The ISO received comments on the topics discussed at the September 25 and 26, 2019 stakeholder call from the following:

1. 8minute Solar Energy
2. Alameda Municipal Power (AMP)
3. American Wind Energy Association of California (AWEA-California)
4. Bay Area Municipal Association group (BAMx)
5. California Energy Storage Alliance (CESA)
6. California Public Utilities Commission – Staff (CPUC-Staff)
7. California Transmission Project (CTP)
8. GridLiance West (GLW)
9. Imperial Irrigation District (IID)
10. LS Power Development (LS Power)
11. NextEra Energy Resources (NEER)
12. North Gila Imperial Valley #2 (NGIV2)
13. Pacific Gas & Electric (PG&E)
14. Public Advocates Office
15. Silicon Valley Power
16. Transmission Agency of Northern California (TANC)

Copies of the comments submitted are located under the 2019-2020 transmission planning webpage at:

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

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

1. 8minute Solar Energy Submitted by: Bora Akyol and Luke Hansen		
No	Comment Submitted	CAISO Response
1a	The proposal that was presented during the TPP meeting in September related to depth of discharge makes incorrect assumptions with respect to how the plants are actually being contracted and designed. When 8minute signs a contract to deliver a 100MW, 4-hour battery, we handle all of the depth of discharge and degradation issues internally such that the battery will deliver its rated duration and capacity according to the contract. Therefore, we urge the ISO to model the battery system at its full advertised capacity and not using heuristic modeling assumptions to down-rate the power and duration of the battery.	The comment has been noted.
1b	Regarding the operational costs, we are unclear as to why the ISO needs to make assumptions with respect to the operational or replacement costs. The scheduling coordinator bidding to the market integrates these marginal costs to the bid and submits the bid accordingly. Are the operational costs needed to detect market manipulation or for another purpose?	In the ISO's planning production cost model, the "true variable cost" of resources is used instead of bidding price. Lithium-ion batteries' economic lives are measured by the number of cycles and impacted by the depth of discharge or cycle depth, as indicated by the DOE report, the link to which was provided in the presentation in the stakeholder meeting. Therefore, the replacement cost needs to be considered as a variable cost for batteries.
1c	Finally, 8minute has observed that there are currently at least three different working groups (TPP, ESDER4, Hybrid Resources) working on energy storage technology and operations. We would like the ISO to consolidate this work under one working group if possible to reduce administrative and participation overhead and to increase visibility.	The ISO will continue to look for means to consolidate consideration, or, in the alternative, ensure that the progress on issues in one area is coordinated with and fed into other areas. As the transmission planning cycle is set in tariff, each year's transmission planning efforts are based on the best available information and progress on these issues at that time.

2. Alameda Municipal Power (AMP) Submitted by:		
No	Comment Submitted	CAISO Response
2a	<u>Background</u> The existing Downtown/West Oakland Area is made up of two sub-areas, each fed by separate 115 kV networks. The Northern sub-area is primarily fed from Moraga Substation with support from Sobrante Substation. Lines serving the Southern sub-area are primarily served by Moraga Substation and Eastshore Substation. The stations served in each of these sub-areas are identified in Table 1. AMP's Cartwright Substation is normally served from PG&E Station C and AMP's Jenny Substation from PG&E Station J, so AMP has load served from each of the sub-areas. AMP could transfer load so that all load can be temporarily served from either Stations C or J, however this is an unreliable operational state as a single contingency can black out all the service to the island. **Table 1: Stations Served in Northern and Southern Oakland Areas** **Sub-Area ->** / **Northern** / **Southern** **PG&E Stations** / Station K, X, D, C, L / Stations J, Edes, Grant, San Leandro **PG&E Customer Stations** / Cartwright (AMP), Port of Oakland and Schnitzer Steel / Jenny (AMP) To meet the Planning Standards, the northern sub-area depends on aging local generation and Special Protection Systems (SPSs) that drop load. The southern area, while not dependent on local generation, depends on SPS to drop load. For the northern sub-area SPSs, AMP load is the only load at risk of being dropped. For the southern sub-area, at first, AMP was the only load to be dropped but the SPS was modified in 2017 to add three PG&E loads such that each of the four loads would be rotated into the SPS. The CAISO Planning Standards were recently revised to no longer allow the long-term reliance on load dropping to meet the Planning Standards in high-density urban areas such as Oakland. Also, both the Dynegy CTs and NCPA CTs will have reached their 40-year planning life within the TPP planning horizon.	AMP's comment is noted. In regards to the system readjustment following the first contingency, the mitigation does comply with planning standards as long as there is no non-consequential load drop following the first contingency and the system is secured for the next worst contingency. In regards to the SPS's in Oakland area, these will be evaluated for potential removal or to keep as a safety net once the longer-term plan is put in place.

No	Comment Submitted	CAISO Response
	AMP has experienced several operating issues with the existing SPS and load transfer arrangements that have reduced the reliability of service to AMP load. AMP anticipates that this expected loss of local generation will further adversely impact the quality of service that AMP receives and has repeatedly requested that a long-term transmission plan be developed to reliably serve the East Bay area. In the 2012-13 Transmission Planning cycle, the CAISO approved PG&E's proposed East Shore - Oakland J 115 kV Reconductoring Project with a forecast completion date of May 2015. With this upgrade, the CAISO and PG&E assert that the southern area will comply with the Planning Standards without reliance on a load dropping SPS. This project has been repeatedly delayed and is currently forecasted to be completed in April 2021.1 The extended delay for this project is indicative of PG&E's inability to complete projects in a reasonable time period, which furthers the need to come up with a long term plan of service for both the Northern and Southern Oakland sub-areas at the earliest. <u>PG&E's Northern Oakland Area Reinforcement Proposal</u> On September 26th Stakeholder Meeting, PG&E presented its NOAR proposal to address the long-term reliability deficiencies in the northern sub-area. The proposal includes the following four elements. 1. Moraga-Oakland X Lines Rebuild: Rebuild Moraga- Oakland X 115 kV four-line path with three lines with conductor rated for 1100 Amps or higher summer emergency rating 2. Moraga-Claremont Lines Reconductoring: Reconductor Moraga-Claremont #1& #2 115kV lines with conductor rated for 1100 Amps or higher summer emergency rating 3. New Oakland X to Oakland L Line: Build a new 115 kV line from Oakland X to Oakland L substation with conductor rated for 1100 Amps or higher summer emergency rating 4. Moraga 230kV Bus Upgrade: Upgrade Moraga 230 kV Bus (Add sectionalizing breakers and a bus tie breaker to Moraga 230 kV bus)	

No	Comment Submitted	CAISO Response
2b	AMP's Comments on NOAR Proposal While AMP generally supports the development of long-term reliability solutions for the Northern Oakland sub-area, AMP has some concerns about the proposal made by PG&E in this year's Request Window as described below. I. AMP's concern about existing SPS is not addressed There has been no assurance that the NOAR proposal, Oakland Clean Energy Initiative (OCEI) approved in the 2017-18 TPP, or the East Shore – Oakland J 115 kV Reconductoring Project will result in the removal of the SPS equipment which interrupts AMP load under certain contingencies. Discussions with PG&E have suggested that such equipment may remain in place as a "safety net." This concerns AMP in that the mere presence of an SPS requires regular testing and maintenance, which has historically created reliability issues for AMP. Secondly, the need to maintain such equipment as a safety net indicates a lack of confidence in the veracity of the proposal. Again, these SPSs disproportionately impact service to AMP and under the CAISO Planning Standards should be removed. Furthermore, AMP lacks the operational visibility into the PG&E system to understand when it may be at risk for operator action or even at risk of load interruption. This lack of situational awareness makes AMP unnecessarily exposed to the need for sudden action and endangers the efficacy of the proposal's dependence on AMP load transfers. AMP recommends that the AMP load be removed from the SPS, if it continues to exist as part of the adopted plan.	The comment has been noted and will be considered; however will likely not be resolved in the 2019-2020 transmission planning process. The ISO will continue to assess the long-term needs within the area per the ISO Planning Standards.
2c	II. AMP supports CAISO's evaluation of load increase and load distribution without delaying long-term planning process AMP applauds both PG&E and CAISO's efforts in identifying the long-term reliability needs without Alameda/Oakland generation. AMP agrees with PG&E that the load projections in the Oakland area have gone up significantly. In particular, PG&E has recognized a significantly reduced Distributed Generation (DG) contribution at the peak time, a decline in energy efficiency (EE) expectations, and additional load growth that has not been accounted for in the base power flow cases, such as the Oakland stadium and electrification plans.2 During the September 25th stakeholder meeting, the CAISO indicated that they plan to further review the projected demand increase as well as the load distribution across multiple stations in the Northern Oakland area. AMP	AMP's comment is noted.

No	Comment Submitted	CAISO Response
	supports CAISO's proposed evaluation of the load growth and load distribution efforts in their evaluation of PG&E's NOAR proposal. Even if the CAISO thinks the load growth projections and/or distribution of loads needs leads to a decision not to approve a project in this planning cycle, AMP urges the development of long term plans for both the Northern and Southern sub-areas at the earliest possible time.	
2d	III. AMP recommends considering alternatives to NOAR and simultaneous evaluation of reliability in Oakland Northern and Southern sub-areas AMP supports an investigation into the replacement of the aging transmission infrastructure4 but AMP believes that other alternatives to NOAR should be investigated that would address the reliability issues caused by load growth in the Oakland/Alameda area without relying on the local generation. AMP believes that the analysis of extreme events including wildfires and earthquakes should be thoroughly investigated. For instance, the efficacy of spending $180-$360 Million5 to rebuild existing overhead 115kV lines through wildfire risk areas 2 and 3 needs at least some further investigation of alternatives. AMP suggests that projects, such as a new *Oakland J – Oakland C 115 kV* cable that was submitted as part of the *Oakland Area Long Term Plan* in the CAISO 2010-11 TPP should be evaluated as one of the potential mitigation measures to be part of long term plans to provide appropriate transmission service reliability and resiliency levels to the Oakland Northern and Southern sub-areas. And, for that element to be considered, it is incumbent on the CAISO to consider long term solutions to both areas simultaneously.	AMP's comment is noted.

3. American Wind Energy Association of California (AWEA-California) Submitted by: Caitlin Liotiris		
No	Comment Submitted	CAISO Response
3a	I. <u>CAISO Should Provide as Much Information as Possible on the Operational and Other Impacts Associated with the Policy Cases Studied in the 2019-20 TPP</u> The CPUC's Preferred System Plan for the 2017-18 Integrated Resource Planning (IRP) cycle called for certain policy cases and sensitivities in the 2019-20 TPP. The policy cases analyzed in the 2019-20 TPP are: • "Base Portfolio" – 42 MMT GHG target • "Policy Sensitivity #1" – 32 MMT GHG target made up primarily of in-state resources • "Policy Sensitivity #2" – 32 MMT GHG target which includes 2,250 MW of New Mexico wind and 2,000 MW of Wyoming wind that requires new transmission o It is important to note that Wyoming and New Mexico wind resource are assumed to be delivered to CAISO intertie points on new transmission facilities During the September 2019 stakeholder meetings, CAISO presented some high-level assumptions and information related to these policy cases. There is little doubt that the results of these various policy portfolios studied in the 2019-20 TPP will have quite different results from an economic, operational, and state policy achievement perspective. Based on the CPUC's previous estimates, after paying for the transmission required to deliver Wyoming and New Mexico wind resources to CAISO, the Policy Sensitivity #2 portfolios would save ratepayers $300-$558M/year, compared to a case that excludes them. Additionally, as CAISO's previous Special Study on a 50% Renewable Portfolio Standard and Interregional Transmission Projects demonstrated, and as other industry studies have shown, a more diverse resource portfolio (such as the portfolio represented by Policy Sensitivity #2) is likely to have significantly reduced levels of generation curtailment compared to a less diverse portfolio. In providing results for the various policy cases, CAISO's 2019-20 TPP should illustrate the levels of RPS achieved in each policy portfolio and also provide information on the levels of renewable curtailment that occur in each portfolio.	The comment is noted. The ISO will continue its practice to provide the information regarding renewable curtailment during stakeholder meetings and as part of the Transmission Plan.

No	Comment Submitted	CAISO Response
	The policy cases are also likely to have different impacts on system operation. For instance, one portfolio may result in a significant decrease in the three-hour net load ramp or provide other operational benefits. When draft and final results related to the policy cases are published, the CAISO should provide as much information on the operational differences of these various portfolios as possible. This includes, but is not limited to, the three-hour net load ramp for each policy portfolio analyzed in the 2019-20 TPP. AWEA-California looks forward to working with the CAISO to put forward information that will best inform the CPUC, LSEs, and other planning entities of the need and value of a balanced resource portfolio. This is particularly important as LSEs evaluate their near-term procurement needs to meet various state energy policy requirements and goals, including Resource Adequacy, IRP, and RPS.	
3b	II. <u>The CAISO and the CPUC Should Improve RESOLVE's Transmission Constraints</u> Each year, the CAISO provides the CPUC with estimated transmission constraints for use in the CPUC's IRP modeling exercise. The transmission constraints provide estimates of the capacity that CAISO expects can be accommodated on existing and already planned transmission for each renewable energy zone and include estimates of both the expected capacity from Full Capacity Deliverability Status (FCDS) resources and from Energy-Only (EO) resources. These transmission constraints are used by the CPUC as a critical input into the RESOLVE model, which selects the resource portfolios for the IRP, with a preference for capacity that can be accommodated within these transmission limits (as that capacity is assumed not to require additional transmission build out). These transmission constraints are a critical input that substantially drive the IRP portfolios, which in turn affects results of future TPPs, highlighting the importance of ensuring they are accurate and not overly binding. Yet, there evidence that the transmission constraints will be changing going forward, based on modifications to CAISO's Generation Deliverability Assessment Methodology. Additionally, the transmission constraints may be being applied	The ISO is continuing to support refinements to the CPUC's RESOLVE model by providing updates to the transmission capability information. The comment about the need to consider resource diversity while estimating transmission capability is noted. The transmission capability estimates for FCDS resources rely on the predominant technology in specific study areas in GIDAP cluster studies.

No	Comment Submitted	CAISO Response
	inappropriately for Policy Sensitivity #2, as they are not appropriate for use for out-of-state resources delivered to renewable energy zones. This is because the transmission constraints used in RESOLVE do not reflect the additional MW of capacity that may be accommodated on existing transmission due more diverse resources being delivered to (or available within) a particular energy zone. The CAISO should work in conjunction with the CPUC to address these issues as quickly as possible to improve future IRPs and TPPs. First, the RESOLVE transmission constraints will need to be updated as soon as CAISO has certainty regarding its new Generation Deliverability Assessment Methodology (if not before). The CAISO should quickly begin work to estimate what future transmission constraints for each renewable energy zone might be under the new deliverability methodology and to communicate that information to the CPUC. In the interim, while new estimates are being created by CAISO, AWEA-California has asked the CPUC to consider dramatically increasing the transmission constraints, perhaps doubling (or more) the amount of resources that can be accommodated using existing transmission from each renewable energy zone. CAISO's support for that approach, given where the Generation Deliverability Methodology is likely to end up, would go a long way in reducing the time it will take for the impacts of the new deliverability methodology to be incorporated into the state's various planning efforts. Second, the transmission constraints used in RESOLVE do not currently reflect the resource diversity that could be achieved by delivering out-of-state resources to the CAISO at these zones. Thus, improvement of the modeling of out-of-state resources in both the IRP and TPP is required. It is important to point out that the transmission constraints that are developed by CAISO and submitted to the CPUC for use in RESOLVE are based on the predominant resource interconnection requests CAISO has received within that zone. For instance, the FCDS and EO transmission constraints for Southern Nevada/Eldorado/Mountain Pass zone are based on an expectation that solar resources will be interconnecting in that zone and the transmission constraints used in RESOLVE are applicable for solar resources. Thus, these limitations do not reflect additional FDCS or EO capacity that could be accommodated if there was more resource diversity in the renewable energy zone.	

No	Comment Submitted	CAISO Response
	As relevant for the 2019-20 TPP, Policy Sensitivity #2 assumes that the Wyoming and New Mexico wind that is part of this portfolio will be delivered to existing renewable energy zones. For New Mexico/Arizona wind, we understand that these resources are modeled as delivered to Palo Verde, which corresponds to the Riverside East/Imperial renewable energy zones. We understand the Wyoming resources are modeled as delivered to the Southern Nevada/Eldorado/Mountain Pass renewable energy zone. Once these wind resources are modeled as "delivered" to these zones in RESOLVE, the RESOLVE model then applies its existing FCDS and EO transmission constraints for those zones to these wind resources. But the renewable resource types delivered on out-of-state transmission facilities are expected to be more diverse, and have very different generation profiles, than the renewable resource types that are located within these renewable energy zones. If the resource profiles associated with the diverse, regional wind resources that are expected to be delivered to these zones were properly accounted for, they would likely result in very different (likely higher) transmission constraint figures than are currently modeled in RESOLVE. Thus, it is likely that more MW of FCDS and EO resources could be accommodated from the Riverside, Imperial and Southern Nevada/Eldorado zones, if the CAISO had set the transmission limitations for these zones based on an expectation that diverse, regional wind resources would be delivered to, and available in, these zones. It is noteworthy that CAISO already studied the ability to integrate 2,000 MW of Wyoming wind and 2,250 MW of New Mexico wind as part of the Interregional Transmission Project and 50% RPS Out-of-State Special Study. In that analysis, CAISO found there was sufficient Maximum Import Capability (MIC) for renewable delivery to the CAISO system at major delivery points in the northwest and the southwest, implying that the full regional wind portfolio analyzed in Policy Sensitivity #2 can be accommodated on existing transmission and may be capable of providing Resource Adequacy benefits. Going forward, the CAISO and CPUC should better consider how diverse resource types might affect RESOLVE's transmission constraints. For Policy Sensitivity #2, it may be that additional FCDS capability would exist for wind that is interconnected in that zone.	

No	Comment Submitted	CAISO Response
3c	III. Additional Analysis and Opportunity for Review is Needed Prior to Implementing the Proposed PCM Changes for Battery Dispatch AWEA-California appreciates CAISO's continued efforts to improve its PCM and approach to the TPP as system dynamics and the resource mix in the West continue to change. During the September stakeholder meetings, CAISO presented on proposed modifications to PCM modeling for renewable curtailment and for the cost of battery dispatch. Generally, CAISO's proposed approach for renewable curtailment appears reasonable, as it would help improve locational results, reduce curtailment "cliffs" and more closely align the PCM curtailment price with historical market experience. However, the approach CAISO has proposed for battery dispatch requires additional consideration before moving forward. CAISO has proposed to model battery dispatch at the average cost of replacement capacity, when considering cycle life and depth of discharge. This approach fails to reflect the fact that revenues associated with the capacity costs for battery resources, in many instances, are likely to be recovered outside of the CAISO's market. AWEA-California is not aware of any other resource for which CAISO considers the average capacity cost replacement when considering economic dispatch in the PCM. For instance, the average cost of renewable resources (or other conventional resources) are not considered in the PCM's dispatch of these resources. AWEA-California understands that batteries require unique consideration because batteries' economic life is dependent on the number of cycles and depth of discharge. However, application of the full average cost of replacement for every MWh of battery dispatch is inappropriate and will result in far less battery dispatch than may actually occur in the market going forward. AWEA-California ask the CAISO to consider and further scope out the "incremental cost approach" mentioned during the meeting. Alternatively, CAISO could consider using some fraction of average costs to set a dispatch cost for battery storage. The use of the full average cost for battery dispatch, however, runs the risk of "overcorrecting" for the problem that CAISO has	Please refer to the response to 1b. In addition, it was noted in the stakeholder presentation that there can be different options to consider for the replacement cost of batteries in production cost simulation. The ISO will continue to evaluate different options, assumptions, and parameters.

No	Comment Submitted	CAISO Response
	identified for modeling of batteries in the PCM. Thus, additional discussion and analysis is required prior to implementing this proposed change.	

4. Bay Area Municipal Transmission group (BAMx) Submitted by:		
No	Comment Submitted	CAISO Response
4a	PG&E's Proposed Projects Wilson-Oro Loma 115kV Line Reconductoring The scope of PG&E's proposed Wilson-Oro Loma 115kV Line Reconductoring project is to reconductor about 9 miles between Wilson and El Nido substations. The cost estimate provided for the project is $11.3-$22.7 million. The driver for the Wilson-Oro Loma 115kV Line Reconductoring Project are P2 type contingencies at the Panoche substation that cause the Panoche end of Panoche-Oro Loma circuit to open without a fault. These contingency events cause all of the load normally served by the Wilson-Oro Loma circuit to be served only from the Wilson side and therefore overload the Wilson-Oro Loma 115kV circuit. The P2 contingencies driving the project are fairly low-probability type of contingencies, so the proposed project is unlikely to provide a significant increase in reliability. Moreover, as identified in the CAISO preliminary assessment, the Wilson-Oro Loma 115kV Line Reconductoring project would fail to mitigate the voltage issues at Oro Loma 115kV substation associated with the same P2 contingencies. Instead of the Wilson-Oro-Loma 115 kV Line Reconductoring project, BAMx encourages the CAISO to consider evaluating an operating solution to radialize the circuit at Oro Loma 115kV substation during peak times by either splitting the Oro Loma substation or opening either Oro Loma-El Nido or Oro Loma-DFS 115kV segments. This would cause only some load to be automatically picked up following the critical P2 contingency at Panoche 115kV substation and therefore could prevent the identified overload. Additionally, moving some of the load via distribution ties could also resolve the identified overloads.	The existing 115 kV system is Bulk Electric System that is operated as a looped system, and per the NERC TPL-001-4 mandatory reliability standards, the performance requirements for a P2-1 contingency is for avoiding Non-Consequential load shedding.
4b	Northern Oakland Area Reinforcement Proposal During the September 26th Stakeholder Meeting, PG&E presented its Northern Oakland Area Reinforcement Proposal to address the long-term reliability deficiencies in the northern Oakland area. BAMx understands the need to develop a long term plan to serve the Oakland area, but thinks alternatives to the one proposed by PG&E in this year's request window need to be identified and studied prior to approval of the PG&E proposal.	The comment has been noted.

No	Comment Submitted	CAISO Response
4c	SDG&E's Proposed Projects SDG&E has proposed three (3) major high voltage transmission upgrades in this TPP cycle. They are a new 230kV Bay Boulevard-Silvergate transmission line, a new 230kV Encina-San Luis Rey #2 transmission line, and new 230kV Phase Shifting Transformers (PSTs) at Suncrest. In order to help the stakeholders better understand the need and drivers for the projects, SDG&E should provide additional information on the identified overloads that the proposed projects are meant to mitigate. SDG&E should also provide additional information including the power flow cases and the year that shows the identified overloads. For instance, it is not clear whether the power flow cases used by SDG&E are the Summer Peak cases or Sensitivity cases. Additionally, as explained in more detail below, in many cases it is hard to identify any correlation between the CAISO's preliminary assessment results and the identified contingency overloads that serve as drivers for some of the SDG&E's Request Window Applications.	BAMx's comment is noted. As part of the transmission planning process, the ISO is working with SDG&E to better understand any differences in study results.
4d	SDG&E's Proposed Bay Blvd-Silvergate Transmission Line The scope of SDG&E's proposed Bay Boulevard-Silvergate Transmission Line is to "Add a second 230 kV line from Bay Blvd to Silvergate with a minimum rating of 912/1176 MVA to mitigate a new NERC thermal violation". Per SDG&E's September 26th presentation, the identified driver for the project is a 106% overload on Silvergate-Bay Boulevard 230kV for the loss of TL23071 Sycamore-Penasquitos 230kV. However, CAISO's preliminary assessment results do not identify any P1 overloads whatsoever on the Silvergate-Bay Boulevard 230kV circuit. It seems that the only overloads, in the CAISO's preliminary assessment, identified on the Silvergate-Bay Boulevard 230kV circuit are for P6 (N-1-1) contingencies and are observed within the sensitivity cases. Therefore, it is unclear under which conditions a P1 on the Sycamore-Penasquitos (SX-PQ) 230kV circuit would cause an overload on Silvergate-Bay Boulevard (SG-BB) 230kV. BAMx performed an independent power flow analysis using the 2029 SDG&E Summer Peak Case and found that a P1 contingency scenario entailing the loss of the TL23071 (SX-PQ) results in a loading of only 79% on the TL23026 (SG-BB) line.	It is the ISO's understanding that the 106% overload identified by SDG&E is based on the continuous rating of Silvergate-Bay Boulevard 230kV line under SDG&E's 2029 off-peak scenario with heavy northbound flow via the north of San Onofre 220 kV path from SDG&E to SCE. Actually, this line has two-hour short term emergency rating, which is 29% higher than its continuous rating. The current ISO market congestion management has enough time to bring the power flow level within its continuous rating by re-dispatching generation in the area.

No	Comment Submitted	CAISO Response
	Therefore, BAMx would request that the CAISO provide additional information on the contingencies driving the need for the project to the stakeholders before the project is approved.	
4e	SDG&E's Proposed TL230XX New 230kV Encina-San Luis Rey #2 The scope of SDG&E's proposed Encina-San Luis Rey #2 Circuit is to construct a new third 230kV circuit between Encina and San Luis Rey 230kV stations. The identified driver for the project is "loss of TL230003 (Encina-San Luis Rey) loads TL23011 (Encina-San Luis-Escondido) to 106%-120% of its rating limit". SDG&E does not provide any additional information under which study years and scenarios these overloads were observed. Furthermore, CAISO's preliminary results do not show any identified overloads on the Encina-San Luis 230kV circuits for any contingency types. BAMx's independent power flow analysis using the 2029 Summer Peak SDG&E case confirmed the CAISO's findings. Therefore, BAMx would request that the CAISO provide additional information on the contingencies driving the need for the project to the stakeholders before the project is approved.	The P1 overload concerns were driven by the potential system operation condition with heavy northbound flow through north of San Onofre 220 kV path from SDG&E to SCE. The ISO 2017-2018 Transmission Plan evaluated the potential congestions and confirmed that current congestion management was sufficient to eliminate the overload concerns without resulting in significant congestion cost.
4f	SDG&E's New 230kV Phase Shifting Transformers (PST) at Suncrest SDG&E proposes to install new 230kV Phase Shifting Transformers (PSTs) at the Suncrest substation. The primary drivers for the project identified in the SDG&E's September 26th presentation were "reliability and economic issues on the Suncrest path". However, no economic analysis was presented in order to support the claim of economic issues driving the need for the project. Additionally, the P6 (N-1-1) overload on the TL23054 and TL23055 230kV lines from Sycamore Canyon to Suncrest could potentially be mitigated by the CAISO's congestion management as well as the existing operating procedure (SDG&E SOP, i.e., GIP2005). It also appears that SDG&E has not fully evaluated potential transmission alternatives, such as preferred resources and energy storage. Very little supporting information has been provided to date in order to justify the capital investment associated with the proposed project. Therefore, BAMx would encourage the CAISO to refrain from approving this project until a more complete evaluation of the transmission alternatives is performed.	The ISO has evaluated the P6 overload concern on the 230kV lines from Sycamore Canyon to Suncrest in its transmission planning process for years, and concluded that current operational procedure is sufficient to eliminate the overload concerns along with the TL23054/TL23055 RAS. The ISO will continue to monitor the P6 overload concern.

No	Comment Submitted	CAISO Response
4g	Potential Alternatives for Economic LCR Assessment BAMx appreciates the CAISO's significant efforts on the LCR Reduction study included in the 2018-2019 Transmission Plan. BAMx found 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, but also assesses (ii) the production benefits and (iii) the local capacity benefits. We request that demand-side options, such as slow demand response, also be considered in all areas where such measures would address the identified reliability constraints. We also request that the CAISO provide consistent consideration for all LCR reduction alternatives across all LCR areas and subareas (14-17) to be studied this year.	Replacement of existing resources with a new types of resources like demand response, batteries, solar was not included in the scope of the study. The replacement of one resource with another generally does not change the need and can be accomplished by looking at the data already available in the LCR reports including the daily and yearly peak load shapes vs the actual local capacity need. ISO studies are geared towards economic projects that would result in decrease or elimination of the actual local capacity need itself. The ISOs intention is to apply consistent consideration among all areas and sub-areas studied this year and those studied last year.

5. California Energy Storage Alliance (CESA) Submitted by: Jin Noh		
No	Comment Submitted	CAISO Response
5a	<u>Inclusion of operational costs of batteries in the PCM</u> CESA is supportive of the CAISO's commitment to estimate the impacts of depth of discharge (DOD) on the operational costs of lithium-ion battery storage, which have different variable operations and maintenance (O&M) costs based on throughput and cycling of the battery. CESA thus understands the inclusion of DOD as a factor in O&M costs to ensure the resources selected for future deployment behave in the way projected in the California Public Utilities Commission's Integrated Resource Planning (IRP) proceeding (IRP) that has key linkages to the TPP modeling. At the same time, the CAISO should also be aware of how O&M costs can vary based on use case (e.g., deep cycling versus ancillary services) as well as on different types of storage technologies, such as flow batteries and many others, which have different O&M costs related to cycling and other operational parameters. For these reasons, CESA has advocated for a customizable pathway for assessing default energy bids (DEBs) in the Energy Storage and Distributed Energy Resources (ESDER) Phase 4 Initiative, where similar questions about representing storage's marginal operational costs have been discussed. In the September 25, 2019 workshop, CAISO proposed two modifications to the way batteries are modeled within the PCM: (1) modeling the dispatchable energy as 80% of the actual energy capacity to reflect an 80% DOD; and (2) using a single flat average cost per MWh to approximate the cost adder related to replacement costs, which was calculated at $33.75/MWh using estimates derived by the Department of Energy (DOE). CESA believes that the CAISO's proposal be modified after having assessed the assumptions of the DOE report and instead proposes that different data sources be used to ensure that the modeled O&M costs are better in line with what CESA members have seen as more realistic assumptions. First, the 80% DOD assumption in the DOE report is an assumption based on academic literature, not a metric derived from empirical data. A potentially better publicly-available source for actual operation parameters could be the	The comment has been noted. The ISO reviewed the alternatives of parameter assumptions as proposed in the comment, and intends to continue to use the parameters as presented in the DOE report and in the stakeholder meeting for the following reason: 1. The cycle life of 3500 cycles is approximately to have one cycle per day for ten years, which is the consistently estimated calendar life of battery in different reports. One cycle per day is a reasonable assumption for four-hour battery, which is in line with the pattern of the solar hours. 2. The comment suggested using $124/kWh as the replacement cost for 2030 referring the NREL's report, which is the low end of the forecast in the NREL's report. In planning study, the middle forecast is normally adopted, however. For example, the ISO uses the CEC's middle load forecast in its transmission planning study. 3. The middle forecast of the battery cost in the NREL report is $207/kWh for 2030, which is higher than the cost of $189/kWh as proposed in the stakeholder meeting, which is the DOE report's middle forecast for 2025 The ISO will continue to refine the assumptions and parameters for battery operation and cost. The development of more complex cost functions will have to take into account the ability to incorporate them into optimization routines, both in production simulation studies and market operations.

No	Comment Submitted	CAISO Response
	assumptions assembled by Lazard in their Levelized Cost of Storage Analysis Version 4.0 study. Based on industry survey data, Lazard estimates that a wholesale energy storage system has a lifetime of 7,000 cycles with a 100% DOD, which is likely on the high end of total cycle life. CESA thus recommends employing a midpoint assumption that is still in line with all literature reviewed in the DOE report and Lazard's estimates: a DOD of 80% and a lifetime of 5,000 cycles. Using this assumption within the formula results in a flat average cost of $23.60/MWh. Another component of the CAISO's formula that could use refinement is the assumed replacement cost of batteries. The CAISO has stated that using 2025 estimates available in the DOE's Energy Storage Technology and Cost Characterization Report is an interim measure that could be modified when 2030 estimates are available. CESA recommends that the CAISO consider cost estimates included in the Cost Projections for Utility-Scale Battery Storage report, published by the National Renewable Energy Laboratory (NREL) in June 2019. This report estimates high-, mid-, and low-cost trends by 2030 based on the available academic literature. Given the results of most of the literature reviewed by the NREL report, as well as the 5% yearly decline in costs used in the DOE report cited by CAISO, CESA recommends considering the low-cost trend estimation of $124,000/MWh.4 Using this data point and keeping all other assumptions of the CAISO intact would result in an adder of $22.12/MWh. If combined with CESA's proposed lifetime cycle assumption, the adder would equal $15.50/MWh. Second, while the assumptions for a flat average cost estimate can be refined, this would not overcome the issue that such an approach may oversimplify the cost structure of battery storage and generalize their operation. To overcome these risks, CESA supports the future development of an incremental cost function that can incorporate the rate of change of operational costs relative to the DOD. In order to develop such a function, CESA is supportive of further coordination among CAISO's initiatives and their stakeholders. Overall, CESA supports the CAISO's efforts to better model energy storage O&M costs since it is not reasonable to model storage as having zero marginal costs, but as discussed above, there could be modifications to reflect what	

No	Comment Submitted	CAISO Response
	CESA sees as more reasonable data sources and estimates. This difference relative to CAISO's proposed estimate could considerably impact the PCM's results on WECC total production cost, renewable curtailment, and battery market revenue. Since the CAISO is an important stakeholder in signaling reliability needs and in optimizing resources in the market, CESA believes it is important to better approximate storage marginal costs, especially in a potential future where storage can play a large part in achieving the state's 2030 and 2045 decarbonization goals.	
5b	<u>Consideration of renewable curtailment within the PCM</u> CESA is supportive of the CAISO's effort to better approximate the behavior of renewable generators in order to inform its TPP. As pointed out in the September 25, 2019 workshop, it is particularly challenging to simulate the performance of variable energy resources (VERs) within models that have been optimized with conventional thermal generation in mind. To resolve the various PCM issues, the CAISO proposes modeling each renewable resource as a collection of smaller resources or "blocks" that will represent a fraction of the overall Pmax while maintaining identical generation shapes. The main difference between the blocks is the inclusion of slightly different curtailment prices, so as to imitate partial curtailment of a resource. CESA believes this methodology is appropriate for the 2019-2020 TPP. In its proposal, the CAISO argues for this method mentioning the implementation impracticality of a more locationally granular and resource specific solution; that is, the development of resource- and area-specific curtailment cost curves. While sympathetic to such an argument, CESA considers that a more granular approach might be better in the long run, especially considering the need to model curtailment of hybrid resources. CESA acknowledges this might not be a pressing issue for the 2019-2020 TPP; however, with over 35 GW of hybrid resources currently in the CAISO interconnection queue, CESA believes it is fundamental to consider how the curtailment of this resources would be estimated under the PCM. In the topic of curtailment, hybrid resources present their own set of challenges relative to standalone VERs. Since they have a dispatchable component, hybrids are more likely to have a curtailment cost curve that can be easily	The comment has been noted; The ISO will continue to review the modeling approach as the resource mix evolves, including hybrid resources. At this time, the ISO has not identified specific differences that would lead to a hybrid resource operating differently in the market than a co-located solar and storage resource and resources will be modeled accordingly in the 2019-2020 transmission planning cycle.

No	Comment Submitted	CAISO Response
	approximated to that of a conventional resource (i.e., with several price-points and small steps). A more important issue when modeling these resources is the fact that they are able to partially curtail from the grid's perspective without foregoing potential revenues from said energy. This makes the opportunity cost of curtailment considerably different from that of a VER. Thus, it could be inadequate to apply the same curtailment price to all solar and wind generators as proposed by the CAISO.	
5c	<u>Conclusion</u> We appreciate CAISO's consideration of CESA's comments and look forward to ongoing participation in the TPP. Going forward, CESA hopes to work with the CAISO to broaden the conversation to also consider how storage resources can be operated in the market to provide daily load shifting, which the recent IRP modeling has shown solar and storage to do. Significant recent attention has been paid to how storage is operating in the market today to provide ancillary services as opposed to daily load shifting, raising concerns with how storage is modeled in PCM and questions as to whether storage can be relied upon in such a future. However, the conversation should not only focus on modeling O&M costs of storage cycling but also on how the CAISO market can send the market price signals to storage to encourage such cycling, especially when energy price spreads are not sufficient. CESA looks forward to those conversations with the CAISO.	The comment has been noted.

6. California Public Utilities Commission - Staff (CPUC-Staff) Submitted by:		
No	Comment Submitted	CAISO Response
6a	I. The CPUC appreciates the CAISO's assessment of on-hold projects and requests further updates on several projects. As indicated in previous ISO cycles, Energy Division CEQA Unit staff is interested in potential regulated utility application filings that trigger compliance with the California Environmental Quality Act environmental document preparation. • The CPUC staff appreciates the CAISO providing specific assessment outcomes in their 2018/2019 TPP for the New Bridgeville-Garberville #2 115 kV line, Atlantic-Placer 115 kV line, Gates-Gregg 230 kV line, Jefferson-Stanford #2 60kV line, and the Bellota-Warnerville 230 kV reconductoring project. All have been cancelled, except for Bellota-Warnerville, which we expect to be filed at the CPUC by PG&E in Q1 2020. However, the CEQA Unit staff is still interested in any further assessments for the Midway-Andrew project which has been renamed the North of Mesa Upgrade and remains on hold. • Northern Oakland Area Reinforcement Project in PG&E's Request Window Proposals will have permitting and construction challenges. The CEQA Unit staff will be interested in the further discussions and assessments of this project as it has number of siting issues such as traversing residential areas, crossing Tier 2 and 3 High Fire threat District areas, and rebuilding transmission structures.	The comment has been noted.
6b	II. The CPUC suggests recommendations for the treatment of energy storage and other low-cost Distributed Energy Resources (DERs) CPUC staff provide recommendations for the treatment of energy storage and other low-cost Distributed Energy Resources (DERs) in the CAISO Transmission Planning Process (TPP). To illustrate these recommendations, CPUC staff provides examples relevant to the CAISO's current consideration of energy storage in its preliminary reliability assessments reviewed in the CAISO TPP stakeholder meetings this September 25-26, 2019 and options to consider energy storage and other DERs as this cycle continues.	The ISO continues to consider storage along with other non-wires alternatives as potential mitigations of reliability constraints.

No	Comment Submitted	CAISO Response
	1. Consider Energy Storage or other low-cost DER solutions for all Reliability Issues CPUC staff recommends that the CAISO, consistent with its Comprehensive Transmission Planning Process (TPP) Tariff, consider energy storage and other "non-wires alternatives" (NWAs) as solutions for identified reliability issues. Per Section 24.4.6.2 Reliability Driven Solutions of the CAISO Tariff, the CAISO, in coordination with each Participating Transmission Owner (PTO) in the CAISO service area, must identify any needed transmission solutions through its annual TPP. The CAISO and PTOs in its service area must also consider lower cost solutions for these identified transmission issues "such as acceleration or expansion of existing transmission solutions, Demand-side management, Remedial Action Schemes, appropriate Generation, interruptible Loads, storage facilities or reactive support." Furthermore, the state of California has established clear directives mandating the procurement of renewable energy coupled with large- and small-scale energy storage and DERs where feasible and cost effective. California has recognized that the procurement of these types of resources is important to combatting the long-term effects of climate change. The CPUC requests that the CAISO fully consider energy storage, other DERs or a combination of DERs for the identified reliability issues in all of its TPP planning areas. To facilitate DER consideration, the expected length that contingencies are reasonably expected to last must be identified as well as the respective storage duration need (see comments below under sections 2 and 3). The CAISO preliminary assessment for the reliability issues in this cycle in the Greater Bay, North Valley, Central Valley, Fresno and Central Coast and Los Padres areas did identify possible reliability issues including overloads in the mentioned service areas. However, the CAISO presentations on possible mitigations that might be considered for further study in this year's TPP cycle for these six study areas did not mention considering energy storage or demand responses or other low-cost DERs in this year's cycle. If DERs and other NWAs were already considered as possible solutions, then the CAISO should make more transparent the analysis, assumptions, and method of consideration of the NWAs. At a high level the transparency of the	

No	Comment Submitted	CAISO Response
	alternative analyses considered needs to be significantly increased. The CPUC notes that the CAISO has identified reliability issues and proposed mitigations in this year's TPP cycle for the following study areas; however, these study areas did not mention energy storage, demand response or other DERs as possible mitigation options. • Mission, De Anza and San Jose Divisions in the Greater Bay Area • The North Valley • The Central Valley Area, specifically Sacramento, Sierra and Stockton/Stanislaus Divisions • In the Fresno Area, specifically in Wilson 115 kV sub-area • In the Central Coast Area, specifically Los Padres sub-area In the project recommendation section of these comments, CPUC staff identify projects that could have reduced costs and greater benefits if energy storage, demand response or a combination DERs were considered to address identified reliability issues.	
6c	2. Revise Methods for Determining Energy Storage Costs For valuation of potential reliability solutions going forward, CPUC staff recommends that the CAISO and the PTOs within its service area use a cost analysis method for energy storage that reflects its capacity (megawatts/MW), duration/energy (megawatt hour/MWh), as well as the widely expected declining cost trends used in other analyses. CPUC staff understands that under current practice, when the CAISO and the PTOs in its service area consider energy storage as an alternative reliability solution, they compare its capital costs with the capital costs of wire solutions. Refer to the energy storage cost discussions and presentations on the Pacific Gas and Electric Company (PG&E) Reconductoring project at Wilson-Oro Loma 115kv and the San Diego Gas and Electric (SDG&E) TL 647 Reconductor and TL 693 Loop-In project. CPUC staff recommend considering modification to the current practice on a going forward basis. If energy storage costs per MWh were considered, energy storage costs may be lower or comparable to wire solutions. For example, PG&E has energy storage capacity contracts that are for a specific price per MWh of energy storage capacity rather than for the specific price for the total capital cost of an energy storage system. This difference in price is achievable	The latest capital cost information available to the ISO is currently used to assess when storage is considered as a transmission asset. As a procurement alternative the most available procurement estimates for the area are used. These costs are used to compare the storage to other alternatives to mitigate the reliability constraint. In studying local capacity benefits, other energy market benefits offsetting costs are taken into account. In addressing more restrictive situations with reliability requirements, other potential benefits are not attributed unless it can be verified that these benefits can be achieved without compromising the ability of the resource to meet the reliability need.

No	Comment Submitted	CAISO Response
	because energy storage developers and utilities can deploy energy storage to provide more than one service to the CAISO controlled and the local distribution grids. For this reason, energy storage can have additional benefits and revenue streams and as a result lower costs than the estimated capital costs of an energy storage unit. Secondly, CPUC staff understands that under current practice, the CAISO and PTOs are not modeling the expected storage cost declines. The TPP stakeholder discussion on September 26, 2019 revealed that the CAISO and the PTOs within its service area have not consider the declining costs of energy storage in their cost analysis for potential mitigations. Given the continued declining costs of energy storage due to on-going investment in advancements, and California's energy storage programs and incentives, the energy storage costs used for valuations should be adjusted to reflect the likely energy storage costs at the anticipated contract date. These adjustments should be based on expected declines in energy storage by type. For example, Wood and Mackenzie estimates that the prices of long-duration front of the meter (FTM) energy storage system will decline by 25 percent between 2019-2021 and the price of short-duration FTM energy storage system will decline by more than 15% by 2021. If adjustments are made, the CPUC staff recommend CAISO consider using the storage costs (available as capacity, energy and O&M) as used in the 2019 IRP Proposed Inputs and Assumptions. (CPUC staff did not check whether this storage declining costs assumption was part of the CAISO TPP Study Plan for the 19-20 TPP.)	
6d	3. Identify Energy Storage Durations Needed for Reliability Solutions CPUC staff suggest that the actual timeframe required to resolve contingencies be considered when reliability needs are identified and validated in the TPP. The amount and timeframe of off-peak recharging capacity during the contingency should also be identified. These considerations are necessary to facilitate the evaluation of DER alternatives to traditional, wired solutions. We are concerned that the specific length of time (or a range) that contingencies may last are not sufficiently addressed in the NERC, WECC, or CAISO planning standards to allow for a consistent and adequate evaluation of energy storage solutions to reliability needs. In certain circumstances, storage could	The ISO will continue to use profile information, as available, similar to the recent analysis in the LCR analysis to assess the need in the area along with assessing the charging capabilities of storage. The ISO considers that to comply with mandatory standards, storage as a reliability concern mitigation must be capable of recharging through off-peak conditions, assuming the contingency remains in place, to be available for the next on-peak period.

No	Comment Submitted	CAISO Response
	not be used indefinitely if a contingency occurs – however, in other instances, a small amount of storage could be useful even if it required off-peak recharging. We note that a CAISO stakeholder process may be needed to address this foundational energy-storage issue with respect to reliability planning. However, until a separate stakeholder process is opened or considered, the TPP would benefit from identifying and documenting the expected duration of each contingency identified and recharging capabilities in the area. In addition, we note that the CAISO Storage as a Transmission Asset (SATA) stakeholder process is now inactive, but even if reactivated, did not appear to be scoped to address the contingency/storage duration issue. The SATA Issue Paper states: > The TPP evaluation methodologies. The ISO is not reexamining the processes that identify the needs and selects the optimal solution(s) to meet identified needs. These issues are appropriately considered in the ISO's annual TPP. If additional clarification of the evaluation process is needed in the future, it will be addressed on a case-by-case basis within the annual TPP or related processes. Similarly, the CAISO Energy Storage and Distributed Energy Resources (ESDER) stakeholder process scope does not appear to address the contingency and storage duration issues identified in this comment. <u>Storage Assumptions Based on Four-Hour Durations</u> CPUC staff suggest that a four-hour energy storage duration may not be the correct de facto assumption for energy storage alternatives to transmission reliability needs in the future. Energy Storage cost and feasibility analyses could vary substantially should lesser durations be appropriate to consider for a given reliability need. It can also be feasible to mitigate contingencies that require more than 4 hours of storage. The 4-hour duration requirement for Resource Adequacy, which is also applied to Local Capacity Requirements (LCR) and corresponding procurement specifications by Load Serving Entities, should not be broadly applied as the basis for eliminating energy storage as a reliability mitigation.	

No	Comment Submitted	CAISO Response
6e	4. Consider Energy Storage as part of a Reliability Solution For the CAISO TPP, CPUC recommends the CAISO consider energy storage as part of package of solutions that combine DERs, storage and other lower cost traditional transmission solutions. An example of this kind of solution is the Oakland Clean Energy Initiative (OCEI). CPUC staff believes that there are more opportunities to consider solutions in the TPP that involve combinations of DERs, which could have lower costs and greater benefits. The PG&E's North Oakland Area Reinforcement projects, for example, constitutes large system changes for the East Bay region. It appears to CPUC staff that each of the proposed changes were considered individually, and a holistic evaluation of the potential role of energy storage and other DERs to decrease expenditures on various parts of the reinforcement project does not seem to be part of the planning approach. Please refer to additional comments on the North Oakland Area Reinforcement and Oakland Clean Energy Initiative projects for more details.	The comment has been noted.
6f	5. Include the Energy Storage Replacement Cost Considerations for CAISO Production Cost Modeling in the ESDER Phase 4 Initiative CPUC Staff recommends that the CAISO coordinate discussion of this topic in CAISO Energy Storage and Distributed Energy Resources (ESDER) Phase 4 stakeholder initiative. The ESDER Phase 4 stakeholder initiative is currently discussing methods to determine energy storage costs to develop an energy storage default energy bid. The ESDER Phase 4 stakeholders include the PTOs in the CAISO service area, energy storage representatives and energy storage industry experts. For these reasons, CPUC suggests that it would be more efficient and appropriate to coordinate the discussion on this topic in the ESDER Phase 4 Initiative versus in two separate initiatives the TPP and the ESDER.	The ISO is coordinating between the multiple stakeholder initiatives to the greatest extent possible. However, the transmission planning cycle must adhere to tariff-based schedules, and work with the best available information at that time. It has been a practice for a number of planning cycles to include an update on related initiatives in chapter 1 of each transmission plan.
6g	III. The CPUC proposes project specific clarifications or recommendations for Energy Storage as part of reliability solutions. A. Recommendations for Energy Storage to be considered for proposed Reliability Projects, or state reasons why DERs are not feasible For the Day 1 CAISO presentation on the Valley Electric Association Preliminary Reliability Assessment Results, the mitigation solutions presented for consideration in this year's TPP were: Option 1: New Gamebird Transformer	The comment is noted.

No	Comment Submitted	CAISO Response
	Project, Option 2: New Charleston-Vista 138kV Line, and Option 3: Amargosa transformer upgrade with reactive support. CPUC staff suggest that one or more additional options be considered that include energy storage and other DERs. The estimated duration of each contingency identified should be documented to allow for the consideration of DERs. If the CAISO finds that DER solutions are clearly not possible, please explain why. For the SCE North of Lugo (NOL) area, voltage overloads were observed at the Inyokern substation. The CAISO presenter did not mention considering alternatives such as energy storage or another DERs as a possible solution for this reliability issue. The CAISO presenter recommended installing capacitor bank for the mentioned issues without provided background on the range of options considered.	We are currently looking into the need for voltage support. Various forms of voltage support will be considered.
6h	B. Recommendations for Energy Storage to be considered as Part of Proposed Reliability Solutions <u>PG&E Northern Oakland Area Reinforcement Project Components:</u> PG&E's proposal in the 19-20 TPP includes a portfolio of East Bay projects (the Northern Oakland Area Reinforcement) that present a large and complicated system of new expenditures on a variety of transmission and reliability solutions. Many of these 19-20 TPP proposals seem to be interdependent and CPUC staff is concerned that the overall package has not been optimized. Particularly, there does not seem to be any consideration of using energy storage as part of a solution to this multipart construction expenditure. Staff are concerned that each part may have been viewed individually and sequentially and that the potential changes to the overall project that would accrue from, for example, substituting storage for some of the changes were not viewed holistically. Rebuilding the Moraga-Oakland X lines seems to solve one problem but creates an additional issue that then needs to be solved with other transmission construction. PG&E seems to have eliminated energy storage as too expensive as a stand-alone solution to each individual issue but has not studied the possibility that some energy storage in combination with decreased	The comment has been noted. The Northern Oakland Area Reinforcement Project is currently under review.

No	Comment Submitted	CAISO Response
	transmission expenditures may help to alleviate some part of the Moraga Claremont issues that result in the second project. For example, PG&E stated in the meeting that there was not sufficient land to site utility-scale storage in the project area but admitted that they had not considered BTM storage as an option. A more holistic evaluation may be able to consider storage in various locations, including behind-themeter, as part of the solution to these multi-part reliability issues. As this time, it is not clear whether or not a holistic evaluation of alternatives has been completed. PG&E also stated that they planned to move some parts of the Moraga-Oakland X lines underground, and PG&E is also planning to rebuild the line as a three conductor instead of four. CPUC staff are not clear why reducing the number of conductors in high fire threat zones is a worthwhile expenditure, or if this has non-fire related reliability benefits. Additionally, it did not seem that PG&E evaluated other fire prevention procedures, such as conductor hardening, tower replacement, or other system hardening efforts PG&E identified in its CPUC approved Wildfire Mitigation Plan (WMP). Staff understands that the reliability issues associated with this project are further in the future and recommends that PG&E conduct a thorough cost comparison of the various potential reliability benefits and fire prevention strategies, and their cost for application to this specific area of transmission lines. We request that CAISO or PG&E provide answers to the following questions so that the exact problem trying to be solved in the 19-20 TPP is identified. 1. Identify the specific NERC/WECC/CAISO planning standard category and year that triggers the need for each of the four main components of the Northern Oakland Area Reinforcement Project. A "triggering" need is a forecast contingency under which a planning violation would occur if not mitigated, and this usually would include a fine. 2. If the Moraga 230-kV Bus Upgrade can be completed independently by the 2021/2024 forecast P2 contingency need date, clarify whether the remaining, underlying project purpose would be: (1) public safety due to fire risk; or (2) meeting one or more specific, forecast reliability needs within a 10-year planning period that do not allow for load shedding pursuant to NERC/WECC/CAISO planning standards. If the latter, what is the first year	

No	Comment Submitted	CAISO Response
	of a forecast reliability need(s) assuming the Moraga 230-kV Bus Upgrade is already completed and define the need category. 3. Explain why undergrounding is being proposed instead of, or whether it is in addition to other types of system or fire hardening within existing transmission line rights-of-way. 4. Identify the precise length of the proposed transmission line work and amount that would be underground. During the Day 2 CAISO stakeholder meeting, PG&E indicated that about eight miles of transmission line work would be required and about four miles of the lines would be installed underground. Also identify the length of new rights-of-way; PG&E indicated about 2.5 miles.	
6i	SDG&E Avocado Area P1/P2.1 Contingency Thermal Overload CPUC staff would like more detail on the proposed Remedial Action Scheme (RAS) that would be used to offset potential reliability issues identified in this TPP cycle on TL698A as discussed in the CAISO presentation on issues in the SDG&E area. Our specific questions include: Would the RAS stop all charging activities at the Avocado battery? Or would it be configured to limit charging to a certain level? Would there be any differences between the RAS for the loss of 691 and the RAS for the loss of 698A?	There are currently no details available on the design of this proposed RAS. The ISO needs to work with SDG&E, and the storage facility owner on the design of this proposed RAS.
6j	C. Recommendations for Reliability Solution Evaluations to Involve Cost Benefit Analysis of Additional Energy Storage i. For the PG&E Fresno Area, Subarea Reedley CPUC staff requests the CAISO perform a cost benefit analysis of increasing the size of Dinuba Battery Energy Storage System (BESS). The Dinuba BESS is a transmission asset project that mitigates near term issues in the Reedley area and could address longer term issues if its size were increased. CAISO's presentation on Fresno area issues identified a need in the 2029 study for additional capacity in the Dinuba area. In the presentation CAISO stated that rerated net qualifying capacity (NQC) of a solar facility was a driving factor in causing potential P1-P7 contingencies. While the CAISO had not proposed any	The ISO is continuing to assess the longer-term needs in the area that could consider increasing the capacity of the Dinuba BESS project.

No	Comment Submitted	CAISO Response
	additional construction at this time, CPUC staff are interested in seeing an evaluation of the possibility of expanding Reedley BESS project as a potential solution should this continue to be seen as an issue in future TPP cycles.	
6k	ii. For the SDG&E Main Transmission System Reliability Concern No. 3, 4 and 5 CPUC staff requests the CAISO analyze whether energy storage is the low-cost option through a cost analysis.	The comment has been noted.
6l	iii. For the Oakland Clean Energy Initiative (OCEI), CPUC staff strongly support an evaluation of the potential for increased DER procurement to meet the evolving needs in the OCEI project area. Additional DER procurement should also be carefully evaluated as an alternative to the Northern Oakland Area Reinforcement Project or components of this project.	The comment has been noted.
6m	iv. For the Local Capacity Assessments, CPUC staff requests the CAISO consider low-cost DER solutions such as energy storage and demand response to reduce or eliminate the need for gas-fired generation.	Please see answer to question 4g above.

7. California Transmission Project (CTP) Submitted by: Marty Walicki		
No	Comment Submitted	CAISO Response
7a	California Transmission Project (CTP) appreciates this opportunity to comment on the information presented at the 2019-2020 Transmission Planning Process meeting on September 25 and 26 and formally submit the project as a potential alternative to LCR capacity. In our January 17, 2019 comments to the 2019-2020 Draft Study Plan, CTP requested to be studied as an Economic project and noted that the project also can provide significant LCR benefits. CAISO acknowledged this by including our project in the list of Economic Study requests in Table 5.3.1 of the 2019-2020 Final Study Plan and responded to our comments by stating, "The CAISO will study the Western LA Basin and the Big Creek/Ventura LCR areas in its review of alternatives to reduce or eliminate local capacity area requirements for gas-fired generation in this planning cycle and will consider the CTP for both areas."	The comment has been noted.
7b	<u>Update on Proposed Project Configuration for CTP</u> CTP is a proposed HVDC transmission system that will be fully controllable and dispatchable by CAISO. CTP will add a total of 2,000 MW of capacity between Northern California (PG&E) and Southern California (SCE). The ISO previously studied the CTP in the 2018-2019 Transmission Planning Process (TPP). In the previous study, the proposed configuration of the HVDC system connected Diablo Canyon in PG&E's system to Ormond Beach and Redondo Beach in SCE's system. Through these comments, we are informing the CAISO that we are submitting changes to our previous configuration and propose a system that will connect Diablo Canyon, Goleta, Redondo Beach and Huntington Beach. CTP plans to submit the detailed technical information about the project's LCR benefits including updated single-line diagrams of the revised proposed configuration for the project in our submittal for the 2019-2020 TPP Open Window due October 15. In the 2018-2019 Transmission Plan, the ISO concluded that the CTP will potentially provide approximately 1000 MW of LCR reduction benefits in the Western LA Basin and 300 MW of LCR reduction benefit in Big Creek/Ventura area. In this year's TPP, both the Western LA Basin and the Overall Big Creek/Ventura LCR area are to be studied in CAISO's Economic Assessment of LCR. Our preliminary studies have determined that the revised proposed	The comment has been noted.

No	Comment Submitted	CAISO Response
	configuration of the CTP will provide similar if not more LCR benefits to each of the respective LCR areas.	
7c	<u>Valuation Methodology for LCR Capacity Benefit</u> CTP continues to be concerned that CAISO "…plans to utilize the same methodology for evaluating the benefit of eliminating the need for local gas-fired resources until new information becomes available through the IRP process." We suggest the ISO update its valuation methodology to instead value LCR benefits based on the cost of replacing new gas-fired generation or based on the cost of long-term local capacity prices that are reflected in recently executed long-term capacity contracts. We believe this will better reflect the cost-effectiveness of potential transmission solutions throughout their asset life. At a minimum, the LCR value should be at least equal to the soft-offer cap ($6.31/kW-mo.) used for the ISO's Standard Capacity Procurement. There is no basis for any value less than the soft offer cap which is an estimate of the going-forward costs for existing units plus a 20 percent adder.	As the ISO noted in the 2018-2019 transmission planning cycle, the ISO is using an appropriately conservative approach to valuing alternatives for reducing reliance on existing gas-fired generation in local capacity areas, given indications from the CPUS's integrated resource planning process for the continued need for those resources for system capacity. The ISO intends to continue this approach in the 2019-2020 cycle and will continue to participate in the CPUC's IRP process accordingly.
7d	<u>Public Policy Requirements and CTP Benefits</u> In this year's TPP cycle, the ISO will perform assessments to evaluate transmission solutions needed to meet state, municipal, county or federal policy requirements or directives. The CPUC provided a Base Portfolio as well as two Sensitivity Portfolios for CAISO study. We believe CTP will be able to support delivery of renewable energy between northern and southern California to facilitate the ability of load serving entities to access renewable energy in the Base Portfolio (and the two Sensitivity Portfolios) that is needed to meet their RPS responsibility. And, its unique location offshore offers California an option to interconnect and deliver up to 2,000 MW of economic wind energy if future portfolios include new build for offshore wind.	The comment has been noted.

8. GridLiance West (GLW) Submitted by: Jody Holland		
No	Comment Submitted	CAISO Response
8a	1. <u>Comment on Remedial Action Schemes for Policy-Driven Assessment Mitigation</u> GridLiance West requests that CAISO consider transmission upgrade projects when analyzing the system for mitigation plans in the policy assessment. The status quo alternative of increasing the number of Remedial Action Schemes (RAS) needed to protect against grid contingencies is not recommended. GridLiance West's preferred alternative would be to rebuild existing transmission lines to decrease dependency on RAS installations. New transmission capacity represented by infrastructure improvements rather than through use of mitigation processes will strengthen the electrical grid and increase overall grid reliability. Also, increasing the transmission capacity would support the CAISO system's ability to achieve the CPUC's greenhouse gas emission reduction targets for 2030. GridLiance West believes exploring transmission system upgrade alternatives would be beneficial and strongly encourages CAISO to do so. If CAISO does not intend to include transmission upgrade projects as alternatives to RAS installations in the policy case, GridLiance West requests an explanation why CAISO has declined to do so.	The ISO has provided transmission capability estimates for the VEA area that assumes that cost effective RAS could relied upon. The ISO's understanding is that Gridliance agrees with the 700 to 800 MW existing system transmission capability estimate provided for the VEA area.
8b	2. <u>Request for Clarification Regarding the TPP Policy-Driven Assessment Methodology</u> CAISO staff showed a schematic on electronic slide 219 of how the Deliverability Assessments and the Production Cost Simulations feed into the next cycle of the IRP. Given the transmission availability limits CAISO provided to CPUC in 2018, based primarily on the Deliverability Assessment, it is unclear whether the production cost model ever provides information into the IRP other than to potentially further restrict IRP buildout siting. In other words, given that for all but one CREZ area, CAISO's deliverability-based limits prevented renewable buildout in those affected areas. As a result, the production cost modeling in TPP will never find constraints to evaluate in those CREZs or sub-CREZs. GridLiance West continues to encourage the CAISO staff to consider how they could examine in the TPP those constraints that were indicated by the deliverability assessment to ensure through production cost modeling that the	The ISO publishes the production cost results summarizing renewable curtailment in each of the renewable zones identified in the portfolio and provides this as an input into the IRP. The ISO is continuing to work with the CPUC on refining the EO portion of RESOLVE. The 1448 MW of solar resource in Westlands mapped by the CEC as "new build" will be assumed to interconnect to one of the 500 kV lines connected to Gates 500 kV or at Gates 500 kV substation. The 489 MW solar resource in Greater Carrizo mapped by the CEC as "new build" will be assumed to connect to near Morro Bay 230 kV.

No	Comment Submitted	CAISO Response
	limits and costs for exceeding the limits are also proven out in the production cost modeling. Similarly, GridLiance West encourages CAISO to reconsider the method by which it defines energy-only inputs to CPUC. The simple rule applied in 2018 – to not allow any energy only resources beyond the level of dispatchable (e.g., thermal) resources in an area - seems to offer no assurance of an optimal generation/transmission mix. GridLiance West would like additional details about the CAISO's siting assumptions associated with the resource sets labelled "new build" in the 2018/2019 IRP portfolio. It seems the siting of these resources was left to the CAISO TPP staff. GridLiance West requests that the staff share the MW quantity, resource type and bus of the mapping of those renewables in the IRP portfolio.	

9. Imperial Irrigation District (IID) Submitted by:		
No	Comment Submitted	CAISO Response
9a	IID appreciates the opportunity to provide comments on the CAISO's draft 2019-2020 Transmission Planning Process (TPP) Study Plan based on the information presented at the September 25, 2019 stakeholder meeting. IID has been reviewing potential participation in the North Gila to Imperial Valley #2 Project (NGIV2) for several years and has included the project in its recently adopted Integrated Resource Plan. IID believes NGIV2 will be a benefit to IID ratepayers both near and long term to help IID continue to be deliver low-cost energy. Specifically, IID believes NGIV2 will benefit IID by: • Increasing reliability for the greater Imperial Valley area and providing an additional import/export outlet through the interconnection of the NGIV2 Project to the IID Highline 230kV substation; • Providing access to IID's currently stranded bi-directional transmission capacity on the Palo Verde to North Gila path (including access to IID's ownership in the Hassayampa – North Gila #2 capacity); and • Further strengthen the IID transmission system to enable delivery of additional renewable energy, including geothermal resources, to the CAISO and WestConnect areas. While IID has not yet executed a full participation agreement with the NGIV2 Project development team, IID is considering and evaluating potential ownership in the project. For planning purposes only at this time, the CAISO Economic Modeling may include a scenario with an up to 30% ownership of NGIV2 by IID with the remainder being recovered as planned with the CAISO. Please note the 30% is a high level estimate for purposes of modeling only; although IID is exploring potential ownership, no definitive agreements have been negotiated and any such agreements would be subject to review and approval by the IID board of directors.	The comment has been noted. The ISO notes that the NGIV2 project was considered in the 2018-2019 transmission planning cycle, and was not identified through the interregional planning process as being carried forward into the 2nd year (the 2019-2020) of the two-year interregional planning process for more detailed study. This project may seek to be revisited in the 2020-2021 transmission planning cycle, which is an "intake" year in the interregional coordination process.

10. LS Power Development (LS Power) Submitted by: Sandeep Arora		
No	Comment Submitted	CAISO Response
10a	(1) Contract Path Model should be implemented in ABB Gridview so economic benefits of transmission projects can be correctly quantified. In last few TPP cycles, CAISO has not implemented the "contract path" feature in its ABB Gridview software. Implementing this feature is critical in capturing accurate economic benefits of transmission projects that connect CAISO's Balancing Authority Area (BAA) to other BAAs in the WECC. CAISO has noted in the past that it intends to implement this enhancement in future TPP cycles; and we strongly recommend that CAISO implement this feature in the 2019/2020 TPP. Absent this implementation, CAISO studies will yet again significantly underestimate the economic benefits of transmission projects that provide new transmission capacity for the CAISO BAA to transact with other BAAs. WECC Anchor Data Set (ADS) Production Cost Model (PCM) models have standard wheeling charges that apply for any transactions between two BAAs. Unless this contract path feature is implemented, it is not possible to separate a new "no wheeling charge" transmission path from standard wheeling charges between two BAAs. For instance, LS Power's Southwest Intertie Project North (SWIP-North), which is proposed as an Economic Project to CAISO in this TPP cycle, offers a 1000 MW new transmission path between Idaho Power (Midpoint) and CAISO (Harry Allen), free of any wheeling charges. As a parallel path to existing major CAISO interties; COI, PACI, and NOB, SWIP-North provides an alternate path for economic energy from the Pacific Northwest to flow into California, especially during evening peak and allows exports out of CAISO during middle of the day oversupply conditions. Standard WECC ADS PCM models will use the default $9.94/MWh wheeling charge for imports into CAISO from Idaho Power and $19.77/MWh for exports from CAISO to Idaho Power. This creates an "artificial" barrier for economic energy to transfer between CAISO & Idaho Power and hence significantly undermines the benefits of a transmission project like SWIP-North. The contract path feature in ABB Gridview allows implementing a "no wheeling charge path" for a portion of transmission capacity between two BAAs while still retaining standard wheeling charges for the remaining transmission capacity.	The ISO will conduct congestion analysis in details and will evaluate economic studies identified or submitted to the current planning cycle. The ISO has consistently considered physical capability as opposed to contract path capacity in its analysis. This approach aligned pragmatically with recognizing the potential to explore utilizing underutilized parallel contract path capacity in lieu of pursuing construction of new facilities – which constitute a long term expectation of continued benefits. The ISO is nonetheless considering GridView's new contract path feature that provides a new approach to model transmission right in production cost simulation study. However, thorough review and validation are needed for this new software feature, and in particular, a consistent approach would need to be implemented across the western interconnection. Especially, transmission rights are modeled in the current ADS PCM using a different approach, which is also provided by ABB GridView. Instead of applying the new feature to a specific project only, the ISO sees it necessary to evaluate the implication of the new feature to the current ADS PCM model. The ISO will work with other planning regions and WECC in the ADS PCM process for reviewing the transmission right model in the ADS PCM. The stakeholder is encouraged to participate into the ADS PCM process to support the transmission right model review.

No	Comment Submitted	CAISO Response
	LS Power recently tasked ABB Inc. to conduct a study for its SWIP-North project by implementing a contract path model for 1000 MW of transmission capacity (out of a total 2000 MW) on SWIP-North. This study utilized the production cost model from CAISO's 2018/19 TPP as a starting point and ran production cost simulation on three scenarios. Scenario 1 was the baseline scenario "without SWIP-North", Scenario 2 modelled SWIP-North "without" contract path and Scenario 3 modelled SWIP-North with contract path such that there were "no" wheeling charges on 1000 MW of transfers between CAISO and Idaho Power for both imports and exports. Production cost simulations were run for the three scenarios. Comparing results for Scenario 1 & 2 showed no economic savings from SWIP-North, consistent with CAISO's study findings from 2018/19 TPP, which is a misleading conclusion since a contract path is not modelled. Comparing Scenarios 2 & 3, showed an estimated $67m/year economic savings from SWIP-North to CAISO ratepayers. When the contract path model was correctly capturing the proposed "no" wheeling charges from SWIP-North, the path was heavily utilized, allowed for intra-day bidirectional flows by facilitating more imports into CAISO during evening peaks and exports out of CAISO during oversupply middle of the day hours. The purpose of this study was not to quantify SWIP-North benefits, as much as to be able to test the contract path modelling functionality. The study succeeded in implementing contract path modelling for SWIP-North in ABB Gridview and demonstrated how important this modelling is to correctly capture economic benefits of transmission projects that connect two BAAs. We recommend CAISO implement contract path modelling for its economic planning study in 2019/2020 TPP and use this to capture economic benefits of transmission projects such as SWIP-North. We can make available our study findings to CAISO should that be of any help. Details on LS Power's SWIP-North Project are provided below. <u>SWIP-North Project</u> SWIP-North is comprised of a 500 kV transmission line from Midpoint substation to Robinson Summit substation. Additional details of SWIP-North are included in the submission of SWIP-North as an Interregional Transmission Project in March 2018 under the 2018/19 TPP. After SWIP-North is built, LS Power's affiliate will attain approximately 1000 MW of new transmission	

No	Comment Submitted	CAISO Response
	capacity that will become available on the existing 500 kV transmission line that connects Robinson Summit to Harry Allen substation ("ON Line"), as per the Transmission Use and Capacity Exchange Agreement ("TUA") among LS Power affiliates and NV Energy, which is further described below. LS Power has proposed this new additional ~1000 MW capacity to be dedicated for CAISO use. In addition, the new 500 kV line from Harry Allen to Eldorado was approved by CAISO to be in-service by 2020. Upon completion of the Harry Allen to Eldorado project, Harry Allen will be a CAISO delivery point. Hence, if SWIP-North was selected by CAISO, CAISO will have access to a complete 500 kV path from Midpoint to Eldorado, approximately 575 miles. Pursuant to the TUA with NV Energy, once SWIP-North is built there would be an exchange of capacity between LS Power affiliates and NV Energy. Upon completion of SWIP-North, NV Energy would get a share of the capacity between Midpoint and Robinson Summit and LS Power affiliate Great Basin Transmission would get a share of capacity between Robinson Summit and Harry Allen, without either party having to pay any amount to the other. As a result of this capacity exchange, LS Power's affiliate would have bidirectional transmission capacity on the entire path from Midpoint to Harry Allen, estimated at approximately 1000 MW. LS Power's economic study request in the current TPP cycle is for CAISO to study the benefits of approximately 1000 MW of bidirectional transmission capacity between Midpoint and Harry Allen, which would be available to the CAISO market upon completion of construction of SWIP-North.	
10b	(2) Economic Benefits in addition to Production Cost Savings LS Power supports CAISO's efforts in improving its study methodology such that economic benefits of a transmission project in helping reduce renewable curtailment can be correctly quantified. We believe this will be a very meaningful addition, especially for transmission projects that can help increase interchange transfers between CAISO and other BAAs. For instance, under system wide oversupply conditions, if CAISO is able continue generating renewables (rather than curtailing) and export the energy to other BAAs that will bring additional economic benefits to CAISO ratepayers and these should be correctly captured and attributed to the enabling transmission projects. We further recommend that CAISO include the following additional benefits in its	The comment has been noted. ISO's TEAM methodology has identified different categories of benefits, including production cost benefit and other benefits, which capture the benefits that this comment suggested. Please refer to the TEAM document on the ISO's website, which also describes the methods for assessing these benefits.

No	Comment Submitted	CAISO Response
	economic study methodology: Capacity savings from reduced renewable curtailments, Green House Gas emission savings, Load diversity and Flexible Capacity reserve sharing benefits. Failure to account for these benefits (and only look at production cost savings) heavily undermines the economic benefits transmission projects are able to provide, especially projects that connect CAISO BAA to external BAAs.	
10c	(3) Economic Assessment of Local Capacity Areas LS Power recommends CAISO perform an economic assessment of Local Capacity Reduction for SDG&E/IV & SCE's LA Basin Areas and model an Energy Storage project connected to SDG&E's Imperial Valley 230 kV substation as a solution to reduce LCR. Over the last few Local Capacity Requirement study cycles, the worst constraint for overall SCE LA Basin & SDG&E/IV areas for 2020 and 2024 study years has been thermal overloads on IV - El Centro 230kV transmission line & El Centro 230/92 kV transformers. This constraint becomes much worse under evening peak conditions when there is no solar generation available. In order to address this constraint, the most effective location for generation is Imperial Valley, followed by reduction in effectiveness going west from Imperial Valley into SDG&E load pocket and down to SCE's LA Basin area. Since not enough generation at Imperial Valley is available during evening peak in order to address this LCR constraint often less effective generation west of Imperial Valley is counted on which increases the LCR need for SCE & SDG&E TAC areas and increases the reliance on OTC generation in Western LA Basin pocket. For this study, we recommend CAISO model an Energy Storage project connected to Imperial Valley substation and study economic impacts of this project being able to reduce overall LCR requirements. We recommend the project be at least 100 MW and 4 hours in duration. The Energy Storage project can either be assumed to providing transmission service with its cost rolled into TAC or a hybrid project with a portion of its costs being rolled into TAC and the rest being recovered by participation into CAISO markets. This project should also be able to address the system capacity need CAISO has recently identified in CPUC's 2017-18 IRP proceeding. LS Power can provide more information to CAISO with respect to modelling, cost, and timing as needed.	The ISO performed an economic analysis of a storage facility located at Imperial Valley substation in the 2018-2019 TPP, and documented the results in the corresponding transmission plan.

11. NextEra Energy Resources Submitted by: Francis Wang and Jason Schmidt		
No	Comment Submitted	CAISO Response
11a	The comments below reflect NextEra's request submitted on March 14, 2019 per CAISO 2019-20 Transmission Planning Process (TPP) the Red Bluff – Mira Loma 500 kV line proposal as economic transmission project and the acceptance by CAISO in the 2019-20 TPP Study Plan including technical studies discussed during the September 25-26th stakeholder meeting. <u>Previously Studied Project in the 2018/2019 Study Plan</u> NEER recognizes the Red Bluff – Mira Loma 500 kV Transmission Project was studied as an economic study request in the 2018/19 TPP. Using the Base Case only, the ISO's 2018/19 analysis concluded the benefit to cost ratio was not sufficient to find the need for the project and concluded that it may need to be revisited in the future as shown on Page 315 of the final report: • Based the TEAM ratepayer perspective, the benefit to cost ratio was not sufficient for the ISO to find the need for this project. • This result may need to be revisited in the future, as conservative values were applied for the local capacity in the LA Basin area due to the uncertainty regarding future system requirements for the gas-fired generation fleet in the area, and the need for further coordination with the CPUC's IRP process and direction from that process. The ISO notes that consideration of system capacity requirements - which would heavily influence the capacity benefits assessed here - is best addressed within the IRP process. As noted in the conclusions of the last study plan above, the assumptions were "conservative and the project should be revisited in the future".	The comment has been noted. The conservative assumptions in the 2018-2019 transmission planning cycle referred to in the comment related to overall valuation of potential reductions of local capacity resources – those assumptions are not being changed in the 2019-2020 transmission planning cycle.
11b	<u>Analysis using 42 MMT Case</u> In the beginning of the 2019-20 TPP cycle, the CAISO published the new 42 MMT case in response to aggressive renewable goals set by CEC. The 2019/20 Base plan as proposed and presented has a base case statewide electric sector GHG reduction target of 42 million metric tons (MMT) by 2030 as set forth in Senate Bill (SB) 350. Using the 42MMT case published by the ISO from the 2018-19 transmission plan, NEER has performed a Production Cost Model (PCM) Analysis using GridView the same tool used by CAISO to	The comment has been noted.

<table>
<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>evaluate economic transmission projects. The analysis used the case as available from the ISO as the Base case, and Red Bluff to Mira Loma 500 kV line added with the line limits enforced, with no additional changes, and the proposed project as described below.</td><td></td></tr>
<tr><td>11c</td><td><u>Project Description</u>
• New ~140 mile 500 kV transmission line between the Red Bluff 500 kV substation and Mira Loma 500 kV substation (Line ratings: 3,421 MVA Normal, 3,880 MVA Emergency).
• 50% Series Compensation with an optimal location in the line to be determined from further studies (Line ratings: 3,291 MVA Summer Normal, 3,949 MVA Summer Emergency).
• Estimated capital cost $850 million.
• Replicating the Benefit to Cost Ratio methodology of the ISO per TEAM methodology, provide a benefit to cost ratio of 1.3, as shown in the table below.

<table><tr><td>Ratepayer Benefits ($million/year)</td><td>104</td></tr><tr><td>PV of Prod Cost Savings ($million)</td><td>1431</td></tr><tr><td>Capital Cost Estimate ($million)</td><td>840</td></tr><tr><td>Estimated "Total" Cost (screening) ($million)</td><td>1105</td></tr><tr><td>Benefit to Cost</td><td>1.3</td></tr></table></td><td>The comment has been noted.</td></tr>
<tr><td>11d</td><td><u>Summary of Benefits</u>
The Red-Bluff to Mira Loma project is long-term multi-value project which addresses reliability, economic and policy considerations, including the following:
• Economic Load and System Production Cost Savings</td><td>This projected has been submitted as an economic study request, and the ISO will consider it in the prioritization and selection of high priority studies for the 2019-2020 planning cycle..</td></tr>
</table>

No	Comment Submitted	CAISO Response
	• Capacity Deferral Savings • Relieve Constraints for interconnecting new Renewable Generation and storage resources • Reduces Renewable curtailments • Provides Deliverability to existing generation resources • Provides reliability support of underlying transmission system	
11e	<u>Request for Model</u> NextEra appreciates the time and effort undertaken to produce the Gridview Production Cost Model used to incorporate the more aggressive CEC and CPUC assumptions, stakeholder input to follow the planning process. NextEra requests the preliminary model be posted when the preliminary policy and economic study results are reviewed in November, so all stakeholders can review during the comment period. Having full access to the preliminary model will provide a first glance for stakeholders to validate what is outlined in the transmission plan and provide feedback to the ISO.	The ISO is starting from the WECC ADS model; Nextera can review that case and provide comments to the ISO.

12. North Gila Imperial Valley #2 Submitted by:		
No	Comment Submitted	CAISO Response
12a	Draft Reliability Assessment Results NGIV2, LLC notes that the 2019-2020 TPP reliability assessment continues to show that a contingency involving the existing North Gila – Imperial Valley 500kV line (known as the Southwest Powerlink or SWPL) causes multiple reliability concerns (P2 – P6) across the SCE Metro, SCE East, and the greater San Diego/Imperial Valley area. New this year specifically, the assessment shows the need for additional remedial action schemes ("RAS") within the IID area for outages along the Coachella Valley – Ramon/Mirage – Devers path. While the existing IID RAS should be sufficient for the existing resources connected in this area, the addition of several hundred MWs of additional generation within IID's system will require additional transmission to minimize the reliability risk for the region. The proposed interconnection of the NGIV2 project to the IID Highline 230kV collector system has been shown to reduce some of the reliance of the IID RAS (reference the NGIV2 WECC Three Phase Rating report). NGIV2 requests that this be analyzed further within the Local Capacity Requirement (LCR) analysis for the SCE Metro, SCE East, and greater San Diego/Imperial Valley area for the base case and scenario cases.	The transmission upgrades needed on the IID system to deliver IID connected generation out of the IID system will be determined by IID. Please refer to the response to comments submitted by IID (Comment 9a).
12b	Economic Study Plans NGIV2, LLC's economic study request was submitted as a component of the CAISO 2019-2020 Study Plan to evaluate the economic benefits of the NGIV2 project. Our request included CAISO analyzing congestion relief in the LA Basin and San Diego areas due to improvements in transfer capability between Arizona and Southern California and also assessing LCR reductions in the Imperial Valley area – while also considering reliability, operational flexibility, and public policy benefits of the NGIV2 project in its analysis. There are several assumptions that NGIV2 considers critical to the assessment of the Project that we would like included in CAISO's analysis and they are outlined below.	The comment has been noted.
12c	Accurate NGIV2 Model: As part of the WECC Three-Phase Rating Process, the NGIV2 was granted a Accepted Rating on Path 46 of 12,450MW, an increase of 1,250 MW. As such, the CAISO should include this incremental capacity on Path 46, and its associated benefits for relieving constraints, in its economic analysis of the Project. CAISO should also set the binding constraint for Path	The new information has been noted.

<table>
<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>46 to 12,450 MW for the post-NGIV2 economic case. The assumptions CAISO used for the NGIV2 model in the 2018-2019 GridView assessment case are incorrect and the correct parameters that should be used are included in the following Table 1 (values are in per unit, 100MVA base).
<table>
<tr><th>Circuit From-To</th><th>Distance</th><th>Pu R+</th><th>Pu X+</th><th>Pu R0</th><th>Pu X0</th><th>Pu B</th><th>SN</th><th>SE</th><th>WN</th><th>WE</th></tr>
<tr><td>North Gila – Series Comp. (Dunes) 500 kV</td><td>61 mi</td><td>0.00061</td><td>0.01401</td><td>0.00894</td><td>0.04205</td><td>1.08865</td><td>2598</td><td>2598</td><td>2598</td><td>2598</td></tr>
<tr><td>Series Comp @ Dunes</td><td>N/A</td><td>0.00001</td><td>-0.01</td><td>N/A</td><td>N/A</td><td>N/A</td><td>2338</td><td>2338</td><td>2338</td><td>2338</td></tr>
<tr><td>Imperial Valley – Dunes 500 kV</td><td>36 mi</td><td>0.00036</td><td>0.00827</td><td>0.00524</td><td>0.02467</td><td>0.6425</td><td>2598</td><td>2598</td><td>2598</td><td>2598</td></tr>
</table>
<table>
<tr><th>Transformer</th><th>Winding</th><th>Pu R+</th><th>Pu X+</th><th>Pu R0</th><th>Pu X0</th><th>SN</th><th>SE</th><th>WN</th><th>WE</th></tr>
<tr><td>New Dunes 500/230 kV Transformer (to Highline 230kV)</td><td>Auto</td><td>0.0001</td><td>0.00892</td><td>0.0001</td><td>0.00892</td><td>1120</td><td>1120</td><td>1120</td><td>1120</td></tr>
</table>
Table 1: NGIV2 Model for GridView</td><td></td></tr>
<tr><td>12d</td><td><u>Path 26 Congestion:</u> NGIV2 has performed an independent economic analysis to benchmark the CAISO 2018-2019 Economic Assessment results (pre and post NGIV2). In addition to the errors in the modeling of NGIV2 (and the incremental capacity to Path 46), we were able to identify the specific areas of congestion that we believe should be examined for the 2019-2020 assessment with the NGIV2 Project. As shown in Figure 2, the majority (73%) of the Path 26 congestion reported in the assessment is attributed to a single hour (Hour 1, 11/5/2028) where the PDCI maxed out for that one hour (N to S), and forced the Path 26 to hit a limit S to N. This points to an issue within GridView and modeling of HVDC systems that we have discussed before.</td><td>The ISO used the data submitted to the ISO to evaluate study requests and to model projects under study. The stakeholder can submit supplementary data to the ISO for review and evaluation.

The ISO will conduct congestion analysis based on the 2019~2020 planning PCM, and will share the preliminary results with stakeholders in the November stakeholder meeting.</td></tr>
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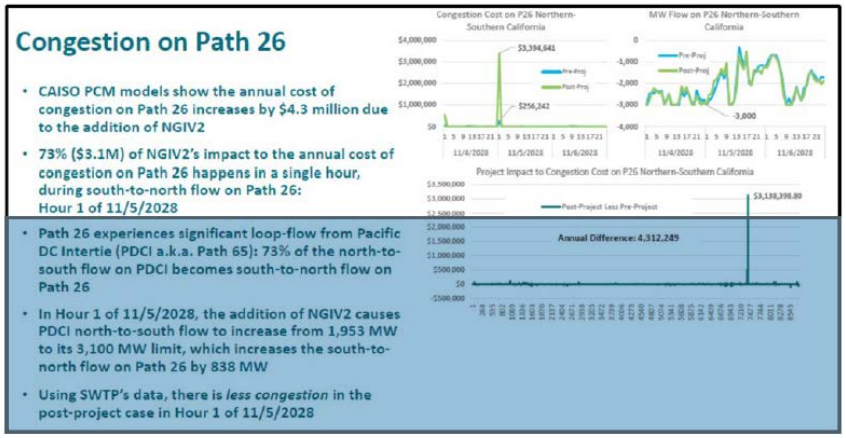
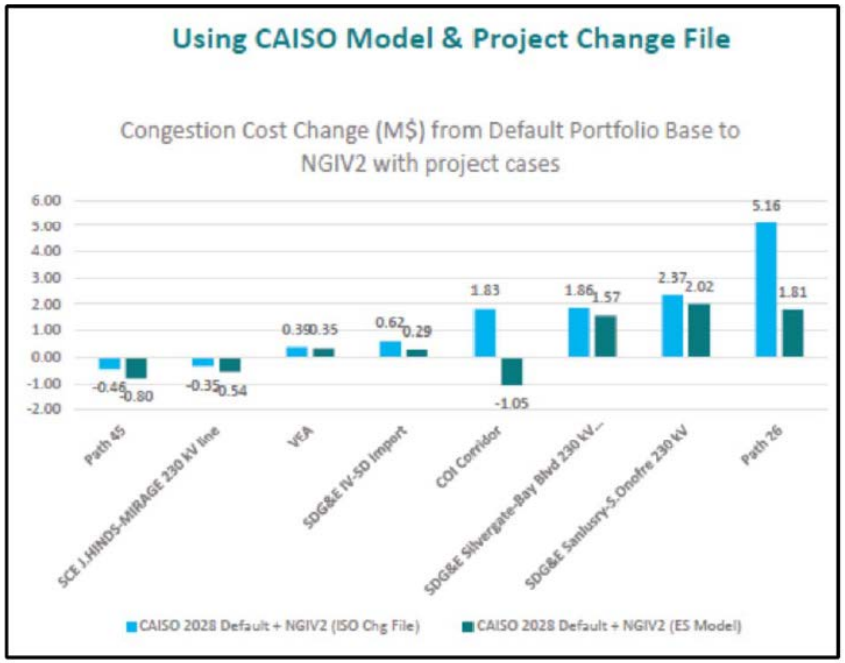
No	Comment Submitted	CAISO Response
	 **Figure 2: Path 26 Congestion due to PDCI**	
12e	Other Reported Congestion: While comparing the NGIV2 benchmarked economic model from the 2018-2019 assessment and the accurate NGIV2 model recently completed, several of the congestion costs reported in the 2018-2019 assessment are less of an impact than noted or in some cases, including COI, the NGIV2 Project actually reduces congestion instead of increasing congestion. Please refer to Figure 3 for a comparison of the reported congestion impacts due to the NGIV2 Project.	The comment has been noted. Please also refer to the response to comment 12d. The ISO notes that the impact of a new project on congestion will change when the model changes. Both the ISO's study in the last cycle and the NGIV2's benchmark study showed that the NG-IV #2 project increase some congestion but decrease others. More importantly, the TEAM requires using the ratepayer's benefit to measure against the project cost in economic assessment. Congestion cost is only one of many elements to be considered in ratepayer's benefit calculation.

No	Comment Submitted	CAISO Response
	 **Figure 3: Congestion comparison with CAISO vs NGIV2 model** Because of the discrepancies in this comparative analysis, NGIV2 requests additional transparency while conducting the 2019-2020 economic analysis, including: continued discussions with those that have submitted projects earlier in the process with preliminary findings, providing raw output files to assist in identifying data anomalies similar to the error with PDCI causing congestion on Path 26, and communicating enough to reach a consensus on the findings from the analysis given the assumptions anticipated in the Study Plan.	
12f	<u>Economic Assessment of Local Capacity Reduction</u> As noted, the 2019-2020 TPP LCR assessment will include several new areas not previously studied in the 2018-2019 TPP. However, it is noted that the greater San Diego/Imperial Valley area will be studied again this year in conjunction with some of the western LA Basin assessments. The CAISO has indicated (in response to a question at the 2/14 stakeholder meeting) that its	The loss of the existing NG-IV #1 line followed by system adjustments and then the loss of the proposed NG-IV #2 line at least 30 minutes later is a NERC P6 contingency.

No	Comment Submitted	CAISO Response
	determination that the NGIV2 project has the potential to reduce LCR for the San Diego/Imperial Valley area by 865 MW was based on an N-1-1 analysis of the existing North Gila – Imperial Valley (SWPL) line and one of the segments of the NGIV2 project, specifically the Highline to Imperial Valley segment. The NGIV2 project will include a minimum 250-foot separation from the existing North Gila – Imperial Valley (SWPL) line and we therefore expect that the modeled outage would be considered an Extreme Event, rather than a P6. We request that the CAISO clarify whether this provides flexibility for further actions and reductions of the LCR. The previous determination in the 2018-2019 assessment showed a 100MW incremental impact on the LA Basin LCR and its subsequent impact on the overall net benefits of the NGIV2 project, was limited by a 1% overload on the Mesa – Laguna Bell 230kV line under the N-1-1 of Mesa-Redondo and Mesa-Lighthipe 230kV circuits. For the 2019-2020 assessment, we request that CAISO also evaluate scenarios that would make other system adjustments following the N-1 to reduce the 1% overload following the subsequent N-1. These adjustments should include potential operational solutions referenced in the draft Transmission Plan that "are often selected in lieu of transmission upgrades." By doing so, the economic and LCR reduction benefits of the NGIV2 project would further increase by approximately 11%.	The Mesa – Laguna Bell 230 kV line is a newly created line after the loop-in of the Goodrich – Laguna Bell 230kV and the Laguna Bell – Rio Hondo 230kV lines into the Mesa Substation. As such, there is no operational solution other than dispatching available resources to mitigate the potential overloading concern on the Mesa – Laguna Bell 230kV line. As part of system readjustment after the first N-1, the CAISO did utilize available CPUC-approved long-term procurement plan preferred resources, as well as available demand response that can be dispatched on-line within 30-minute timeframe to help mitigate the line loading concern. As the LA Basin and San Diego-Imperial Valley area are electrically interdependent, a significant reduction of almost 900 MW of resources in the San Diego-Imperial Valley area is expected to cause transmission facility loading impact in the western LA Basin. The 100 MW incremental LCR impact was determined with the assumption of new resources located at effective location in the western LA Basin.

13. Pacific Gas & Electric (PG&E) Submitted by: Matt Lecar		
No	Comment Submitted	CAISO Response
13a	<u>OCEI is still needed</u> PG&E's proposed Northern Oakland Area Reinforcement Project is a long-term combination of transmission solutions that will address a number of needs, including load serving capability increase, public safety (replacing infrastructure in high fire risk areas that has been identified as needing lifecycle upgrades), and addressing the 2010 NERC Recommendations to Industry. As this is a major, multi-pronged project, in a densely populated, urban portion of the system, PG&E anticipates that this project, if approved, will take at least 7 years, if not longer, to site, permit, and construct. PG&E requests that CAISO confirm in this year's Transmission Plan that the Oakland Clean Energy Initiative (OCEI), which was approved in the 2017-18 TPP and subsequently modified in the 2018-19 TPP, is still necessary to provide near-term reliability within the North Oakland subarea. OCEI can be brought into service quickly (by the end of 2022), as compared to the construction of the long-term transmission solutions. During this timeframe, PG&E expects CAISO to facilitate a coordinated, phased transition and termination of the Reliability Must Run (RMR) agreement with the Vistra Oakland Power Plant, in tandem with the new OCEI resource additions. PG&E appreciates CAISO confirming the continued need for the OCEI and requests CAISO use this year's Plan to identify the location and amounts of any additional resource requirements associated with the incremental load growth in this year's forecast.	The need for the OCEI project is still required in the near-term with the risk of the aging generators in the Oakland area meeting the requirements of the area. The transmission upgrades are scheduled to be in service in 2022 which provides for the opportunity for preferred resources to meet the reliability needs in the near-term. The ISO will continue to coordinate on the longer-term capital and maintenance needs in the area.

14. Public Advocates Office Submitted by: Lina Khoury		
No	Comment Submitted	CAISO Response
14a	1. The CAISO should investigate and evaluate other mitigation alternatives for Transmission Request Window Proposals based on the reliability need to address North American Electric Reliability Corporation (NERC) category P2-2, P2-3, P2-4, and P6 upgrades. During the September 26, 2019, stakeholder meeting, Pacific Gas and Electric Company (PG&E) presented several projects that were identified as needed based on the P2-2, P2-3, P2-4 and P6 contingency overloads. However, special protection schemes (SPS) and/or congestion management are feasible solutions for these contingency overloads. The CAISO's preliminary assessment also shows that the use of an SPS is an appropriate solution for contingency overloads. Listed below are several such projects that may not require capital upgrades to mitigate contingency overloads at this time. During the September 25, 2019, stakeholder meeting, the CAISO indicated that it would determine the need for the capital mitigation solutions to address P2 and P6 contingencies on a case-by-case basis. The Public Advocates Office recommends that the CAISO consider competing low-cost mitigation alternatives when evaluating the following PG&E's proposed projects: 1. Wilson-Oro Loma 115kV Line Reconductoring; 2. East Shore 230 kV Bus Terminals Reconfiguration: The project driver is P2-3 internal breaker fault; 3. Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition: The project driver is P2-4 bus sectionalizing breaker at Newark 230kV Substation; 4. New Oakland X to Oakland L Line: Project drivers are the P6 (N-1-1) on Moraga-Claremont, Moraga-Oakland, D-L, C-L, C-X 115kV Circuits;7 and 5. Moraga 230kV Bus Upgrade: The project driver is a P2-4 internal breaker fault.	With respect to 1) Wilson-Oro Loma 115 kV line reconductoring, the existing 115 kV system is Bulk Electric System that is operated as a looped system and per the NERC TPL-001-4 mandatory reliability standards the performance requirements for a P2-1 contingency is for no Non-Consequential load shedding. With this an SPS is not acceptable mitigation for this contingency. With respect to 2-5) the proposed project are within the Greater Bay area, which is in a high density urban area, and as per the ISO Planning Standards, the SPS would not be acceptable mitigation in the long-term.
14b	2. Transmission Request Window Proposals identified in the sensitivity scenarios and not identified in the CAISO's base case assessment should not be approved. During the September 26, 2019, stakeholder meeting, Gridliance Pahrump, San Diego Gas & Electric Company (SDG&E), and PG&E identified some project needs based on certain contingency overloads. However, the Public Advocates Office observes that the CAISO's preliminary assessment results either do not	

No	Comment Submitted	CAISO Response
	identify those overloads or identify the overloads only in the CAISO's sensitivity scenarios. Therefore, the CAISO should clarify whether these projects are needed or not needed at this time. These transmission projects are as follows:	
	a. GridLiance's Pahrump – Carpenter Canyon and Trout Canyon – Sloan Canyon 230 kV Line Rebuild Project: GridLiance proposed the Pahrump – Carpenter Canyon and Trout Canyon – Sloan Canyon 230 kV Line Rebuild Project in order to mitigate P1, P4, P6, and P7 overloads identified on the same circuits. The CAISO's preliminary assessment on the overloads identified by GridLiance only appear in the Off-Peak High Renewables and Minimum Gas Generation scenarios.	The ISO will evaluate the need as part of the ongoing Phase II of the TPP and inform the stakeholders whether the project is needed or not needed through stakeholder presentations and the 2019-2020 Transmission Plan.
	b. SDG&E-proposed Bay Blvd-Silvergate Transmission Line: SDG&E identified the need for the project as due to a 106% overload on Silvergate-Bay Boulevard 230kV transmission line if there is loss of TL23071 Sycamore-Penasquitos 230kV transmission line. However, the CAISO's preliminary assessment results do not identify any P1 overloads on the Silvergate-Bay Boulevard 230kV circuit. The Public Advocates Office's review of the CAISO's preliminary assessment indicates that the only overloads identified are for the P6 overloads, which are in the sensitivity cases. Therefore, this project should not be approved.	The Public Advocates Office's comment is noted. As part of the transmission planning process, the ISO requested and evaluated the study cases based on which the overloads were identified by SDG&E. It is the ISO's understanding that the 106% overload identified by SDG&E is based on the continuous rating of Silvergate-Bay Boulevard 230kV line. Actually, this line has two-hour short term emergency rating, which is 29% higher than its continuous rating. The current ISO market congestion management has enough time to bring the power flow level within its continuous rating by re-dispatching generation in the area.
	c. SDG&E-proposed TL230XX New 230kV Encina-San Luis Rey #2:SDG&E identified that the need for the project is due to the loss of TL230003 (Encina-San Luis Rey) loads TL23011 (Encina-San Luis-Escondido) to 106%-120% of its rating limit. The CAISO's preliminary results do not show any identified overloads on the Encina-San Luis 230kV circuits for any type of contingency.	The P1 overload concerns were driven by potential system operation condition with heavy northbound flow through north of San Onofre 220 kV path from SDG&E to SCE. The ISO 2017-2018 Transmission Plan evaluated the potential congestions and confirmed that current congestion management was sufficient to eliminate the overload concerns without resulting in significant congestion cost.

No	Comment Submitted	CAISO Response
14c	3. PG&E-proposed Northern Oakland Area Reinforcement Project should not be approved in the current TPP cycle. PG&E has proposed major transmission upgrades in the Northern Oakland Area to address Oakland's long-term load needs. The scope of the Northern Oakland Area Reinforcement (NOAR) project includes the following four elements: 1. Moraga Oakland X Lines Rebuild; 2. Moraga Claremont 115kV Lines Reconductoring; 3. 3. New Oakland X to Oakland L Line; and 4. 4. Moraga 230 kV Bus Upgrade. The CAISO found long-term load issues in the Northern Oakland area and acknowledged that the East Bay area load appears higher than its historical recorded load. However, the CAISO indicated that it needs to confirm loads at stations served by the overloaded lines.14 The Public Advocates Office supports the CAISO's decision to fully investigate the load growth assumptions and the load distribution. The CAISO indicated that the Moraga-Sobrante 115 kV reconductoring project is on hold due to change in load in the East Bay division based on the load forecast and distributed energy resources on the distribution system. The Public Advocates Office also questions the need for the elements of the Northern Oakland Area Reinforcement (NOAR) project. PG&E indicated that one of the reasons for rebuilding the Moraga Oakland X 115kV lines is because these circuits cross Tier 2 and Tier 3 High Fire Threat District (HFTD) areas. However, the proposed project to rebuild the three lines with higher capacity would still cross through the same Tier 2 and Tier 3 (HFTD) areas. Therefore, it is unclear how the proposed project protects the Oakland area customers from any potential de-energization that would occur as a result of wildfire impact. Moreover, this project exacerbates the contingency overloads on the Moraga Claremont 115kV lines when the lines are de-energized and may, trigger the need to reconductor these circuits. Nevertheless, elements of the NOAR project continues to reside in Tier 2 and Tier 3 HFTD areas where it is exposed to potential wildfire-related adverse impact.	The comment has been noted.

No	Comment Submitted	CAISO Response
	The Public Advocates Office notes that PG&E did not provide any comprehensive alternatives to the NOAR project. The Public Advocates Office recommends that all transmission alternatives and preferred resources, including storage, should be fully evaluated before the CAISO considers spending $364 to $728 million of ratepayer funds for PG&E's proposed NOAR projects. It is also important to recognize that the CAISO approved the Oakland Clean Energy Initiative project as recently as in the 2017-18 TPP to address load issues in the electrical needs area as the proposed Moraga Oakland X 115kV project. The Oakland Clean Energy Initiative project is expected to be online by August 2022 and is slated to address the Northern Oakland area's medium-term reliability goals. Given that the incremental upgrades proposed by PG&E under the NOAR project are not needed at least until 2029, we urge the CAISO to monitor the load growth for the next two transmission planning cycles, and to assess the robustness and cost-effectiveness of the NOAR project relative to some potential alternatives to address the long-term reliability needs of the Oakland area prior to authorizing the NOAR.	
14d	4. Southern California Edison Company (SCE)- Alberhill Project. The CPUC previously denied SCE's Alberhill project without prejudice in 2018. SCE indicated it plans to refile for a new Certificate of Public Convenience and Necessity (CPCN) for the Alberhill project. Conversely, SCE has also submitted a plan in the Distributed Resource Proceeding to defer the Alberhill project and evaluate a non-wire solution to address potential overload in the Alberhill service area. However, the CAISO included the Alberhill Project in its 2019/2020 TPP. The Public Advocates Office recommends that the CAISO recognize the potential cancellation and/or deferral of this project in its TPP modeling scenarios.	The removal of the Alberhill project would not expected to significantly change the ISO's findings in the reliability assessment.

15. Silicon Valley Power Submitted by: Jeevan Valath		
No	Comment Submitted	CAISO Response
15a	The City of Santa Clara dba Silicon Valley Power (SVP) appreciates the opportunity to comment during the development of the 2019-2020 Transmission Plan. SVP has reviewed the results of the CAISO reliability assessment for the SVP/San Jose areas and noted the lack of any mitigations suggested by the CAISO and the lack of Request Window proposals by PG&E for this particular area. The CAISO assessment shows overloads on the Newark-Northern Receiving Station (NRS) #1 115kV circuit as early as 2024 and the Newark-NRS #2 115kV circuit in the 2029 Summer Peak Assessment. SVP believes some long-term solutions should be developed now for the area. Past history shows it often takes a long time to complete approved projects. The recent reconductoring of the 2.1 mile NRS-SRS 115kV circuits was approved in the 2013 TPP, and it was just placed in service this year (early 2019). We believe it is important to timely develop and approve a plan to relieve the overloads delineated above. The identified 2024 overloads need attention now because the Newark-NRS 115kV circuits traverse the Don Edwards Preserve, and thus a related project would likely encounter delays due to any mitigation work involving those lines. The number of overloads increase substantially and begin even sooner in the sensitivity cases. SVP believes that the results of the sensitivity cases should be thoroughly considered in developing a plan of service for the area. SVP load growth projections are primarily driven by large scale data center block loads that do not follow the CEC load models. SVP currently has new data centers in its service territory that have recently finished construction and will be ramping load soon. Additional customers are in the final stages of the approval process for data center substations requiring more than 100MW in the next two years. There are six more potential projects (mostly data centers) requiring an additional 300MW over the next 3-5 years. The amount of new data center interest and construction has increased dramatically since the development of the bases cases for this TPP cycle. SVP believes there is a strong potential to exceed the forecast shown in the base cases for the TPP. The necessity to plan for projects to alleviate future	The comment has been noted.

No	Comment Submitted	CAISO Response
	overloads projected in the base cases and sensitivity cases is critical given the timing of these new loads. SVP would like CAISO and PG&E to develop mitigation plans now as they continue to monitor load growth in the area. SVP appreciates the opportunity to comment on the 2019-2020 Transmission Plan Reliability Assessment Results and acknowledges the significant effort of the CAISO and PG&E staffs to develop this material.	

16. Transmission Agency of Northern California (TANC) Submitted by:		
No	Comment Submitted	CAISO Response
16a	The Transmission Agency of Northern California (TANC) appreciates this opportunity to provide comments on the California Independent System Operator's (CAISO) 2019-2020 Transmission Planning Process (TPP) preliminary reliability results and mitigation presented at the stakeholder meeting on September 25-26, 2019. TANC's primary focus related to the TPP is for the protection of and the maximization of the transfer capability of the California Oregon Transmission Project (COTP) and the California Oregon Intertie (COI) or Path 66. TANC is the majority owner of the COTP which is operated in coordination with the CAISO controlled grid under terms of agreements, with the other COI owners (Pacific Gas and Electric Company, Western Area Power Administration and PacifiCorp), that govern COI operation. The COI represents an extremely valuable and important part of the Western US and California grid for: (1) allowing access to economic, clean, reliable and flexible energy that helps maintain grid reliability, (2) supports regional electricity markets, (3) helps meet California's clean energy goals, and provides capacity and/or Resource Adequacy (RA) for the California market. Maintaining high transfer levels on COI will continue to be important to reliable operation for the CAISO and for regional Balancing Authorities throughout the Western US as dispatchable and baseload resources are further limited due to plant retirements, evolving policy goals , and severe weather conditions challenge grid operators. To this end, transmission planning which would seek to maintain (or increase) the transfer capacity ratings of the COI is desirable, while actions or inactions which would limit the transfer capabilities are detrimental for TANC, CAISO, and the entire Western US regional market. TANC's comments in this proceeding fall into two basic categories. First, TANC provides specific comments on the technical studies. Second, TANC provides more general comments and suggestions on the studies underlying assumptions and the appropriate goals of the TPP.	The ISO continues to assess the reliability needs of the higher path flows in the nomograms and mitigation that may potentially increase the nomogram particularly at corresponding high northern California hydro output. The ISO will also continue to assess in the economic assessment.
16b	With respect to the technical studies, TANC's comments are as follows:	The comment has been noted.

No	Comment Submitted	CAISO Response
	1. TANC supports and commends the CAISO for the COI Nomogram sensitivity studies that were performed on the 2029 summer peak case with COI flows in the north-to- south (NS) direction and the 2029 spring off-peak case with the COI flows in the south-to-north (SN) direction. The sensitivity studies provide additional insight into the power flow thermal results, potential mitigation solutions, and unique relationships in the COI S-N studies that exist between specific system limitations to the output of localized hydro generation systems.	
16c	2. In the summer peak load studies with COI at 4,800 MW N-S, an overload resulted on the Round Mountain -Table Mountain 500-kV line following the outage of the adjacent Round Mountain -Table Mountain 500-kV line. This overload was also found to be the most limiting in the COI N-S Nomogram sensitivity study. To mitigate this reliability issue, the CAISO listed either to reduce COI N-S flows or to bypass the series capacitor on the overloaded Round Mountain -Table Mountain 500-kV line. TANC suggests indicating specifically that the bypassing of the series capacitors would be a part of a new Remedial Action Scheme (RAS) as described in past CAISO TPP studies. Also stated in past comments, TANC supports the addition of this proposed new RAS since this would not only improve COI N-S transfers during high northern California hydro conditions; but also, more importantly, during the many planned maintenance outages that occur on the bulk transmission system annually and impact COI transfer capability. In addition, TANC suggests adding the reduction of local generation to the potential mitigation solutions listed for this thermal overload in the assessment results. As shown in the COI N-S Nomogram sensitivity, reducing Colusa generation and Hatchet Ridge generation is also effective in mitigating the overloads.	The comment has been noted. The ISO is considering RAS to bypass series capacitors on the Round Mountain-Table Mountain 500 kV lines in case of their overload as one of the solutions. Adding Colusa and Hatchet Ridge generation to the RAS for the COI double outages is also considered as a possible mitigation of the observed overloads.
16d	3. In the off-peak load studies with COI flows exceeding 3,300 MW S-N, an overload resulted on the Olinda 500/230-kV transformer following the loss of the Round Mountain 500/230-kV transformer and vice versa. The proposed mitigation for these overloads is to reduce COI S-N flows.	The comment has been noted. The ISO noted that the overload on the 500/230 kV transformers in the off-peak cases significantly depends on the output of the generation connected to each transformer, which is Hyatt and Thermalito output for the Table Mountain transformer

No	Comment Submitted	CAISO Response
	TANC suggests that the CAISO further investigate the relationship between the hydro generation output from the Shasta and Pit river systems to the impacts resulting across the Olinda and Round Mountain 500/230-kV transformers. The CAISO pointed out in the COI S-N Nomogram sensitivity that the resulting loading on the Olinda 500/230- kV transformer significantly depends on the Shasta generation output. It would be equally important to understand if the Round Mountain 500/230-kV transformer overload is primarily driven by the Pit river hydro output. If reducing the generation from these regions is determined effective in mitigating these overloads in the reliability assessment cases, TANC suggests including details of the findings in the subsequent 2019-2020 TPP studies.	overload, Shasta output for the Olinda transformer overload and Pit River output for the Round Mountain transformer overload. Reducing this generation will be effective for mitigation of these transformer overloads. However, in developing of the COI nomogram versus Northern California generation output, dispatch of this generation was assumed according to how it has been dispatched. These details will be described in the 2019-2020 Transmission Plan.
16e	4. Also, in the off-peak load studies (with COI flows exceeding 3,300 MW S-N), the results indicated an overload on the Table Mountain 500/230-kV transformer following up to twenty different system outages. The proposed mitigation for these overloads is to simply reduce COI S-N flows. The Table Mountain 500/230-kV transformer overload was also the most limiting condition in the COI S-N Nomogram sensitivity studies. The CAISO identifies the relationship between the overload and the output of the Hyatt and Thermalito hydro generation. The CAISO also pointed out that the resulting loading on the Table Mountain 500/230-kV transformer significantly depended on the Hyatt and Thermalito generation output. TANC suggests that the CAISO further investigate the relationship between the Hyatt and Thermalito generation output to the overload resulting on the Table Mountain 500/230- kV transformer. If reducing the generation from these plants is determined to be effective in mitigating the overload in the reliability assessment cases, TANC suggests including details of the findings in the final TPP report. The COI S-N Nomogram was developed in operations in 2019 as a result of the high COI S-N demand that occurred during February and March of 2019. At that time, resources from California were exported over COI to assist in the reliable operation of the Pacific Northwest (PNW) system as an	The comment has been noted. The ISO noted that the overload on the Table Mountain 500/230 kV transformer in the off-peak cases significantly depends on the output of the Hyatt and Thermalito generation since these generators are directly connected to the Table Mountain 230 kV bus. Reducing this generation is effective in mitigation the overload. The details will be included in the 2019-2020 Transmission Plan.

No	Comment Submitted	CAISO Response
	extended cold front had hit the PNW region while the availability of regional hydro resources was limited. To maintain a high COI S-N transfer capability for those times most needed, a further understanding of the relationship between the limiting facilities and the output of localized hydro generation systems will be needed.	
16f	With respect to the studies underlying assumptions and the goals of the TPP process, TANC's comments are as follow: TANC believes that robust regional transmission is critical to supporting reliability, the ongoing development of regional markets (Energy Imbalance Market (EIM) and Extended Day-Ahead Market (EDAM)), and meeting capacity requirements to serve load (including RA in CAISO). Thus, current mitigation schemes that relieve overloads through interregional flow reductions, and in particular, by curtailing flows on COI, are at odds with meeting the overall goals noted above and need to be consistent with contractual obligations among the COI owners. In instances where limiting interregional flows are proposed as solutions in the TPP, TANC suggests other alternatives be evaluated. The TPP studies should consider known system challenges and be consistent with findings in other CAISO or regulatory proceedings. For example, the CAISO has recently provided comments and analysis in the California Public Utilities Commission's (CPUC) Integrated Resource Planning (IRP) proceeding detailing specific near- and long-term issues and proposed solutions. Specifically, the CAISO's October 2, 2019 Comments to the CPUC in Rulemaking 16-02-007 make several recommendations to the CPUC including support of: (1) 4,700 MW of incremental procurement; (2) planning and procurement for the retirement of the Diablo Canyon Power Plant; (3) procurement of incremental resources that support renewable integration and specifically address operational issues presented by the CAISO; (4) use of import assumptions commensurate with the RA program; and (5) recognition that RA and operational needs are at the system level and are not unique to the SCE Transmission Access Charge area. The TPP's modeling assumptions should incorporate this information and other CAISO analysis and work that provides guidance and insight regarding future system needs.	The comment has been noted.

No	Comment Submitted	CAISO Response
16g	In summary, TANC appreciates the opportunity to comment on the technical aspects of the current TPP studies. TANC believes that the TPP could be improved by incorporating additional data and information on both the base case assumptions used in the model (e.g., CPUC's various data sets) and on the sensitivity analyses conducted (e.g., incorporate more significant variations in generation, load, transmission, transmission outages and other inputs). The CAISO is the correct agency and the TPP is an appropriate forum for the CAISO to lend its insights and understanding of the regional grid to be proactive and seek to address future challenges before they have a chance to become crises. The proposed solutions identified in the TPP should not default to relying on mitigation schemes that reduce interregional transfer capability and, to the extent transmission solutions are identified, should recognize the long lead times necessary for implementing transmission solutions. TANC's obligation is to ensure that its interstate transmission resource remains available for efficient use by TANC and its Members which in-turn complements the state's goals for reliability, regional markets and additional state policies. TANC looks forward to continuing to be an active stakeholder and offering our input to the CAISO in this critically important effort.	The comment has been noted.