCR that could be displaced by a near-term transmission solution.</p>	
10d	<p><b>California-Oregon Intertie Reliability Assessment and Related Smart Wires Request Window Proposal, Sections 2.4.4 and 2.4.5</b></p> <p>Section 2.4.4, page 81 the CAISO states:  <i>"Although the ISO agrees that the proposed [Smart Wires] project can mitigate the identified overloads, there is not a reliability need for such project since the overload can be mitigated by bypassing series capacitors on the Round Mountain-Table Mountain 500 kV lines with contingencies, operating within the COI nomogram or by congestion management reducing generation in the area of overloads. This project could be submitted as a potential economic study request in the next transmission planning cycle."</i></p> <p>Smart Wires will re-submit this project proposal as an Economic Study Request in the 2020-21 TPP. In the meantime, the report recommends implementation</p>	<p>The comment has been noted.</p>

No	Comment Submitted	CAISO Response
	<p>of an SPS that bypasses the Round Mountain-Table Mountain series capacitors and utilizing congestion management to mitigate the reported COI overloads. Since congestion management and SPS implementations come at a cost to ratepayers, Smart Wires requests that the CAISO:</p>	
10e	<p>Share with stakeholders the cost estimates for the recommended reliability mitigation measure of implementing an SPS to bypass series capacitors on the Round Mountain-Table Mountain 500 kV lines #1 and #2, and</p> <p>b. Recognize that the recommended reliability mitigation measures as mentioned in Section 2.4.6, have economic implications and should be included in an economic evaluation along with all other proposals for alleviating COI overloads before implementation.</p>	Please see response to 10b
10f	<p>Conclusions</p> <p>In Summary, Smart Wires recommends that the CAISO final 2019-2020 TPP Report:</p> <ol style="list-style-type: none"> <li>1. Recommend the Smart Wires' proposed solution for the Contra Costa Sub-area contingent upon the results of the 2021 LCR study,</li> <li>2. Report the cost of the recommended SPS implementation for COI, and</li> <li>3. Acknowledge in the report that the recommended COI mitigation measures have economic implications and should be compared to the other alternatives submitted in the 2020 – 2021 economic request window before implementation.</li> </ol> <p>Smart Wires recognizes the large amount of work that goes into each TPP cycle and greatly appreciates CAISO's consideration of the comments outlined in this document. We thank you for this opportunity to comment and are ready to provide assistance should the CAISO need additional information about Smart Wires' proposals or comments.</p>	Please see responses above.

11. Transmission Agency of Northern California (TANC) Submitted by: David Oliver		
No	Comment Submitted	CAISO Response
11a	TANC strongly supports the addition of the California-Oregon Intertie (COI) Nomogram sensitivity study in this year's DTP and agrees on the importance of maintaining the current COI rating.	The comment has been noted.
11b	Regarding the North-to-South (N-S) Study, TANC supports the recommended solution of installing a Remedial Action Scheme (RAS) that will bypass the series capacitors on Round Mountain –Table Mountain 500 kV lines to prevent the thermal overload.	The comment has been noted.
11c	Regarding the South-to-North (S-N) Study, TANC (1) suggests that CAISO remove the first paragraph on page 83 as it appears to be intended for the COI N-S flows section, (2) agrees that the primary driver of the Table Mountain 500/230-kV transformer overload is low regional load and Northern California Hydro (NCH) generation levels also located in the region, and (3) agrees that the output of the Shasta and Keswick hydro generation could impact the thermal loading on the Olinda 500/230-kV transformer during off-peak load conditions and high COI S-N flows, but suggests the CAISO use a broader narrative since other generation within the region also have a similar impact.	The comment has been noted.
11d	Regarding the reliability studies, TANC (1) strongly supports the recommended mitigation option of implementing the RAS to bypass the series capacitors on the overloaded Round Mountain-Table Mountain 500 kV line, (2) agrees that the option of reducing COI N-S flows according to the seasonal Nomogram was not an appropriate solution, and (3) suggests adding the base case thermal loading of the Table Mountain 500/230-kV transformer to the Thermal Overloads Table in Appendix C.	The comment has been noted
11e	<b>1. Nomogram/Hydro Dispatch</b> TANC strongly supports the addition of the COI Nomogram sensitivity study in this year's Transmission Planning Process (TPP) and firmly agrees with the importance of maintaining the current COI rating in the long-term planning horizon. With regards to the results and related discussion in the draft TPP, TANC provides the following comments.	The comment has been noted.

No	Comment Submitted	CAISO Response
11f	<p><b><i>South-to-North (S-N) Study</i></b></p> <p>TANC appreciates the CAISO including the COI S-N nomogram study since the COI S-N Nomogram recently created in 2019. For that reason, the relationships between the COI SN transfers, NCH generation levels, and system load to the system limitations are less understood as those captured in the much more thoroughly studied COI N-S nomogram. However, TANC would like to make the following comments and suggestions that pertain to the narrative that summarizes the results of the COI S-N study in the DTP on pages 83 to 85. □</p> <p>Remove from page 83, paragraph 1 of the “S-N flows on COI” section: The paragraph appears to be misplaced and intended for the COI N-S flows study section.</p> <ul style="list-style-type: none"> <li>• Table Mountain 500/230-kV transformer overload: TANC agrees with the CAISO’s conclusion that the primary driver of the Table Mountain 500/230-kV transformer overload is low regional load and NCH generation levels also located in the region.</li> <li>• Olinda 500/230-kV transformer overload: TANC agrees that the output of the Shasta and Keswick hydro generation could impact the thermal loading on the Olinda 500/230-kV transformer during off-peak load conditions and high COI S-N flows. However, TANC suggests that the CAISO use a broader narrative since other generation within the region also has a similar impact.</li> </ul>	<p>The comment has been noted</p>

12. Western Grid Development (Western Grid) Submitted by: Martin Walicki		
No	Comment Submitted	CAISO Response
12a	<p><b>1. PTEP LCR Reduction Benefits</b></p> <p>We appreciate the CAISO's determination that the PTEP will provide net 1,993 MW's of LCR reduction benefits by reducing the LCRs in the LA Basin and, thereby, allowing 1,993 MW's of existing gas plants to close in the West LA Basin and Big Creek/Ventura area. <i>Draft TPP Report at page 339.</i> However, the CAISO applied a very conservative value to the LCR benefits. In this regard, the CAISO stated that:1 The [PTE] project provides other benefits for which the CAISO is valuing with conservative assumptions at this time, due to uncertainty regarding future reliance on gas-fired generation for system and flexible needs. The CAISO went on to explain that: The uncertainty regarding the extent to which gas-fired generation will be needed to meet those system and flexible capacity requirements necessitated taking a conservative approach in this planning cycle in assigning a value to upgrades potentially reducing local gas-fired generation capacity requirements. The CAISO accordingly placed values on benefits associated with reducing local gas-fired generation capacity requirements <i>primarily on the difference between the relevant local area capacity price and system capacity prices. This conservative assumption was a key difference between the economic benefits calculated in this study, and the economic assessments stakeholders provided in support of their projects. The ISO recognizes that the capacity value of many of these projects will need to be revised when actionable direction on the need for gas-fired generation for system and flexible needs is available</i></p>	Please refer to the responses below.
12b	<p>Western Grid believes that the LCR benefits when valued based on known facts demonstrates the PTEP is an economic alternative to procuring local resources and provides other benefits as well. With respect to the LCR studies performed in this year's cycle CAISO states on page 264 of the Draft TPP Report:</p> <p>These studies were conducted under the economic analysis framework, as there is currently not a basis for identifying solutions on a reliability basis or policy basis. If there are sufficient local resources to maintain reliability, reducing the use of those resources is not necessary to meet NERC or ISO planning standards. Further, there are no applicable federal or state policies at</p>	Please refer to the responses below.

No	Comment Submitted	CAISO Response
	<p>this time that necessitate planning for reduced local capacity levels beyond state policies for generation relying on coastal waters for once-through-cooling, and those needs have been addressed in previous transmission plans.</p>	
12c	<p>Western Grid believes CAISO did not achieve its objective of providing helpful information to state policy makers and regulatory agencies by using conservative values for local capacity. Using realistic values for local capacity would have provided better information to CPUC for ensuring future policy decisions will evaluate the most cost-effective alternatives especially when considering the benefits of long-lead solutions such as the PTEP. The CAISO's valuation method produced prices in the LA Basin local capacity areas of \$1.39 and \$1.89/kW Month. However, as the CAISO found, the PTEP reduces the need for local capacity in those areas by 1,993 MW's thereby avoiding the need to purchase that amount of local capacity and, thus, saving the cost differential between that local capacity and the lower cost of the PTEP.</p>	<p>The CAISO's economic evaluation was assessing whether or not to consider seeking approval of economic-driven transmission projects, and accordingly relied on the prudent assumptions noted. The local capacity costs utilized in the CAISO's analysis is based on publicly available information from the CPUC. In addition, the latest CPUC Integrated Resource Plan continues to rely on the majority of the 1993 MW resources to meet system resource needs over CAISO transmission planning horizon. As a result, eliminating the local capacity need for those resources would simply result in the procurement of the same resources for system resource adequacy needs. However, the CAISO will continue to monitor the IRP process and update our transmission planning assumptions accordingly, and continue to support the IRP process with transmission information.</p>
12d	<p>Based on information publicly available from both the CPUC and FERC public files, Western Grid has been able to confirm that the Load Serving Entities("LSEs") have been incurring LCR costs that far exceed the cost of the PTEP. Based on the publicly available data reflected in Table 1, the weighted average price of local capacity contracts in the Western LA Basin is about \$15.84/kW-month<sup>3</sup>. Even if the contract prices for the three Once Through Cooling ("OTC") units planned for retirement and shown in Table 2 are included, the average weighted price for gas-fired generation in the Western LA Basin is about \$8.90/kW-month (Table 3). This is based on an analysis of the publicly available data for existing LCR contracts totaling roughly 3,644 MW's of existing gas plants in the LA Basin. By way of comparison, the LCR contract price needed to cover the PTEP cost is approximately \$7.35/kW-month<sup>4</sup>. Obviously, the price of LCRs will only rise in the future as the CPUC starts to plan for the retirement of the non-OTC gas units, particularly since there is no clear resource that can replace the reliability and flexibility currently provided by</p>	<p>The CAISO did not see a link or other means of specifically identifying the "CPUC and FERC public files" referenced by Western Grid, so we have not been able to review those sources of information. Please refer to the above response.</p>

No	Comment Submitted	CAISO Response																																																																				
	<p>the gas plants other than an HVDC circuit like PTEP's with its associated converter stations.</p> <p><i>Table 1. 2019 Average Capacity Cost for Western LA Basin Gas-fired Resources (not including retiring OTC units)</i></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;">Western LA Basin Generators (natural gas-fired)</th> <th style="width: 15%;">2019 Avg Capacity Cost (\$/kW-Month)</th> <th style="width: 15%;">NQC (MW)</th> <th style="width: 40%;">\$/YEAR</th> </tr> </thead> <tbody> <tr> <td>El Segundo Energy Center</td> <td>19.76</td> <td>526.68</td> <td>\$124,907,429</td> </tr> <tr> <td>Malburg power plant</td> <td>26.84</td> <td>134</td> <td>\$43,153,574</td> </tr> <tr> <td>Walnut Creek Units</td> <td>17.16</td> <td>480.65</td> <td>\$98,968,457</td> </tr> <tr> <td>Long Beach Peakers (Hinson)</td> <td>4.395</td> <td>260</td> <td>\$13,712,400</td> </tr> <tr> <td>Harbor</td> <td>3.925</td> <td>99.99</td> <td>\$4,709,529</td> </tr> <tr style="background-color: #fce4d6;"> <td><b>Total</b></td> <td><b>14.42</b></td> <td><b>1501.32</b></td> <td><b>\$285,451,389</b></td> </tr> <tr style="background-color: #e0e0e0;"> <td><b>Weighted Average Cost</b></td> <td><b>15.84</b></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>Table 2. 2019 Average Capacity Cost for Western LA Basin Gas-fired Resources (retiring OTC units)</i></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;">Retiring OTC Generators in Western LA Basin</th> <th style="width: 15%;">2019 Avg Capacity Cost (\$/kW-Month)</th> <th style="width: 15%;">NQC (MW)</th> <th style="width: 40%;">\$/YEAR</th> </tr> </thead> <tbody> <tr> <td>Alamitos*</td> <td>3.65</td> <td>335.06</td> <td>\$14,675,628</td> </tr> <tr> <td>Huntington Beach*</td> <td>3.65</td> <td>451.55</td> <td>\$19,777,890</td> </tr> <tr> <td>Redondo Beach</td> <td>4.25</td> <td>1355.73</td> <td>\$69,142,230</td> </tr> <tr style="background-color: #fce4d6;"> <td><b>Total</b></td> <td><b>3.85</b></td> <td><b>2142.34</b></td> <td><b>\$103,595,748</b></td> </tr> <tr style="background-color: #e0e0e0;"> <td><b>Weighted Average Cost</b></td> <td><b>4.03</b></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>Table 3. Summary 2019 Average Capacity Cost for Western LA Basin Gas-fired Resources</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">2019 Avg Capacity Cost (\$/kW-Month)</th> <th style="width: 15%;">NQC (MW)</th> <th style="width: 40%;">\$/YEAR</th> </tr> </thead> <tbody> <tr style="background-color: #fce4d6;"> <td><b>Total Table 1 and Table 2</b></td> <td><b>10.45</b></td> <td><b>3644</b></td> <td><b>\$389,047,137</b></td> </tr> <tr style="background-color: #e0e0e0;"> <td><b>Weighted Average Cost</b></td> <td><b>8.90</b></td> <td></td> <td></td> </tr> </tbody> </table>	Western LA Basin Generators (natural gas-fired)	2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR	El Segundo Energy Center	19.76	526.68	\$124,907,429	Malburg power plant	26.84	134	\$43,153,574	Walnut Creek Units	17.16	480.65	\$98,968,457	Long Beach Peakers (Hinson)	4.395	260	\$13,712,400	Harbor	3.925	99.99	\$4,709,529	<b>Total</b>	<b>14.42</b>	<b>1501.32</b>	<b>\$285,451,389</b>	<b>Weighted Average Cost</b>	<b>15.84</b>			Retiring OTC Generators in Western LA Basin	2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR	Alamitos*	3.65	335.06	\$14,675,628	Huntington Beach*	3.65	451.55	\$19,777,890	Redondo Beach	4.25	1355.73	\$69,142,230	<b>Total</b>	<b>3.85</b>	<b>2142.34</b>	<b>\$103,595,748</b>	<b>Weighted Average Cost</b>	<b>4.03</b>				2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR	<b>Total Table 1 and Table 2</b>	<b>10.45</b>	<b>3644</b>	<b>\$389,047,137</b>	<b>Weighted Average Cost</b>	<b>8.90</b>			
Western LA Basin Generators (natural gas-fired)	2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR																																																																			
El Segundo Energy Center	19.76	526.68	\$124,907,429																																																																			
Malburg power plant	26.84	134	\$43,153,574																																																																			
Walnut Creek Units	17.16	480.65	\$98,968,457																																																																			
Long Beach Peakers (Hinson)	4.395	260	\$13,712,400																																																																			
Harbor	3.925	99.99	\$4,709,529																																																																			
<b>Total</b>	<b>14.42</b>	<b>1501.32</b>	<b>\$285,451,389</b>																																																																			
<b>Weighted Average Cost</b>	<b>15.84</b>																																																																					
Retiring OTC Generators in Western LA Basin	2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR																																																																			
Alamitos*	3.65	335.06	\$14,675,628																																																																			
Huntington Beach*	3.65	451.55	\$19,777,890																																																																			
Redondo Beach	4.25	1355.73	\$69,142,230																																																																			
<b>Total</b>	<b>3.85</b>	<b>2142.34</b>	<b>\$103,595,748</b>																																																																			
<b>Weighted Average Cost</b>	<b>4.03</b>																																																																					
	2019 Avg Capacity Cost (\$/kW-Month)	NQC (MW)	\$/YEAR																																																																			
<b>Total Table 1 and Table 2</b>	<b>10.45</b>	<b>3644</b>	<b>\$389,047,137</b>																																																																			
<b>Weighted Average Cost</b>	<b>8.90</b>																																																																					



No	Comment Submitted	CAISO Response
12e	<p>In terms of the need for system capacity, by order issued November 13, 2019, the CPUC has directed LSEs to purchase 3,300 MW's of system capacity to be in service in the 2021-2023 time period (1-3 years from now).<sup>5</sup> To the extent that additional <i>system</i> capacity is a concern, certainly an additional 1,993 MW's of system capacity can be acquired by the 2027 in-service date of the PTEP (7 years from now). Obviously, system capacity located outside the local capacity areas will be less expensive than capacity located in the local areas. Therefore, system capacity should be located outside the local areas and any such needs are not a basis for keeping gas plants in the local areas in service. Indeed, for this and other reasons, the PTEP will be developed and permitted to the maximum extent possible to allow for expansion. With respect to the "flexibility" of gas fired plants, the PTEP with its associated converter stations are far more flexible than gas fired generation. The PTEP converters with their grid forming attributes, can respond much faster than the synchronous generators used on gas fired units. The faster response applies both in reaction time and impact for AC voltage control and frequency stabilization while providing effective short circuit capacity and system damping requirements.</p>	See response to 12c.
12f	<p><b>Other Benefits of the PTEP</b></p> <p>The PTEP will allow the gas fired plants in the local capacity (coastal) areas to be replaced with renewable energy (including offshore wind) outside the local area. This will allow the associated high-priced land in the local areas to be used for other purposes. It will also improve air quality particularly in the LA area where the poor air quality falls disproportionately on disadvantaged neighborhoods.</p> <p>In addition to the planned OTC retirements, there are approximately 3,658 MW's of gas fired plants <i>in the Western LA Basin alone</i> that will need to close by 2045 under the requirements of SB 100. The CAISO and major load serving entities have urged the CPUC to start planning for the shutdown of these gas plants as soon as possible and certainly by this summer. Therefore, using PTEP to allow closure of 1,993 MW's of gas plants in the LA basin by 2027 is an appropriate start on this long overdue and challenging effort.</p>	See response to 12c.

No	Comment Submitted	CAISO Response
12g	<p>The PTEP will provide reliability support to the Big Creek/Ventura Area of SCE, specifically within the Goleta area. The Goleta area is subject to voltage collapse issues under a double line (N-2) outage of the two 220 kV lines feeding Goleta substation from Santa Clara substation. The proposed PTEP will mitigate this issue by providing up to 500 MW into Goleta in the event of an outage. Further, as noted in the CAISO 2020 Local Capacity Technical Study, page 165, the Elwood generating station “will only be allowed to retire after suitable replacement is in place at or near the same bus (Goleta)”. The PTEP is proposed to have a direct connection to Goleta substation and would serve as a viable replacement, several times over, for the Elwood generating station and eliminate the need for Elwood to be under a Reliability Must Run (“RMR”) contract.</p> <p>Finally, the PTEP reduces the risk of another wildfire cutting off electric service to the LA coastal area. The PTEP with its associated subsea cables would have allowed the lights to stay on in LA even without the local gas plants when service from the terrestrial lines from the east were cut off this past summer. With the vast number of MW’s in the CPUC resource portfolio assumed to come from solar and batteries that will be located in the interior part of the State and will need additional transmission to reach the coastal population, it makes good sense to have at least some capacity delivered by subsea cables that do not involve the same wild fire risks.</p>	<p>SCE has already procured a sufficient quantity of storage resources in the Santa Clara and Goleta sub-areas to eliminate the need for the Ellwood facility.</p> <p>The local capacity benefits in the Santa Clara sub-area and the comment on the benefits during potential or actual fires have been noted.</p>
12h	<p>3. PTEP Congestion /Production Cost Benefits of PTEP            CAISO production cost results show a load payment increase to CAISO ratepayers of \$10.8 million and a generation net revenue increase of \$21.5 million to CAISO ratepayers. This results in a production cost benefit (ignoring congestion revenue for the moment) of \$10.7 million to CAISO ratepayers. However, this production cost benefit is completely offset from the negative benefit quantified for lost CAISO Transmission revenue of -\$19.2 million, resulting in an overall net negative benefit to CAISO ratepayers of -\$8.5 million. Based on this result, Western Grid has questions regarding CAISO’s TEAM approach based on the following:</p>	<p>Considering a congested transmission path connecting two areas, generally speaking, LMP may increase in the sending area while congestion relief reduces LMP in the receiving area. The changes of LMP may be different from hour to hour. The hourly LMP results are not included in the TPP report, but stakeholders can re-produce the results from the PCM models that the CAISO posted on the Market Participant Portal.</p> <p>In the CAISO’s TEAM benefit calculation, renewable generators are treated as “ISO owned” generators, i.e. their net revenue is considered</p>

No	Comment Submitted	CAISO Response
	<p>a) Figure 4.10-1 of the Draft TPP Report, the PTEP almost completely eliminates the south-to-north Path 26 corridor congestion cost along with other congestion costs identified by CAISO in the base case (~\$15 million reduction on Path 26 and \$4 million on other paths.) At the same time, the CAISO load costs increase by \$10.8 million which implies that overall Locational Marginal Prices (“LMPs”) charged to load increased ~\$0.05/MWh on average<sup>6</sup>. Can CAISO elaborate on the drivers for the LMPs to load increasing by explaining in the final TPP report how the Default Load Aggregation Point (“DLAP”) prices for PG&amp;E, SCE and SDG&amp;E load areas change from the Base Case to the with PTEP scenario?</p> <p>b) Congestion relief would typically tend to decrease LMPs charged to load rather than increase cost. However, CAISO’s results are counter to this expectation. We interpret this result to imply that the effect of increasing cost to load while at the same time decreasing congestion cost is due to multiple hours with negative or depressed LMPs that were driven by oversupply conditions in the Base Case. If this is true, is it possible that the curtailment bid assumption used by CAISO negatively affected the net benefit result of the TEAM analysis for the PTEP? Western Grid questions whether or not the study correctly quantifies production cost benefits with respect to cost to load savings. Is it correct to start with a Base Case scenario where depressed prices due to oversupply conditions show a positive benefit to load? Even though it appears that LSE’s have paid lower costs due to oversupply conditions, the bi-lateral contracts with the suppliers may require them to pay deemed deliveries for the curtailed MWs that are not cleared in the market. This cost for the deemed deliveries is not accounted for in CAISO’s TEAM analysis. Western Grid believes that the avoided curtailment cost needs to be considered as a benefit in the overall determination of the PTEP’s Benefit Cost Ratio (“BCR”).</p>	<p>to benefit CAISO’s ratepayers. Therefore, the changes of renewable generation (or curtailment) have been considered in TEAM calculation.</p>
12i	<p>c) Table 4.10-3 in the Draft TPP Report also shows that PTEP provides a WECC Production cost benefit of \$7.3 million. We conclude from this outcome, in conjunction with the eliminated congestion on Path 26, that the PTEP allows the previously curtailed renewable energy to be delivered to the northern CAISO system or to other Balancing Authority Areas (“BAAs”). We believe this benefit should be included in the BCR calculation for PTEP and categorized as</p>	<p>The TEAM methodology requires the CAISO to assess economic benefit of transmission upgrade from the CAISO ratepayer’s perspective.</p>

No	Comment Submitted	CAISO Response
	<p>a Renewable Integration Benefit which is one of the stated TEAM benefit categories. The CAISO results clearly demonstrate that it will help “mitigate integration challenges, such as over-supply and curtailment, by allowing sharing energy and ancillary services among multiple BAAs.”</p>	