The ISO received comments on the topics discussed at the February 29, 2016 stakeholder meeting from the following:

1. Bay Area Municipal Transmission group (BAMx)
2. Blythe Energy Inc.
3. California Energy Storage Alliance (CESA)
4. California Public Utilities Commission (CPUC)
5. Diamond Generating Corporation
6. Duke American Transmission Company
7. Eagle Crest Energy
8. Large-Scale Solar Association
9. LS Power Development
10. NextEra Energy Transmission West (NEET West)
11. Owner's Coordinated Operation Agreement
12. Pacific Gas & Electric (PG&E)
13. Smart Wires, Inc.
14. TransCayon, LLC

Copies of the comments submitted are located on the 2016-2017 Transmission Planning Process Page at: http://www.caiso.com/planning/Pages/TransmissionPlanning/2016-2017TransmissionPlanningProcess.aspx.

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

No	Comment Submitted	CAISO Response
1	**BAMx** **Submitted by: Joyce Kinnear**	
1a	**Scope and Schedule for the 2016-2017 Planning Cycle** BAMX continues to request that Table 2-1 of the Study Plan be enhanced. The table does not delineate when the CAISO responds to each round of Stakeholder comments. BAMx believes that stakeholder review process and comments and the CAISO's resulting responses and changes to the Study Plan are integral to creating this ever improving process, but this important aspect has not received as much attention in the past as it should have. BAMx requests that CAISO acknowledge the improvements to the process that this ongoing feedback provides and that Table 2-1 should be expanded to identify when such responses would be available. It is also important that stakeholders understand the options for solutions to reliability deficiencies that have been identified in the assessment. An important source for potential alternative solutions is the project submittals made through the Non-PTO Request Window. Therefore, BAMx requests that Table 2-1 be expanded to specifically identify a timely posting of Non-PTO Request Window projects.	Table 2-1 provides schedule of the key milestones of the Transmission Planning Process. As noted in the Draft Study Plan, there is a two-week Stakeholder comment period following the Stakeholder Meeting #1. ISO's response to the comments are posted along with the Final Study Plan on the posting due date. Footnote 2 of Table 2-1 sets out the ISO's intention to target responses to comments ideally within three weeks of the close of comment periods, and no later than the next public stakeholder event relating to the Transmission Plan. The ISO appreciates the need to provide meaningful responses to the comments, and responds to all comments received. However, it would not be appropriate to be more definitive on schedule as the emphasis must be on the consideration of the comments and incorporation into the next phase of the planning process rather than focusing on the responses to comments. The ISO seeks to post received comments and submissions through the non-PTO window as quickly as possible. A specific date has not been established, as the ISO must frequently revisit with non-PTOs the confidentiality of certain material contained in the proposals.
1b	**Previously Approved Projects** In last year's TPP the CAISO analyzed whether previously approved PG&E projects are still required. We commend the CAISO for doing so. While some projects were cancelled, no information was provided as to why other projects were still deemed necessary. We request that the CAISO continue analysis in this planning cycle and additional information be provided on projects whose analysis confirmed a continuing need. With the passage of SB350 and its requirements for increased energy efficiency, it is incumbent for the CAISO to re-evaluate previously approved projects from all PTOs that have not started construction.	The ISO will be conducting additional review of previously approved projects and in doing so will be taking into account the uncertainties in the load forecasting through sensitivity analysis. The scope of the review and any such sensitivity studies is yet to be determined.
1c	**Generation Assumptions** Northern California Natural Gas Fueled Generation	

No	Comment Submitted	CAISO Response
	While there has been much focus on the retirement/repower of the OTC units in Southern California, the early retirement of SONGS, and the potential impacts of recent events at Aliso Canyon gas storage facility on southern California generation and system reliability, the reliance on natural gas fueled generation in northern California should be studied as well. For example, prior planning cycles have shown the importance of maintaining some generation at the Moss Landing site after the OTC compliance period. As was seen most recently in the case of the Coolwater Power Plant, current owners can make quick decisions to shut down existing power plants if there is no longer a viable business case for them going forward, without necessarily considering the impacts to system reliability. With these considerations in mind, BAMx supports that in addition to including the shut down of the Pittsburg Power Plant and Moss Landing 6 and 7, there should be an assessment of the impacts on reliability if other Bay Area gas fueled units or entire power plants were to become commercially unviable due to increased penetration of renewable resources leading to potential surplus natural gas fired generation capacity or other market changes. It is important to understand the impacts to the system sufficiently in advance to allow consideration of a full range of options in the case that the absence of any specific power plant could lead to reliability issues. Obtaining this information at the earliest date will provide opportunity to evaluate how new local resources, such as new preferred resources or new gas fired generation, might be able to manage any reliability impacts. As part of its OTC compliance plan, the study plan assumes that Moss Landing 1 & 2 will be limited to a maximum of 85% of their current capacity. It is not clear whether this reduction represents a ceiling on the maximum generation or an increase in plant auxillary load. If it is the former, BAMx recommends that the CAISO investigate the opportunity for increased reactive power capability that could be achieved with reduced generation. If such capability would be useful in maintaining system reliability, discussions with the generation owner concerning increasing the reactive capability should be considered.	The ISO is conducting two special studies in the 2016-2017 TPP related to the comments (1) gas electric coordination; and (2) potential early retirement of gas generation. In regards to the 85% capacity for Moss Landing 1 & 2 after the identified OTC compliance date for the generating facility, this is the capacity that has been provided by the CEC for this plant.
1d	Qualifying Facility (QF) Generation Retirements Similar to natural gas fueled generation discussed above, QFs may also become commercially unviable upon the expiration of their contracts necessitating study of the local reliability impact of such loss of generation. In the event reliability issues are identified, the findings should be presented	The ISO will be conducting a sensitivity study of QF generation in local areas as indicated in 4.11-2 of the 2016-2017 TPP Study Plan to

No	Comment Submitted	CAISO Response
	sufficiently in advance for a full range of options to be considered, including targeted procurement within the CPUC Long Term Procurement Plan (LTPP) of preferred resources or recontracting with the QF in comparison to transmission expansion.	assess the impact of retirement of QF generation. This will be similar to the sensitivity study that was conducted in the 2015-2016 TPP.
1e	Other (non-QF) Generation Retirements Section 4.7.5 identifies that, unless otherwise noted, specific generator retirements assumptions are based upon a resource age of 40 years or more. BAMx requests that Tables A1-1 through A1-4 in the Study Plan be expanded to include the initial in-service date for all non-hydroelectric generators and which generators reach a life of 40 years during the planning horizon. For those that will reach 40 years of service within the planning horizon, identify specifically which will be assumed to retire and which will be assumed to remain operational. For those assumed to remain operation beyond 40 years, the project specific rationale supporting the assumption should be identified. Similar to above statements concerning Northern California generation, BAMx recommends that in the event reliability issues are identified associated with any such retirement assumptions throughout the CAISO system, the findings should be presented sufficiently in advance for a full range of options to be considered, including targeted procurement within the CPUC Long Term Procurement Plan (LTPP).	Table A3-1 reflects retirement of generation based upon announcements from the generators. The ISO will document generators assumed to be retired as a result of assumptions identified in Section 4.7 as a part of the based case development with the reliability results.
1f	Preferred Resources BAMx is highly supportive of the major strides made by the CAISO in prior TPP cycles in identifying the likely impact of preferred resources on the transmission grid in the LA Basin and San Diego area following the shut down of SONGS. Additonally, we also support the current explicit modeling of preferred resources in the power flow base cases. A next step in increasing the value of preferred resources is to geographically target their implementation so as to improve their value to the system. We discussed above the necessity for studying such resources as potential solutions for any retirement in generation in Northern California. In line with the above, BAMx is concerned that there is especially an information gap when it comes to preferred sites for energy storage. The CPUC has authorized a procurement target of 1,325 MW installed capacity of new energy storage and further energy storage may be considered. While these can be valuable resources for integrating renewable resources, they have the potential	Section 4.8.3 of the study plan describes the following process that already addresses this suggestion. As the 2016-2017 TPP studies identify transmission constraints in the local areas, the ISO will identify the effective busses that the storage capacity identified in the Table 4.8-3 can be distributed amongst within the local area as potential development sites. Table 4.8-3 describes the assumptions that shall be used for the technical characteristics and accounting of the three classes of storage mandated by D.13-10-040. These storage capacity amounts will not be included in the initial reliability analysis. The storage capacity amounts will be used as potential mitigation in those planning areas where reliability concerns have been identified.

No	Comment Submitted	CAISO Response
	to increase the utilization of the exsiting transmission system and to avoid the need for expansion. Battery systems have a wide degree of flexibility in siting, but little information beyond the OTC/SONGS related work in southern California is available to assist both developers and LSEs in targetting the installation of energy storage devices. BAMx believes that this is a lost opportunity and encourages the CAISO to develop locations in the TPP where energy storage devices would not only assist in renewable energy integration, but would also avoid the potential for system upgrades. In summary, BAMx recommends that the 2016-2017 TPP cycle include a discussion of areas with emerging reliability issues that would benefit from targetted development of preferred resources.	
1g	**Load Forecasts and Assumptions** Due to the lag in the development of input assumptions, load forecast and distributed generation assumptions in this planning cycle do not appear to include the full impact of the recent passage of SB 350. While this is understandable, BAMx recommends that the study plan include a process whereby before a reliability project is recommended for approval in this planning cycle, an assessment be made as to the potential for this new legislation to either defer or eliminate the need for the reliability project under consideration. If such an assessment supports a potential delay in need, it should be deferred to next year's planning cycle when this new legislation can be accounted for in new load forecasts. The identified sensitivity studies include a 2026 summer peak case that has no behind-the-meter PV. The value of such an extreme case is unclear, especially given level of adoption currently being seen in California. BAMx recommends instead that the personnel resources used to develop and analyze this case be used elsewhere in the Study plan. Section 4.6.3 of the draft Study Plan includes discussions of the power factor assumptions for SCE and SDG&E. This discussion should be expanded to include all the PTOs. Furthermore, the project recommendations from the previous planning cycle included a number of voltage control projects to better control high voltages. As such voltage issues typically arise during light load system conditions, the power factor assumptions should be expanded to include	Once a reliability project need is identified, the ISO considers the timing of the need before approving the project. If the need date can be met by approving the project in a later planning cycle, then the project approval is deferred to a later planning cycle. The sensitivity study is intended to understand the impact of the behind the meter generation on the reliability of the local areas. This condition represents a number of uncertainties such as location and magnitude of generation at specific locations, impacts of cloud cover during high load periods and the peak load shift impact as identified in the CEC Energy Demand forecast that was not taken into consideration at this time. Power factor information will be contained in the power flow models that will be posted on the Market Participant Portal and will be within ISO Tariff requirements in section 8.2.3.3.

No	Comment Submitted	CAISO Response
	the power factor assumptions under such light load conditions. If any system issues arise because of these assumptions, an investigation of the economics of altering the power factors of the load that the CAISO grid experiences should be investigated. Lastly, the actual real time performance should be compared to both the assumptions and CAISO Tariff requirements.	
1h	**Special Studies – 50% Renewable Energy Goal for 2030** BAMx is very supportive of the investigative study that the CAISO made in the previous planning cycle on the impacts of the greater reliance on In-State Energy Only resources to meet the recently increased RPS goals. BAMx encourages the CAISO to continue to expand this work to provide stakeholders more detailed information quantifying potential congestion or curtailment observed.	Your comment has been noted.
	In addition to close coordination with the CPUC on the RPS calculator and the development of resource portfolios, the current studies being performed as part of the SB 350 benefits assessment should also inform the TPP analysis. For example, the SB 350 work has shown that reflecting the capability of the existing interties to support renewable energy imports has a significant impact on renewable resource portfolio options and lessens the need for remote Out-of-State (OOS) resources. BAMx recommends that the TPP studies likewise include imports over the existing interties when analyzing this increased RPS goal. To further the SB 350 work that only included a single estimate of the existing transmission system capability, more analysis of the system capability would better inform the CPUC's portfolio development.	The use of the existing system to meet transmission needs is always the first choice.
	BAMx requests that the base cases for the incremental 50% RPS portfolio be included in the materials made available to stakeholders. To faciliate understanding of these cases, the resources making up the 33% RPS base portfolio should be distinguished from the incremental resources necessary for the 50% renewable portfolio.2	The cases will be posted.
	Communication of the study results will be highly important. The study findings of the 50% renewable portfolios should be fed to the latest version of the RPS Caluclator in a timely fashion for the CPUC Energy Disvision (ED) to update the transmission availability data in order to develop the renewable portfoliso for the 2017-18 TPP. There needs to be adequate time for stakeholders to weigh-in on	Your comment has been noted.

No	Comment Submitted	CAISO Response
	the information provided by the CAISO to CPUC ED. In particular, we request the CAISO provide its findings associated with the 50% RPS special study during the public stakeholder meeting #3 scheduled on November 16, 2016 (Table 2-1 schedule in the Study Plan). This schedule will provide the stakeholders adequate time to participate more meaningfully at the CPUC's RPS Calculator and portfolio workshop sometime in December 2016. There are many aspects associated with the safe and reliable operation of the California electric system. While electric infrastructure is a critical component necessary to integrate higher levels of renewable generation, other aspects such as resource integration, disturbance performance (including governor response, inertia, short circuit current, etc.) and cost are similarly important. Therefore, communication concerning the results of the transmission study in this TPP cycle must be carefully crafted so that the audience is aware that this analysis addresses only a fraction of the considerations necessary for an electric system to be sufficiently flexible to accommodate a higher level of renewable generation. In summary, the forums and timelines for addressing any other identified considerations should be discussed	
1i	**FERC Order 1000 Process** This year will launch the first full cycle of the biennal FERC Order 1000 interregional coordination process for collaborating with neighboring planning regions on large, interregional transmission projects. The precise implementation of project accessment process is not clear and all parties likely have much to learn in this initial cycle. In order to help stakeholders better understand the timing of the FERC Order 1000 coordination activities and how they mesh with the CAISO TPP, BAMx recommends that Table 2-1 schedule in the Study Plan be expanded to include descriptions of the activities that support the FERC Order 1000 process including interregional meetings and when materials would be available to stakeholders as the process unfolds.	The intent of Table 2-1 is to provide a schedule of the key milestones for the TPP. As coordination with the neighboring planning regions evolves, the ISO will communicate those details separately, at least in the 2016-2017 planning cycle.

No	Comment Submitted	CAISO Response
2	**Blythe Energy Inc.** **Submitted by: Christopher J. Doyle**	
2a	I. Background Blythe submitted the Loop-In Project into the request window for the 2014-2015 Transmission Planning Process ("TPP"). As outlined in that submission, in addition to numerous reliability benefits, the Loop-In Project provides a significant economic benefit. Reliability studies conducted in the 2014-20155 TPP confirmed the existence of high voltage issues when the Blythe Energy Project ("BEP") and Metropolitan Water District ("MWD") pumps were off-line. Though the Loop-In Project would have addressed these high voltage issues, CAISO suggested those same benefits could be obtained through an operating procedure that Southern California Edison ("SCE") was developing. That operating procedure includes opening the Buck Blvd. breaker to take the BEP gen-tie off-line. As explained in detail in Blythe's comments on the 2014-2015 draft Transmission Plan, taking the BEP gen-tie off-line could result in significant financial consequences to BEP under SCE's interpretation of BEP's power purchase tolling agreement. Although the 2014-2015 Transmission Plan suggested that the reliability benefits provided by the Loop-In Project could be achieved through alternate means, the CAISO indicated that it intended "to complete the analysis of the [Loop-In Project] through further study associated with the 2014-2015 planning cycle." The draft 2015-2016 Transmission Plan reaches a nearly identical conclusion, stating that while the Loop-In Project "has not been found to be needed at this time," "[a]ctivities are continuing, as an extension of the 2014-2015 planning cycle, to explore the issues raised by the project proposal." Blythe also submitted an economic planning study request in the 2015-2016 TPP. The CAISO declined that request, as noted in the draft 2015-2016 Transmission Plan, only on the ground that the CAISO has not yet found that the Project was needed for reliability. The draft Plan provides no analysis or conclusions as to whether the Project does in fact provide economic benefits, which should be the relevant analysis for economic projects, not reliability.	Please see responses to similar comments to the February 18, 2016 meeting topics on the 2015-2016 Transmission Planning Process.
2b	II. Reliability Issues Associated with SCE's Eastern Bulk System The draft 2015-2016 Transmission Plan suggests that reliability issues associated with high voltages in the vicinity of the Buck Blvd., Julian Hinds, and	Please see responses to similar comments to the February 18, 2016 meeting topics on the 2015-2016 Transmission Planning Process.

No	Comment Submitted	CAISO Response
	Eagle Mountain substations can be resolved through an SCE operating procedure and the installation of two shunt reactors at Eagle Mountain substation. However, the CAISO's September 21-22, 2015 Stakeholder meeting concerning preliminary reliability assessment results revealed existing problems in the area that include thermal overloading, voltage violations under light load conditions, and dynamic issues under both N-1-1 and double contingencies. In particular, the Julian Hinds - Mirage 230 kV line is a major bottleneck that overloads in a variety of contingencies. These contingencies include the loss of the Julian Hinds - Eagle Mountain line, or the Red Bluff - Devers #1 and #2 lines. The 2017 Summer Peak case also shows the Julian Hinds - Mirage line overloads with the loss of the Palo Verde - Col River 500 kV line. At the September 21-22 Stakeholder meeting, the CAISO also identified a potential SPS guideline violation associated with the Devers - Red Bluff N-2 contingency. The draft 2015-2016 Transmission Plan does not appear to address these issues. Appendix C to the Plan does not even reference the Julian Hinds - Mirage overload. The draft Plan also appears to be missing numerous N-1-1 contingencies in the area, including loss of the Julian Hinds - Eagle Mountain line followed by the loss of Palo Verde - Col River. Nor does the Plan identify reliability issues associated with the Devers-Red Bluff N-2 contingency. Certain bus faults also appear to be missing from Appendix C, including, for example, the loss of the 230 kV tie breaker at Julian Hinds that opens up the connection between SCE and MWD. Blythe is concerned that these issues were not adequately addressed in the draft 2015- 2016 Transmission Plan, and believes that the Loop-In Project could provide a key part of the solution. Blythe urges the CAISO to fully address these issues in the 2016-2017 process, and to complete its evaluation of the Loop-In Project in the process.	
2c	III. **Economic Benefits Associated with the Loop-In Project** For the past several years, Julian Hinds - Mirage 230 kV circuit has been considered a "congested path" with significant costs associated with that congestion. Congestion data from the CAISO OASIS shows that in 2013 and 2014 the line indicated congestion nearly 100 hours each year, and in 2012 the	The ISO studied this project as a continuation of the 2014-2015 Transmission Planning Process. A presentation on that study was given on September 22, 2015. The ISO's studies did not support the need for this project.

No	Comment Submitted	CAISO Response
	line indicated congestion for more than 500 hours. The Loop-In Project would address this congestion, and result in significant economic benefits. As part of Blythe's Request Window submissions in 2014 and 2015, ZGlobal conducted an analysis of the expected economic benefits of the Loop-In Project, using the same Transmission Economic Analysis Methodology ("TEAM") used by the CAISO to conduct its own economic planning studies in the TPP. That analysis showed that the total economic benefits would be approximately $33.7 million, with production cost benefits of over $15 million. ZGlobal also calculated the transmission revenue requirement ("TRR") for the Loop-In Project, using the methodology provided in the FERC Cost-of-Service Manual. The annual TRR for the Loop-In Project is expected to be $18.9 million. The expected net benefit of the Loop-In Project is therefore more than $14.3 million in the first year alone, with a cost-benefit ratio of 1.8. By comparison, the cost-benefit ratio for the Delaney-Colorado River Project, approved by the ISO Board in 2014, had a maximum cost-benefit ratio of 1.17. The fact that the vast majority of the Loop-In Project is already constructed also provides significant benefits, and cost certainty, to customers, as well as minimizing the environmental impacts and permitting timelines associated with constructing new transmission lines. Overall, the expected present value of the net benefits from the Loop-In Project would be approximately $278 million. The draft 2015-2016 Transmission Plan declined to conduct an economic study of the Loop-In Project because the Project "has not been found to be needed at this time" for reliability purposes. However, regardless of the existence (or lack thereof) of reliability benefits, there are clear economic benefits to the Project, which alone merits its approval. Blythe further notes that the draft 2015-2016 Transmission Plan fails to address the congestion costs associated with Julian Hinds - Mirage. Blythe requests that the CAISO address these issues in the 2016-2017 TPP, and conduct a study of the economic benefits of the Loop-In Project, including the benefits associated with relieving congestion on the Julian Hinds - Mirage line.	
2d	IV. **Conclusion** Blythe's Loop-In Project would provide significant reliability and economic benefits.	Please see responses to Comment #2 above.

No	Comment Submitted	CAISO Response
	The Project will eliminate voltage issues and overloads in SCE's 230 kV system east of Devers, and will provide net economic benefits of $14.3 million in the first year alone. The net economic benefits over the 40 year life of the Project are likely to be over $755 million. In light of these benefits, Blythe requests that the ISO conduct an economic study to confirm the benefits of the Loop-In Project, and conclude its evaluation of the reliability benefits associated with the Project, in connection with a broader review of the existing reliability issues in SCE's Eastern bulk system, including those issues the CAISO itself identified in its September 21-22, 2015 stakeholder meeting in the 2015-2016 TPP.	

No	Comment Submitted	CAISO Response
3	**California Energy Storage Alliance** **Submitted by: Jin Noh**	
3a	**Bulk Storage Study (Special Study)** CESA commends the CAISO for conducting a Bulk Energy Storage Resource Case Study ("Case Study") in the 2015-2016 TPP that aimed to explore the ability of a bulk storage resource to reduce production costs, emissions, renewable curtailments, and renewable overbuilds. The Case Study concludes that bulk storage brings benefits in all scenarios it ran, but is best utilized in a solar-dominant renewable portfolio standard ("RPS") given the midday hourly generation profile of solar resources. The Case Study represents a preliminary step toward demonstrating the value of bulk storage resources in a high percentage renewables future. However, CESA requests that continued special studies be conducted on bulk storage systems and suggests the following additions and improvements to the 2016-2017 TPP Study Plan: • **Expand the Case Study scope to other types of bulk storage resources:** The Case Study examined two 300-MW pumped storage resources, but there are a number of other bulk storage resource types, such as compressed-air energy storage and other longer duration energy storage resources, that should also be examined and considered in a special study. • **Consider a 50% RPS Study:** The Case Study used a 40% RPS by 2024, but with the passage of Senate Bill 350 that instituted a 50% RPS by 2030, CESA believes this Case Study should be re-run with the new policy objective. For example, Eagle Crest Energy (ECE), a CESA member, submitted comments on the draft 2015-2016 Transmission Plan urging the CAISO to update the Cast Study to reflect a 50% RPS in the 2015-2016 study cycle, and CESA is hopeful that the CAISO will accept that recommendation. In any case, a future study should incorporate a 50% RPS, since the RPS level will be at or	Your comments have been noted. The ISO has previously indicated that the study in the 2015-2016 transmission plan will be updated to consider a 50% RPS scenario and additionally that an updated 50% analysis will be included in the 2016-2017 planning cycle using updated assumptions. The timing has not been determined at this time. Regarding transmission system benefits, these depend upon the specific location of the resources, and the ISO's studies of storage benefits in renewable integration are being conducted more generally without selecting specific project proposals at this time. Storage and other preferred resources are also explored as preferred mitigations for transmission relief, and the ISO encourages stakeholders to propose such projects to address identified needs.

No	Comment Submitted	CAISO Response
	above that level for the majority of the life of these storage facilities. While the TPP focuses on a 10-year planning horizon, these special studies are information only and the results and conclusions from these special studies will greatly inform future TPP cycles. • **Quantify transmission impact of bulk storage resources:** The CAISO can build on the efforts of this Case Study by quantifying the transmission benefits and impact of bulk storage systems, which was not within its scope, especially in the geographic areas where the prior 50% RPS Study indicated potentially serious transmission congestion (under normal or contingency conditions). The Case Study instead focused on system- level renewables generation impacts, but did not consider congestion relief and other locational impacts. Quantifying the transmission impact (*e.g.*, transmission congestion relief, reduction of renewables curtailment from that mitigation) is important because it will reveal the value of non-wire alternatives such as bulk storage as a transmission resource. In doing so, the ISO will be able to better align cost recovery mechanisms with the transmission benefit portions attributable to energy storage systems.	
3b	**<u>50% Renewable Energy Goal for 2030 (Special Study)</u>** The 50% Renewable Energy Goal for 2030 Special Study ("50% RPS Special Study") plans to investigate the potential transmission needs to meet the 50% RPS by 2030 goal. In the process, CESA requests that the CAISO study how non-wire alternatives can cost-effectively meet these transmission needs. Non-wire alternatives such as energy storage have the added benefit over traditional "wires" solutions of: reduced environmental impacts (*e.g.*, avoiding infrastructure siting concerns of traditional solutions); relatively quick design and construction for some technologies; flexibility to be developed incrementally and developed using existing infrastructure (*e.g.*, co-locating with existing electrical infrastructure); and providing reliability advantages by siting non-wires alternatives in diverse geographic locations.	Your comment has been noted.

No	Comment Submitted	CAISO Response
	A key challenge is that there is currently no consensus methodology to allocate costs and attribute specific benefits of non-wire alternatives such as energy storage that can function as both a transmission asset and a market resource. Part of the challenge of analyzing storage facilities is the broad array of benefits it can provide. Some of those benefits can be reflected through market revenues to a storage provider; however, others are not monetized in the market but nevertheless provide value to ratepayers and help meeting California's carbon- reduction and clean-energy goals. The CAISO itself recognizes this problem in the draft 2015- 2016 Transmission Plan, which states that "consideration should also be given to how the storage resource would be compensated for the benefits it brings to the system." Thus, CESA believes that it is time to consider how such compensation should be provided, and specifically whether some or all of these benefits should legitimately be included in the CAISO Transmission Access Charge (TAC). This recommended Special Study should at least begin to explore that important question.	

No	Comment Submitted	CAISO Response
4	**California Public Utilities Commission (CPUC)** **Submitted by: Keith White**	
4a	***1. If the 2016-2017 TPP Encounters Situations Where Transmission Projects Foreseeably Could Require Follow-On Measures to Achieve Initial Objectives, the CAISO Should Consider and Discuss the Reasons and Implications.*** As CPUC Staff commented regarding the draft 2015-2016 Transmission Plan, transmission planning can experience the "whack-a-mole" effect, where new infrastructure planned at one location to address a problem can be followed in short order by problems that consequently pop up (like moles) elsewhere. The Mesa loop-in project was cited as a current example. CPUC Staff asked that the CAISO provide deeper insight into these situations. Now, the CAISO is requested to provide such deeper insight in the 2016-2017 TPP cycle, such as regarding the following. a. Whether need for follow-on measures is reasonably apparent and deserving of inclusion in the original assessment. b. Whether need for follow-on measures could reasonably arise (or has arisen) from *changed information and forecasts,* and when it is appropriate to proactively examine (e.g., via sensitivities) alternative conditions that might produce such needs. c. Whether need for follow-on measures could result (or has resulted) from differences among or changes within modeling methods (supporting different conclusions), and how the impacts of such changes or differences can be anticipated or managed.	The analogy used by the CPUC staff is normally considered in situations where addressing one issue creates an off-setting and equally sized issue in another location, and as such, the ISO does not agree with that characterization. With major mitigations under development materially shifting historical load patterns and fundamentally changing the sources of supply into the local areas, it is not unexpected that secondary issues within the areas will emerge as load and distributed energy forecasts evolve and more information becomes available as to the locations of preferred resources within the local areas.
4b	***2. The CAISO Should Clearly Document Key Differences in Assumptions Among the Varied Reliability and LCR Study Cases, Should Describe Which Key Assumptions Drive Modeled Violations in Particular Cases, and Also Should Explain How Multiple Cases Individually and Jointly Contribute to Findings of Need for Transmission Investment.***	

No	Comment Submitted	CAISO Response
	CPUC Staff made this request in commenting on the draft 2015-2016 Transmission Plan. Besides being valuable generally, the requested information is helpful to the CPUC in administering permitting and siting processes. In those processes, it is important to accurately identify project goals. CPUC Staff requests that the CAISO provide such deeper explanation and insights in the final 2016-2017 TPP Study Plan and in the 2016-2017 Transmission Plan. Construction of reliability assessment and Local Capacity Requirements (LCR) study cases that are appropriately informative, stressful and at the same time reasonable appears to be becoming more challenging. This may reflect increasing penetration of resources that are variable and only partly predictable, as well as of distributed and behind-the-meter resources having varied operating characteristics and locations plus limited or uncertain visibility and responsiveness from a grid operation perspective. All of this makes it especially important that the CAISO clearly document, explain and differentiate the load and resource assumptions across various reliability assessment and LCR study cases, as well as how those cases individually and jointly drive conclusions regarding reliability risks and needed solutions. For example, the CAISO indicates on page 11 of Draft Study Plan that reliability assessment base cases will use CEC peak and energy forecasts from the 2015 IEPR1 without reflecting potential impact of increased PV penetration in pushing net peak load later into the day. The same page then states that "*these and other forecasting uncertainties will be taken into account in the sensitivity studies identified in section 4.11.2 as needed*." This illustrates the growing complexities of designing and interpreting reliability assessment and LCR studies, and underscores the need to specifically document, explain and differentiate the load and resource assumptions used for the different reliability assessment and LCR study cases. Beyond clearly documenting, explaining and differentiating key generation and load assumptions in different cases, the CAISO should clearly identify ▪ *which* key assumptions drive significant modeled reliability problems or violations in particular cases,	Your comment has been noted. The 2015-2016 Transmission Plan did not identify the need for any significant projects associated with reducing local capacity needs. If any such projects are identified in the 2016-2017 Transmission Plan, then a comprehensive explanation of this need and the relevant analyses will be provided. Regarding questions about LCR cases and methodology, the ISO notes that the LCR methodology is developed and managed through separate processes coordinated with the state's resource adequacy program, and methodology proposals should be raised in that forum.

No	Comment Submitted	CAISO Response
	▪ *which* reliability problems identified in the various reliability assessment and LCR study cases drive conclusions regarding needed transmission investments or other reliability solutions, and ▪ how the different cases and their results are interpreted both individually and *jointly* to arrive at conclusions. This will help all parties understand and assess how evolving conditions, in both the real world and in modeling, especially regarding variable, distributed and behind-the-meter generation, are impacting determination of reliability needs. Some specific types (this is not an exhaustive list) of information and insight that are valuable and are requested include the following.	
4c	*a.* *The resource output levels modeled for each reliability assessment and LCR study case should be clearly and completely identified.* Tables 4.7-1 through 4.7-4 of the Draft Study Plan show output levels to be assumed for different kinds of renewable generation (e.g., 25% NQC for solar, during peak hours, for the PG&E area), for different types of study cases. Tables 4.11-1 and 4.11-2 list the different reliability assessment base and sensitivity cases (off-peak with maximum PV output, etc.) to be run for different load areas, for different time horizons (e.g., 2026). The final Study Plan and also the ultimate 2016-2017 Transmission Plan should show explicitly, completely and in a readily understandable manner, what output levels were assumed for each generation type (including fossil and hydro where relevant) for each reliability study case.2 Corresponding and *similarly formatted* (comparable) information should be provided for LCR study cases, since LCR studies are playing a complementary role in identifying reliability problems and solutions. CPUC staff note that storage and its potential future reliability and economic3 roles are increasingly factoring into electric system planning studies and their uncertainties. We also note that CAISO's documentation and interpretation of reliability assessment and LCR studies have apparently not to date provided detailed insights into how electric storage is being modeled in these different study cases. Going forward and starting with the 2016-2017 TPP Study Plan and Transmission Plan, the CAISO should document and explain *storage*	Your comment has been noted. This information will be provided at a moderately detailed level in the study plan and in the report and in full detail in the posted powerflow cases. Electric storage is modeled, as a reliability mitigation, at its full output capability that can be produced for four hours.

No	Comment Submitted	CAISO Response
	operational assumptions used in reliability assessment and LCR studies, analogous to the way that the CAISO documents and explains, or is requested in these comments to document and explain, corresponding assumptions for other kinds of resources. We understand that modeling of storage is a growing challenge and will likely evolve. However, we look forward to seeing that evolution more explicitly documented in future studies and reports, including how modeling of storage is or should in the future be influenced by system interconnection level (transmission level, distribution level, customer/BTM level) and by storage durations (e.g., 2 hours, 4 hours, 6 hours, longer durations).	
4d	*b.* *What each reliability study and LCR study case represents, in terms of specific real world operational hours (thus, conditions) should be clearly identified.* For each reliability assessment and LCR study case, the operational time period(s) such as hours of the day, weekday vs holiday/weekend, and months/season being represented by the generation and load levels for that case should be clearly identified, such as via a separate table or via footnotes to other tables that list study cases and assumed generator output levels (see topic 2-a. above). If a particular case represents a composite or generalization across a range of hours or conditions, or if the load and generation levels assumed for a particular case are not typically coincident, then this should be clearly explained. A specific situation where CPUC Staff request clarification regarding what hours and conditions certain cases represent is the following. CAISO staff's response at the February 18 stakeholder meeting indicated that for certain study cases BTM PV output would be modeled for the specific hour (or set of hours?) represented by that study case whereas front-of-meter solar (and wind?) generator output would be modeled at a certain percentile level achieved over a wider range of hours. While helpful and appreciated, this information requires further clarification. Does it refer only to LCR studies, to on-peak reliability studies, or to other (which?) studies? Is the BTM PV output assumed for the hour or set of hours represented by such a study case based on 8760-hour PV output profiles, or on some other (which?) information? (How) is this different than the derivation of output levels in different cases, for utility scale and other front-of-meter wind and solar resources?	Your comment has been noted.

No	Comment Submitted	CAISO Response
4e	*c. Specifically for the reliability assessment case "summer peak with no BTM PV" the CAISO should explain what load and resource output levels were used, and the rationale*. What hour(s) of the day does this case represent in *each* load area? Is it meant to represent an hour in which there would normally be BTM PV output but there is complete cloud cover for all BTM PV in an area, simultaneously? In contrast, how will front-of-the-meter PV be modeled for this case, and what is the rationale? Is there a similar LCR study case also having high loads and no or extremely low BTM PV output, and if so, how and why does it differ from the "summer peak with no BTM PV" reliability assessment sensitivity case?	Your comment has been noted. The referenced sensitivity study is intended to help understand the impact of the behind the meter generation on the reliability of the local areas. This condition represents a number of uncertainties such as location and magnitude of generation at specific locations, impacts of cloud cover during high load periods and the peak load shift impact as identified in the CEC Energy Demand forecast that was not taken into consideration at this time.
4f	*d. Page 15 of the Draft Study Plan states "In 2016-2017 TPP base cases, the PV component of self-generation will be modeled as discrete element"[sic] and CPUC Staff requests that that CAISO clarify what this means for each kind of study case (e.g., reliability assessment versus LCR, on-peak versus other).* • The CAISO should clarify if modeling BTM PV as a "discrete element" means allocating aggregate BTM PV amounts among different individual buses in each service area using PTO allocation methodologies discussed in CPUC Staff comment topic 3 below. If it means something more or different, the CAISO should explain. • In reliability assessment and LCR study cases, is BTM PV modeled as *supply*, discretely at each bus, or in some other manner? How (using what profiles, or via some other manner) is BTM PV removed from the basic load forecast at each bus, and then added back as discrete supply (or otherwise)? We understand that three output "data points" for BTM PV amounts in the aggregate and at any bus may be: zero, the on-peak MW BTM PV impact given for each area in the 2015 IEPR load forecasts, and nameplate MW levels identified on page 16 of the Draft Study Plan as coming from a CEC-provided spreadsheet. The CAISO should explain if the different BTM PV output levels assumed for the different reliability assessment and LCR study cases are derived based on the above three output levels, or if any (which?) study cases incorporate BTM PV output levels based on 8760-hour or other *multi-hour profiles*, and what is the	All cases will include the same modeling methodology for BTM PV, and means allocating aggregate BTM PV amounts among different individual buses in each service area using PTO allocation methodologies. BTM PV removed from the basic load forecast at each bus, and then added back as discrete supply. In the powerflow model, the revised model is an exact equivalent of the CEC load forecast.

No	Comment Submitted	CAISO Response
	source of the profiles. This explanation should also clarify the statement on page 16 of the Draft Study Plan that "*Output of the self-generation PV will be selected based on the time of day of the study using the end-use load and PV shapes for the day selected*." Are the output profiles4 modeled for BTM PV the same across all of the different buses among which the BTM PV is distributed5 within any given study area (e.g., SCE metro or Los Angeles Basin)? In other words, do BTM PV at the *different* buses all have the *same* output level as a fraction of their nameplate capacity, for each hour studied? How is this rationalized as a reasonable representation of output levels that likely do not fluctuate in unison across all buses? The CAISO is requested to provide similar clarification regarding diversity or uniformity of output profiles modeled for front-of-meter wind and solar resources, including the number of different profiles modeled.	
4g	***3.*** **The Method for Allocating Customer (BTM) PV to Buses Should be Clearly Described and the Resulting Allocations Should be Reported.** Slide 10 of the February 18 presentation on the Reliability Assessment indicates that modeled BTM PV locations "will be identified based on location of existing behind-the-meter PV and information from PTO on future growth." Given the growing importance of BTM PV in reliability and other studies, the CAISO and PTOs should describe in more detail how and based on what information BTM PV locations will be modeled, and what key uncertainties and assumptions this involves. Discussion at the February 18 meeting indicated that Distribution Resource Plans recently submitted by PTOs to the CPUC may play a role in establishing these locational assumptions, and this should be explained more fully. Additionally, understanding (e.g., via maps or tables) where the BTM PV are actually being placed on buses or groups of buses for the 2016-2017 TPP would be very useful for understanding reliability and LCR study assumptions and results, as well as for understanding implications for future planning needs and methods.	Please see response to Comment #4f above.
4h	***4. Methodologies Used by PTOs to Create Bus-level Load Forecasts Should be Explained in Greater Detail.*** Pages 11-14 of the draft Study Program describe at a high level how the PTOs convert 2015 IEPR load forecasts into bus-specific load forecasts. More detail	The methodologies utilized by the PTOs to allocate loads to buses, has not changed in many years, and remains consistent with the

No	Comment Submitted	CAISO Response
	should be provided, including whether the methodology for allocating aggregate forecast load to buses only applies to *peak* loads (including 1-in-2, 1-in-5, 1-in-10, weather-adjusted), and whether the 8760-hour load shapes for the different buses are then calculated based on a single 8760-hour load shape for an entire load area, allocated to buses *in the same proportions as peak loads* - - or whether some other method is used. Also, it should be clarified if peak loads modeled for different buses are coincident peak loads, so that a situation cannot occur, for example, in which bus X has a modeled peak load occurring at a different hour than the modeled (coincident) peak load for the overall load area (such as SDG&E). Additionally, it should be clarified if and how the loads allocated to buses using the PTOs' methodologies represent loads without accounting for either AAEE or BTM PV, such that both AAEE and BTM PV are added (to each bus for each hour) separately, according to whatever bus allocations and 8760-hour or other shapes are attributed to the AAEE and to the BTM PV.	explanations provided in the past. The AAEE allocations to busses are determined by the CEC.
4i	***5. The CAISO Should be Prepared to Run Reliability Sensitivity Cases with Higher Levels of AAEE than Included in the 2015 IEPR Load Forecast.*** Senate Bill 350 calls for doubling of AAEE by 2030. SB 350 and its planning implications were not known in time to inform the CEC's development of the 2015 IEPR load forecast. However, if an appropriate planning scenario reflecting a higher AAEE goal is developed it would be valuable for this scenario to be analyzed as a sensitivity case(s) in the 2016-2017 TPP. Thus CPUC Staff request that the CAISO be prepared to run such a case(s), should it be developed in a timely manner.	The CPUC proposed planning assumptions and scenarios document specifically recommend, among others, that the Mid Baseline-Mid AAEE forecast be used for the CAISO's system-wide 2016-2017 TPP cycle. The ISO relies on the load forecasting performed by the CEC, coordinated with state agencies including the CPUC. Some level of forecast uncertainty is managed through sensitivity studies required as part of NERC's mandatory standards, but the ISO is not considering replacing reliance on the CEC forecast. Further, the ISO is not aware of CEC activities to develop an updated forecast addressing the higher AAEE goal ahead of the CEC's 2016 IEPR forecast update which the ISO expects to utilize in the 2017-2018 planning cycle.
4j	***6. The CAISO Should Assess Need for New and Previously Approved Reliability Driven Transmission Upgrades in Light of Continued Decline in Load Forecasts and Growth of Customer Generation, and Should Explain How Customer Generation in Community Choice Aggregator (CCA) Areas will be Considered.***	Refer to ISO's response to Comment #1b

No	Comment Submitted	CAISO Response
	CPUC Staff appreciated CAISO's effort in the last TPP cycle to assess previously approved transmission projects, resulting in cancellation of 13 projects that are no longer needed apparently due largely to declining load forecasts. As we stated in comments on the draft 2015- 2016 Transmission Plan, the CAISO should continue such assessment for all load areas. Results should be reported in the 2016-2017 Transmission Plan. Load forecasts continue to decline and distributed (including behind-the-meter) resources continue to grow. As one example, the CAISO should evaluate the continued need for the Vaca-Dixon/Lakeville reconductoring project, and should indicate the year (if any) in which absence of this upgrade produces modeled reliability violations. If modeling does produce violations, the final reporting of this study and its conclusions should clearly describe whether continued operation (past assumed retirement dates) of Pittsburg generators, or other (which?) measures, were modeled as mitigations. We note that status of PG&E's application to the CPUC regarding this project is currently uncertain. Finally, CPUC Staff note that resource developments and planning by Community Choice Aggregators (CCAs) can impact reliability needs in some areas, including the North Bay/North Coast area affected by the above mentioned reconductoring project. It is unclear to what extent this information is reflected in the IEPR load forecasts and in the CAISO's studies. Any clarification here would be valuable. In particular, CPUC Staff have received information regarding Marin Clean Energy6 and Sonoma Clean Power, indicating that load served by behind-the-meter resources in these two areas exceeds 100 MW and could roughly double in 10 years, while slightly smaller but significant amounts of local distributed wholesale renewables are being contracted or planned.	
4k	*7. The CAISO and Transmission Developers Should Ensure That Planned In-Service Dates for Approved Projects Are Consistent with Realistic Timelines Particularly for Permitting and Siting - - Including the Permitting Timeline Estimates Provided in Appendix A.* CPUC Staff comments on the draft 2015-2016 Transmission Plan emphasized this point, citing as an example a project for which the planned in-service date may be unachievable given a realistic timeline. CPUC Staff have reviewed the status of several major transmission projects recently approved by the CAISO that are now before the CPUC for permitting. Updated information relevant to the	Your comment has been noted. The ISO will also be looking to the CPUC staff to provide input on future proposed mitigations that are under consideration through the planning cycle.

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	timelines for those projects are listed in Appendix A, and these timelines should be considered by the CAISO and project developers.	
4l	***8. The CAISO Should Assess, Discuss with Stakeholders and Model as Warranted - - the Value of Reactive Controls at Various Categories of Resources in Helping Manage Overvoltage Issues Such as Those Driving Approval of Reactive Controls at Six PG&E Substations in the Draft 2015-2016 Transmission Plan.*** In identifying need for investment in reactive controls at six PG&E substations, the CAISO cited growing overvoltage issues in both modeling and real-world monitoring. In discussion at the February 18 stakeholder meeting, the CAISO cited as a significant cause the changing generation mix including growth of renewable generation. The CAISO should explain which generators or types and locations of generators are responsible, and whether these issues would be detected or addressed in transmission or distribution-level interconnection studies. CPUC Staff also previously asked whether periodic investment in reactive controls on the transmission system is the best or only solution. We repeat and expand that request. We ask the CAISO to consider and model the ability of reactive controls at distributed and customer resources to significantly contribute to mitigating this problem. CPUC Staff note that CAISO has a market reform initiative in place to require reactive controls on asynchronous generators, and that one of many thrusts of the CPUC's Rule 21 (distribution level interconnection) reforms is achieving reactive control capabilities at distribution-level resources. Periodic investment in centralized transmission level reactive controls may be the most cost-effective solution or part of that solution, but there should be a proactive assessment of the mix of potential solutions.	Existing generation reactive capability is utilized as a voltage mitigation before identifying the need for capital projects. New generation interconnection studies determine if there is a need for that generation to provide reactive power and new generation with reactive power capability is also utilized as a voltage mitigation before identifying the need for capital projects. Please see response above regarding distribution power factor assumptions.
4m	***9. The CAISO Should Clarify the Methodology for Modeling Preferred Resources in Reliability and Also LCR Studies.*** CPUC Staff understand that at least for the Los Angeles Basin and San Diego areas, the CAISO will initially model (in reliability assessment base cases) most preferred resources offline. Then, if this results in identified reliability problems, the CAISO will add preferred resources up to specific limits, at the most effective	Your comment has been noted. Pages 24-31 of the draft 2016-2017 Study Plan provide details of how preferred resources will be modeled in both the reliability studies and the LCR studies.

No	Comment Submitted	CAISO Response
	locations, to test ability of those resources to mitigate the reliability problems. Here, we use the term preferred resources broadly to include energy efficiency, demand response, storage, and local distributed renewable generation. Below, we request clarification regarding (1) what preferred resources will be included in the reliability assessment base cases, and (2) what will be the upper limits on amounts of preferred resources subsequently modeled to test ability to mitigate problems. These clarifications should be included as specifically as possible in the final Study Plan, with full clarification in the 2016-2017 Transmission Plan. Further, CPUC Staff request that the same information regarding modeling of preferred resources, as elaborated below, *also be provided for LCR studies*. First, the amounts and types of preferred resources *included in reliability assessment base cases* should be explicitly defined. CPUC Staff understand the bottom of page 26 and top of page 27 of the Draft Study Plan as indicating that energy efficiency, demand response ("DR") and behind-the-meter ("BTM") generation - - as "*embedded in the CEC load forecast*" will be included in base cases. CPUC Staff assume and request confirmation that this means that BTM generation amounts specified in the load forecast, even if ultimately modeled as supply, will be included in reliability base cases. The CAISO should clarify if the statement that modeling BTM PV as "*a discrete element*" as described on page 15 of the Draft Study Plan means that BTM PV will be modeled as supply allocated to individual buses and if not, what it does mean. CPUC Staff also request clarification regarding what types and amounts (by location) of DR are being included in the base cases, and specifically whether this means only that certain amounts of DR are assumed to already be reflected be in the load forecast (based on the above-cited statement from page 27 of the Draft Study Plan) thus not needing to be modeled explicitly, or whether it means something else and if so, what it means. The next paragraph on page 27 of the Draft Study Plan states that "*assessments will be initially performed using preferred resources other than DR to identify reliability concerns…and if reliability concerns are identified…..additional rounds of assessment will be performed using potentially available demand response and energy storage*…" Page 28 states that "*The DR capacity amounts* [having been described in preceding table and text] *will be modeled offline in the initial*	Please see response #4f above to similar questions on BTM PV modeling.

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	reliability study cases….” and later states that “*These storage capacity amounts* [1404 MW shown in Table 4.8-3] *will not be included in the initial reliability analysis*.” On the other hand, slide 17 of the Reliability Assessment presentation on February 29 states that energy storage amounts [apparently referring to amounts in Draft Study Plan Table 4.8-3] are “*not included in starting cases (no location data available), unless* [emphasis added] *already procured by LSEs as part of the LTPP process*.” All of the above leaves ambiguity regarding what preferred resources are included in base cases. CPUC Staff’s interpretation, which CAISO is requested to confirm or correct, is that: *No DR amounts not already embedded in the load forecast (if any) will be included in base cases. Otherwise, preferred resources falling within CPUC Track 1 and 4 authorizations will be included in bases cases only if (1) they have already been procured with CPUC approval, and (2) the locations of such procured preferred resources are well defined. CPUC Staff request clarification of what types and amounts of preferred resources procured pursuant to Track 1 & 4 authorizations, beyond storage amounts described on pages 30 and 31 of the Draft Study Plan, thus qualify for inclusion in reliability assessment base cases.*	Storage is modeled in amounts consistent with D.13-10-040. However it is not included in starting cases (no location data available), unless already procured by the load serving entities (LSEs) as part of the LTPP process. Locational information is provided by the CPUC for PG&E and SCE areas. For remaining storage amounts we identify the most effective busses for potential development after reliability concerns have been identified.
4n	Second, CPUC Staff request clarification of what will be the *upper limits* on total amounts of preferred resources that may be added as potential mitigation measures, where initial modeling has identified reliability problems. Our understanding, which the CAISO is requested to confirm or correct, is that the following limits apply. a. Local Additional Achievable Energy Efficiency (AAEE) will be added up to bus- specific amounts consistent with the aggregate LSE amounts in the low AAEE forecast in the 2015 IEPR. b. Local EE procured via Track 1 & 4 authorizations will be considered additive to (i.e., will increase) the AAEE modeling limit given by a. above. c. Local DR amounts assumed to meet a 30-minute total response time9 (for N-1-1 contingencies) will be added as	The Mid Additional Achievable Energy Efficiency (AAEE) scenario will be used for system-wide studies. Because of the local nature of reliability needs and the difficulty of forecasting load and AAEE at specific locations and estimating their daily load-shape impacts, using the Low-Mid AAEE scenario for local studies is more prudent at this time. Local EE procured via Track 1 & 4 authorizations will be considered additive to (i.e., will increase) the AAEE modeling amounts given above. The DR mitigation modeling amounts in item c are generally correct. The higher amount of DR in Table 4.8-1 is assumed to be a potential

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	specified in Table 4.8-1 of the Draft Study Plan, and there will also be a separate sensitivity case(s) in which the SCE amounts in Table 4.8-1 are replaced by amounts provided by SCE. The DR procured under Track 1 & 4 authorizations such as indicated in Table 4.7-7 of the Draft Study Plan is additive to the above amounts, as an upper limit on total amounts added for mitigation tests. d. Local renewable resources procured through Track 1 & 4 authorizations will be added for mitigation, and are assumed to be additive to any local distributed renewables included in the TPP base case RPS portfolio. e. Local storage procured via the CPUC storage mandate (or in the case of SCE, exceeding the mandate) will be added if not already included in the base cases. CPUC staff assume and request confirmation or correction that upper limits on aggregate preferred resource additions for mitigation modeling in the Los Angeles Basin and San Diego areas will be set at the maximum of (i) the Track 1 & 4 maximum authorizations and (ii) amounts actually procured. We request clarification as to how maximum preferred resource additions above amounts already procured in these areas will be allocated among the *different* types of preferred resources, for modeling purposes. The CAISO is also requested to describe a. how the specific aspects of preferred resource modeling for reliability studies as discussed above are treated for *LCR studies*, clearly indicating the similarities and differences (reiterating a request stated above); b. which kinds of preferred resources described above, and which kinds of other resources, are considered to be "fast response" (e.g., within 30 minutes total response time) for reliability study and LCR purposes; c. how, including types and MW limits, preferred resources will be modeled and assessed for ability to mitigate reliability problems in *other areas*	amount that can be repurposed to respond in 20 minutes. The lower amount of DR in SCE is the amount of DR that currently exists that can respond in 20 minutes. Items (d) and (e) are correct. The ISO will model the preferred resources as procured by the LSEs for the LA Basin and San Diego areas. If additional preferred resources beyond procured amounts are needed to mitigate identified reliability concerns, the ISO will model up to the upper limits authorized by the CPUC for LTPP Tracks 1 and 4. The additional amounts for preferred resources will be proxy capacity amounts at the most effective locations and will be used as a guide for the LSEs for consideration for future procurement needs. Other than the need to meet the identified proxy capacity amounts to address reliability need, the ISO is neutral on the types of preferred resources to be considered by the LSEs for further procurement. The capacity amounts of preferred resources modeled in the LCR and reliability studies are intended to be the same.

No	Comment Submitted	CAISO Response
	besides the south coastal load centers, noting that page 26 of the Draft Study Plan states that in previous planning cycles, CAISO "…*made further progress in integrating preferred resources into its reliability analysis focusing on other areas where reliability issues were identified*."	Fast response resources are those that can respond within 20 minutes.
4o	***10. In Assessing Preferred Characteristics for "Slow Response" Local Capacity Resources the CAISO Should Describe What Types of Resources are Considered Slow Versus Fast Response, and How, Quantitatively, Total Reliability and LCR Needs Can be Met by Combinations of These Two Categories of Resources.*** In summarizing its planned special study "*to identify the characteristics of the 'slower' response* [resources] *that are to be considered for local capacity resources"* the CAISO notes on page 51 of the Draft Study Plan that slow response resources unable to respond within 30 minutes of an initial contingency may if having certain [to be identified] characteristics provide local capacity value by being able to be dispatched or "positioned" in advance of an actual contingency. The CAISO also states that "*The number of dispatches in the latter* [slow response, pre-positioning] *case is anticipated to be orders of magnitude higher than the former* [fast post- contingency response]. This appears to CPUC Staff to offer the possibility of slow-response resources making a substantial contribution to meeting overall local capacity and local reliability requirements particularly under certain important scenarios and, as the CAISO indicated in the February 18 meeting, perhaps more so in certain parts of the grid than in others. Thus, CPUC Staff request that the CAISO identify (starting with the final Study Plan to the extent possible) what kinds of resources are categorized as slow versus fast response. Beyond this, it will be important to learn (and we look forward to learning) what relative and absolute amounts of fast versus slow response resources, or perhaps even amounts of different *types* of fast versus slow response resources, are needed *in combination* to meet reliability and local capacity requirements in different load areas, and certainly in the Los Angeles Basin and San Diego areas.	The ISO is undertaking the additional analysis of the necessary characteristics in response to stakeholder requests for this information, and to ensure that all possible uses of preferred resources are available. The initial focus in the past had been on the necessary characteristics of fast response resources, based on stakeholder feedback that the opportunities were greater for those resources, and there was general lack of interest in end-use customers in providing slow response type services at that time. The ISO is not in a position to assess how significant the contribution of slow response resources may be in the future. Fast response resources are those that can respond within 20 minutes. Slow response resources are those that cannot respond within 20 minutes.

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	11. The CAISO Should Report the Planning Status of Transmission Projects Falling Within the Planning Horizon that Support a State Infrastructure Project (Such as the High Speed Rail Project), and Should Begin More Detailed Studies When Required by Those Projects' Timelines. In comments on the Draft Study Plan for the 2015-2016 TPP, PG&E requested a large load interconnection sensitivity study be performed on the Greater Fresno area during the summer peak period, significantly driven by planned interconnection of the California High Speed Rail Project (HSR). The CPUC supports this request for the 2016-2017 TPP, as the 2025 initial operating date for the San Jose - North of Bakersfield segment of the HSR project falls within the CAISO's planning horizon. The CPUC believes it is important for stakeholders to be able to track the status and progress of transmission projects for which objectives significantly involve electrical support of a state infrastructure project. Furthermore, the CPUC suggests that, when studies are conducted for each transmission project of this type, the CAISO indicate the extent to which the cost, electrical configuration and approximate geographic location of the transmission project are affected by the needs of the state infrastructure project.	The identified loads are currently under assessment as load interconnection projects by PG&E. The ISO will continue to work with PG&E as required on these load requirements and will assess them consistent with other load interconnection projects.
	12. CPUC Staff Reiterate Our Comments on the Draft 2015-2016 Transmission Plan Appreciating the CAISO's Initial Informational 50% RPS Study and Looking Forward to Continuing Studies, and We Also Look Forward to Future Insights Regarding Out-of-state Renewable Resources as an Identified Area of Focus in the Draft Study Plan. CPUC Staff appreciate the CAISO's initial informational study of implications and feasibility of pursuing the legislatively established 50% renewable energy goal. We look forward to future refinements of both CAISO studies and the CPUC's planning tools informed by those studies. This includes further insights regarding the following. ▪ Benefits (e.g., reliability, reduced curtailments, perhaps even limited RA deliverability) of different levels of transmission upgrades well	Your comments have been noted.

No	Comment Submitted	CAISO Response
	below upgrade magnitudes needed for full capacity deliverability. ▪ How conditions at the distribution level such as expansion of distributed energy resources and various kinds of controls and services for/from such resources - - impact feasibility and costs for pursuing a 50% RPS in different ways. ▪ The important but still uncertain role of ability to export surplus renewable generation - - in affecting feasibility and costs for pursuing a 50% RPS in different ways. ▪ The extent to which potential problems revealed in power flow studies do or do not resolve themselves via reasonable fine tuning of assumptions regarding how/where future renewable resource additions will be deployed. We look forward to further exploration of options and implications for pursuing out-of- state renewable energy as indicated in the Draft Study Plan. We expect that resulting insights will partly fall under the topics identified above, along with additional insights such as regarding source and delivery options for out-of-state renewables, and perhaps how westwide developments and uncertainties may impact these options.	
	13. CPUC Staff Look Forward to Further Assessments of Frequency Response Issues Particularly Under High Renewables Futures, and with Fine-Tuning of Modeled Response From Existing Providers as Emphasized in the Draft Study Plan. For future frequency response studies in 2016 CPUC Staff request that the CAISO: ▪ provide context relative to other studies (such as 50% RPS studies and 2016-2017 TPP study cases) by describing in sufficient detail both CAISO area and westwide renewables portfolios and dispatch levels assumed for frequency response studies; ▪ provide greater quantitative insight into how commitment of resources to meet frequency response needs interacts with flexible reserves commitment to manage load/wind/solar variations and uncertainties, including the extent to which flexible reserves versus	Your comment has been noted. The ISO will be continuing to assess frequency response in the 2016-2017 TPP with a focus on the modeling issues that have been identified. CPUC staff should also refer to the ongoing ISO Frequency Response stakeholder process, details of which are available at: http://www.caiso.com/informed/Pages/StakeholderProcesses/FrequencyResponse.aspx .

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	frequency response needs are fully additive, overlapping, or somewhere in-between; ▪ assess the potential (and modeling requirements) for additional sources of primary frequency response not modeled in recent studies especially looking out 10-15 years with high renewables penetration, such as storage, demand response, other preferred resources, and frequency response obligation contracts with other BAs; and ▪ complementary to the CAISO's stated intent to focus on understanding the discrepancy between modeled versus historically experienced frequency responsiveness from conventional providers - - assess and clarify the extent to which current assumed (conventional) frequency response providers could and should be expected or incentivized to provide greater frequency responsiveness, and the extent to which this impacts differences between modeled versus observed system frequency responsiveness.	
	14. The CAISO Should Explain How Required Frequency Response Capabilities will be Modeled in Both Economic and Operational Flexibility Studies. In production simulation studies, the CAISO formerly modeled regional minimum generation constraints as proxies for a mixture of more complicated reliability requirements not inherently captured in direct current (DC) flow production simulations. Subsequently the CAISO has transitioned to instead modeling commitment constraints as production simulation proxies for *frequency response capability requirements*. CPUC Staff comments on the draft 2015-2016 Transmission Plan requested that the CAISO describe how this frequency response capability modeling was conducted in production simulations for 2015-2016 TPP economic studies. The CAISO should describe to the extent possible now, and if necessary more fully when possible, what production simulation methodology or constraints will be used to model (serve as proxies for) frequency response capability requirements, in 2016-2017 TPP studies. This should include	Your comment has been noted.

No	Comment Submitted	CAISO Response
	description of requirements or constraints regarding commitment and/or headroom levels for different specific kinds of generation. Also, the CAISO should clarify if different methodologies may be used (and may of necessity have to be used) for GridView simulations such as for TPP economic studies, versus for PLEXOS simulations such as for operational flexibility studies. Besides being important in the context of the CAISO's own planning processes, methods of modeling production simulation operational constraints as proxies for frequency response capability requirements will be important when the CAISO's modeling studies are presented and discussed in the CPUC's Long Term Procurement Plan (LTPP) proceeding. In the recent cycle of that proceeding parties have already expressed strong interest in understanding and discussing the rationale and implications of production simulation constraints as proxies for reliability needs. Thus, information requested here regarding modeling of frequency response-based constraints the 2016-2017 TPP should supplement and/or update characterization of such modeling constraints as described in the *Assumptions and Scenarios* documentation for the new cycle of CPUC's Long Term Procurement Plan proceeding.	
	15. CPUC Staff Look Forward to Additional Detail and Vetting for the CAISO's Approach to Assessing the Potential for Economically Driven Retirement of Generation. *Dramatic evolution of electricity resource mixes and markets can produce economic pressures on some resources, including resources having important reliability roles. The CAISO's planned assessment of potential for economically driven retirements thus confronts an important topic which is already on many minds and agendas. However, constructing a credible and robust methodology for such an assessment is challenging and potentially controversial, and the CAISO should carefully describe and vet this methodology before proceeding to conclusions. This should include consideration of revenue implications of increased needs for various reserve and ancillary services, combined with new patterns of generator operation.*	Your comment has been noted. We reiterate that any consideration of potential economically-driven retirement of gas-fired generation is focusing primarily on screening for purposes of assessing reliability implications on the transmission system, and not meant as a comprehensive analysis of resource requirements and future resource procurement needs. It is unlikely that this process (and the first cycle of examining this issue in particular) will provide results suitable for other purposes.

No	Comment Submitted	CAISO Response
5	**Diamond Generating Corporation** **Submitted by: Paul Shepard**	
5a	The Study Plan uses a standard assumption that conventional resources will be retired at the end of a 40-year life cycle unless the generator has announced an earlier date. The "40- year" assumption does not account for the risk that fast-starting gas resources ("firm capacity resources") may retire earlier than an assumed 40-year useful economic life. During the 10-year planning horizon of the 2016-2017 TPP, numerous firm-capacity resources will come off their existing contracts and the CAISO short-term market prices will not support the continued availability of firm capacity resources. There is also no adequate price signal through CAISO market prices or its other procurement mechanisms to maintain and invest in firm capacity resources absent a multi-year commercial arrangement. Put simply, there is a risk of premature retirement of firm capacity resources that are within their ordinary operational life but for the absence of a regularized pathway for re-contracting. In both the LTPP and this proceeding, the CAISO has wisely recognized the magnitude of these risks by proposing a new sensitivity study: > There is a potential for the economic early retirement of gas generation as a result of the increasing levels of renewable generation interconnecting to the electrical grid. The special study will develop a methodology for developing potential early retirement scenarios and assess the early retirement scenarios to identify if there are any reliability impacts associated with the early retirement of gas generation on the ISO controlled grid. The brevity of Appendix A-3 (presumed retirements) highlights the potential value of this sensitivity. Appendix A-3 contains a mere fraction of the universe of conventional resources in Appendix A-1. Appendix A-3 only includes those resources that have previously announced retirement or reach age 40 within the TPP's 10-year planning horizon. Many of these retirements have already been planned around (e.g., SONGS) and the overall impact of Appendix A-3 on the 2016-2017 study results will probably be negligible. By studying a new sensitivity, the CAISO will provide greater public, aggregated information on the	Your comment has been noted.

No	Comment Submitted	CAISO Response
	timing, quantity and general types of firm capacity resources without ongoing commercial commitments to the CAISO market. Diamond strongly supports the CAISO's efforts to develop this critical data set for both the CAISO and other entities with planning responsibilities.	

No	Comment Submitted	CAISO Response
6	**Duke American Transmission Company** **Submitted by: Brian Biering**	
6a	DATC looks forward to providing its perspective in the 2016-2017 TPP as a PTO, transmission developer, and a stakeholder interested in seeing California achieve its aggressive 2030 Climate Goal. As discussed below, DATC is concerned that the State's 2030 Climate Goal is not effectively accounted for in the 2016-2017 TPP. The 2016-2017 TPP would utilize a 10-year planning horizon and include an "informational" 2030 planning scenario that would have no impact on the actual transmission plan. Transmission planning, investment and construction takes time and the decisions the CAISO makes in this TPP will affect the State's ability to achieve the 2030 Climate Goal. DATC therefore requests that the CAISO revise its Study Plan to actually incorporate the results of the 2030 scenario into the Plan itself. California has set a very high bar for the energy sector by raising the state's renewables penetration goal from 33% to 50% by 2030 and by calling for a 40% reduction from 1990 GHG emission levels by 2030 (and putting the State on the trajectory for reaching an 80% reduction by 2050). To achieve these ambitious goals, California will need to go beyond the 50% RPS and must start planning now for the infrastructure necessary to meet the 2030 targets and beyond. It is of upmost importance that planning and decision making processes that the State engages in today support the overall goals and long-term objectives for California. Sound transmission development will play an integral role in meeting the State's GHG targets by connecting renewable resources to load and facilitating an increasingly regionalized transmission grid. While 2030 may seem distant, for transmission planners, it is rapidly approaching. Planning, permitting, financing and constructing significant transmission projects in California can take up to ten years or even longer. Thus, if California is to have the transmission in place to meet its 2030 (and beyond) carbon reduction goals—which include very significant electrification of transportation on top of the renewable energy demand—it needs to engage in coordinated multi-agency long-term planning starting now.	Your comment has been noted. The ISO agrees that progress must be made towards achieving the policy goals in California. Recognizing the need for sound policy decisions regarding the resources necessary to achieve those goal, the state agencies must be given the appropriate and reasonable time to establish those resource details in order for transmission planning and project approvals to proceed. The ISO considers that the special studies being conducted in this planning cycle establish a solid foundation to move more decisively in future planning cycles.

No	Comment Submitted	CAISO Response
	The 2016 – 2017 TPP sets a relatively short a planning horizon that does not account for the 2030 target: • The studies that comply with TPL-001-4 will be conducted for both the near-term (2017-2021) and longer-term (2022-2026) per the requirements of the reliability standards. • Within the identified near and longer term study horizons the ISO will be conducting detailed analysis on years 2018, 2021 and 2026. If in the analysis it is determined that additional years are required to be assessed the ISO will consider conducting studies on these years or utilize past studies in the areas as appropriate. (Citations omitted) In finalizing the Study Plan, the CAISO should consider how the planning horizon correlates with the State's 2030 Climate Goal and whether the 2030 Scenario contemplated in Section 7.3 of the Study Plan should be more than just "informational". This analysis should consider whether the use of a 10-year planning horizon foregoes "right-sizing" opportunities that may be needed to meet the 2030 Climate Goal. Transmission developers assume significant costs and spend considerable time in obtaining financing and regulatory approvals. These efforts are based upon a definition of the project size that must be made early in the development process. Once a commitment to constructing a transmission project at a particular voltage has been made, the opportunity to resize that same transmission project later becomes increasingly costly, time consuming, and potentially impractical. In many cases, the opportunity will be lost entirely once a commitment to a voltage level has been relied upon for financing, permitting and planning. Thus, the decisions made (or not made) in this planning cycle will impact how the State achieves its 2030 Climate Goal and the 2030 scenario should be integrated into the plan itself. In sum, one of, if not the most, significant hurdles in providing transmission planning certainty and using transmission as a tool in achieving the 2030	

No	Comment Submitted	CAISO Response
	Climate Goal is the ten-year planning horizon used by the CAISO and the CPUC. While a ten-year planning horizon may be appropriate for certain transmission planning objectives – e.g., reliability needs, the ten-year planning horizon is too short to facilitate the achievement of the 2030 Climate Goal. DATC appreciates the CAISO's consideration of these comments and looks forward to participating in the 2016-2017 TPP.	

No	Comment Submitted	CAISO Response
7	**Eagle Crest Energy** **Submitted by: Susan Schneider, Consultant**	
7a	**50% RPS Study** The CAISO should add to the scope of the 50% RPS Study proposed in this planning cycle a closer examination of export feasibility. The 50% RPS Study in the last planning cycle examined net-export scenarios between 2,000 and 8,000 MW. This is a very wide range, up to approximately the maximum historical simultaneous export level. The prior study did not attempt to assess which export level was actually feasible. Narrowing the range of realistic export levels will be key to making policy decisions about potential over-supply mitigation measures – those policy decisions will likely be very different at a 2,000 MW export level than an 8,000 MW export level. In fact, physical and operational limitations, legacy contracts, and policy/political factors could very well restrict such exports in the study time horizon. The CAISO's ability to export any renewable or other energy over-supply is premised on the ability and willingness of neighboring regions to absorb that excess energy; that ability and willingness will be based on several factors: • ***The physical ability of adjacent / nearby regions to absorb excess energy when it is likely to be available***. Neighboring states have relatively small loads compared to California and their own resource fleets to manage, and many large native resources in those areas lack operating flexibility. This is exemplified by the issues surrounding the current inflexibility of "block" imports, which has actually been exacerbated since implementation of CAISO 15-minute markets. • ***The willingness of other regions to forego the economic and other benefits of developing renewable-energy facilities.*** The entire west has abundant renewable resource potential, and native development is an economic driver in many Western states. It's unclear why neighboring states would want to forego the economic development associated with native renewable development in favor of procuring California energy. On the contrary, many regions considering joining the CAISO EIM and/or an expanded west- wide ISO/RTO are doing so to expand access to California markets, to sell energy from high- potential	As noted in the stakeholder comment, the ISO's ability to export any renewable or other energy over-supply is premised on the ability and willingness of neighboring regions to absorb that excess energy and that ability and willingness will be based on a number of factors. The issue is being explored through interregional coordination discussions at this time outside of the framework of the ISO's annual transmission planning process, and additional technical studies focused on that specific issue are not likely to provide material results at this time. The ISO will continue to monitor the broader interregional discussions and consider next steps moving through the year.

No	Comment Submitted	CAISO Response
	renewables or other production in their own areas and thus to reap the associated jobs and other economic benefits from such development. • ***Legacy transmission agreements.*** Many of these areas have less-flexible, long-term transmission agreements in place that could reduce the use of those assets by others.	
7b	**Storage Study** The "Bulk Energy Storage Study with 40% RPS in 2024" performed in the last study cycle was a good start. However, that examination was quite limited (focusing on a small subset of potential storage benefits), and additional analytic work is needed to inform CAISO and CPUC policy decisions about procurement and funding of such assets. For the reasons discussed below, ECE believes that this work should be performed under the economic study category, given the ability of bulk energy storage to provide many of the same economic benefits quantified for transmission facilities in the economic study process. The CAISO's statements in other forums about its need for pumped-storage resources should be supported here with additional analytical follow-up work in the Study Plan. For example, the CAISO stated in its March 26, 2015 comments in CPUC Rulemaking 15-03-011 that, to manage increasing levels of intermittent/renewable energy on the system: … the CAISO and the CPUC must be prepared to implement solutions that will allow for the reliable operation of a highly dynamic grid. Energy storage, with its unique ability to both consume excess renewable energy and to quickly inject clean energy back onto the grid to meet ramping and peak demand needs, has the potential to be a cornerstone of the new electric network. Pumped energy storage, in particular, can be constructed at large scale, with characteristics that are necessary to meet the grid's over- generation and ramping needs. CAISO studies demonstrate that additional bulk energy storage with fast-ramping capabilities is essential to balance California's rapid rise toward a 50% renewable grid. Not only would California benefit from additional bulk energy storage resources such as pumped storage, California could be harmed without them. The CAISO therefore urges the CPUC to consider (a) increasing current procurement targets to allow for the capacity of bulk energy storage resources	As noted in the response to CESA comments (See 3 above) the ISO has previously indicated that the study in the 2015-2016 transmission plan will be updated to consider a 50% RPS scenario and additionally that an updated 50% analysis will be included in the 2016-2017 planning cycle using updated assumptions. The timing has not been determined at this time. That analysis focuses more specifically on system – e.g. resource – benefits looking more broadly and without targeting specific locations for the resources, and the value proposition is based largely on the parameters indicated in the comments. The comments provided have been noted and will be considered in that regard. It should be noted that the foundation for a number of the parameters proposed in the comments is itself under active development, such as the level of need and the value of frequency response capabilities, and those parameters will in turn depend heavily on future resource decisions. Regarding transmission system benefits, these depend upon the specific location of the resources, and the ISO's studies of storage benefits in renewable integration are being conducted more generally without selecting specific project proposals at this time. Storage and other preferred resources are also explored as preferred mitigations for transmission relief, and the ISO encourages stakeholders to propose such projects to address identified needs.

No	Comment Submitted	CAISO Response
	without subsuming the procurement of smaller and newer technologies, and (b) earmarking capacity within those procurement targets specifically for pumped storage. Similarly, the draft 2015-6 Transmission Plan states that "consideration should also be given to how the storage resource would be compensated for the benefits it brings to the system." (p. 258) The CAISO must recognize that neither the CPUC nor the CAISO itself can reasonably make the policy decisions needed to support the pumped-storage procurement it recommends, or the means by which storage would be funded or compensated, without the analytic support that will form the basis for such decisions. This analytic support must be provided by the CAISO. Moreover, those critical policy decisions cannot be postponed indefinitely if the CAISO expects to have these facilities available when needed, e.g., by 2024 when RPS levels may reach or exceed 40%. Like transmission facilities, pumped storage facilities take many years to plan, develop, and construct. Thus, the CAISO should perform the more complete studies now to preserve those options and enable those procurement, funding, and development decisions to be made by California policymakers in the next 1-2 years. For example, the Eagle Mountain Project is already FERC-licensed; however, even for a facility at this advanced stage, procurement decisions are needed soon to meet a 2024 commercial-operation date. Other pumped-storage facilities that are not as far along will take even longer to develop. Therefore, ECE requests that the CAISO undertake an in-depth Economic Planning Study for pumped storage hydro facilities to provide a comprehensive assessment of the system, local, and societal benefits of such facilities. The justification for large storage facilities will likely rely on all of these different benefits, so this study should be broad enough to encompass them and avoid isolated, "silo-based" analysis that has hampered storage development to date. Specifically, the study should consider, and quantify where possible, the following benefits:	

No	Comment Submitted	CAISO Response
	• **System benefits:** Renewables and other energy curtailment avoidance (e.g., through reduced renewable generation "overbuild" needs to meet RPS requirements), frequency response, ramping, flexible capacity requirement reductions, avoided transmission, etc. • **Locational benefits:** As the 50% RPS Study in the last planning cycle illustrated, there may be localized congestion or other negative grid impacts that could be addressed by bulk storage facilities. For example, additional renewables development in high-potential renewables areas such as East Riverside, or imports from other areas (which may become part of an expanded west-wide ISO/RTO by joining with the CAISO), could be accommodated through locating bulk storage facilities in that area. ECE understands the CAISO's general reluctance to study specific facilities in the TPP, but in reality there are only a small number of known feasible pumped-storage locations in California. In this cycle, the CAISO should examine the curtailment-avoidance, voltage support, and other locational benefits that could accrue from pumped-storage additions in these locations. • **Societal benefits:** The storage study in the last cycle gave a price per ton of emissions (source not explained) and a reduction in millions of metric tons. However, given the state's ambitious carbon-reduction goals, the CAISO should consider potential future increases in carbon-emissions values over time, as well as any other emissions-related or other societal benefits. This study should reflect these key assumptions: • **RPS level:** The study should include a 50% RPS level. The RPS will reach 50% just a few years after a 2024 COD, and it will be at or above 50% for the vast majority the asset life. • **Project size:** The storage study in the CAISO's draft 2015-6 Transmission Plan noted: …the effectiveness of the new pumped storage resource is limited by its maximum capacity in relative to the volume of potential renewable generation curtailment. In this study the new pumped storage resource has 600 MW maximum pumping capacity that converts to 500 MW maximum generation, with an efficiency factor of 83%. When the curtailment…is greater than 600 MW, the pumped storage resource…cannot store all the energy and use it in later hours. The portion of energy exceeding 600 MW is still curtailed…(p.253)	

No	Comment Submitted	CAISO Response
	That document further states that curtailments of renewable energy were "…greater than 600 MW in many of the hours." Far higher levels of renewables curtailments (>13,000 MW) were seen in the 50% RPS Study in that last planning cycle. Mitigating larger amounts of renewables and other energy curtailment can reduce "overbuild" need, better optimize generation and transmission assets, and improve system reliability. Therefore, the economic planning study should consider whether increasing the hypothetical bulk storage facility size (e.g., to 1,500MW or more) would provide a commensurate increase in benefits. Several feasible facilities under development in and around California could provide far more pumped storage capacity (individually or in total) than 500/600 MW.	
7c	**Conclusion** ECE recognizes the challenges of analyzing pumped-storage facilities, since the far-reaching and long-lived benefits are difficult to capture in a narrow analysis. The results of the study requested by ECE should be factored into broader thinking about the public policy benefits of maximizing the use of renewable resources consumers have paid for, and achieving state carbon-reduction goals without assuming unrealistic "overbuild" situations where incremental resources would have to be curtailed by 50% or more. ECE is confident that pumped storage will prevail under economic scrutiny if coordinated and comprehensive analysis considers the value of these assets in achieving the State's clean energy objectives.	Please refer to the above response.

No	Comment Submitted	CAISO Response
8	**Large-Scale Solar Association** **Submitted by: Susan Schneider, Consultant**	
8a	The Large-scale Solar Association (LSA) hereby submits these comments about the CAISO's draft Study Plan (Plan), for the 2016-2017 Transmission Planning Process (TPP). LSA's comments address the Special Studies proposed in the Plan for this next study cycle – specifically, the 50% RPS Study. While the main parts of the Transmission Plan will continue to be based on a 33% RPS in this cycle, the Plan proposes continued examination of selected issues related to the legislative mandate to implement a 50% RPS level by 2030, through a Special Study. The topics proposed for this study, and LSA's feedback, are shown below. • **"Anticipate potential transmission needs to meet" a 5 0% RPS goal.** LSA supports this objective. While we understand the need for additional work to craft 50% RPS portfolios for use in the main TPP studies, the 50% RPS Study in the last planning cycle clearly identified some areas where transmission congestion and renewables curtailment could be a strong concern. Given the long lead time for development of new transmission (and/or transmission alternatives), it would be prudent in this study cycle to make at least a preliminary evaluation of any new transmission that might be needed to address these problems.	The ISO will consider this comment in its special study work in the 2016-2017 planning cycle. However, the ISO did not observe material congestion areas in its "50% energy only" special study analysis.
8b	• **Consider potential impacts of transmission-related curtailment on conventional generation.** LSA agrees that this is an important area of study that should be included because, among other things, these impacts could also affect the transmission analysis discussed above.	Your comment has been noted.
8c	• **"Evaluate out-of-state renewables impacts on the reliability performance and curtailment of renewables."** It is not clear from the brief description in the Plan what the CAISO plans to study here, and LSA requests that the CAISO include additional explanation in the final Plan.	Your comment has been noted.
8d	• **"Provide a framework for considering interregional transmission proposals emerging through the interregional coordination processes developed in compliance with FERC Order No. 1000."** The Plan notes that, based on information to date, this could be a vehicle for studying the proposals for long transmission lines to import Wyoming or New Mexico wind generation.	Your comment has been noted. The ISO notes, however, that a primary driver in considering on a resource study basis outside-of-state resources is the resource diversity provided by out-of-state wind resources, and the ISO's special study work in the 2015-2016 planning cycle indicated considerable potential for in-state solar development.

No	Comment Submitted	CAISO Response
8e	LSA does not oppose study of these options. However, LSA notes that there is also considerable solar potential closer to the CAISO area geographically and urges the CAISO not to limit its study to the specific proposals of Wyoming or New Mexico wind.	
8f	In addition to these topics, LSA urges the CAISO to add an additional topic to this Special Study: A closer examination of export feasibility. The 50% RPS Study in the last planning cycle examined net-export scenarios between 2,000 and 8,000 MW. This is a wide range (up to approximately the maximum historical simultaneous export level), but this study did not examine the feasibility of these export levels. Optimal ways to address potential CAISO system over-supply may be different at the lower export levels than at the upper level. LSA suggests study of two aspects of the export issue. The first aspect is physical feasibility, i.e., the ability of adjacent or nearby regions to absorb excess energy from the CAISO, when it is likely to be available. For example, their ability to absorb this energy, given: - The potential loads of these areas at the times of the day or year when surplus energy is likely to be available; and/or - The operating flexibility, i.e., large resources in those areas when the extra energy is likely to be available. The second aspect is an assessment of institutional constraints, i.e., any transmission or generation ownership or contractual issues that could impede California's ability to export energy to other areas when it is likely to be available. LSA recommends this portion of the study also identify potential actions, by the CAISO and/or other entities that would reduce or remove these limitations.	Please refer to the response to Eagle Crest Energy, comment 7.a

No	Comment Submitted	CAISO Response
9	**LS Power Development** **Submitted by: Sandeep Arora**	
9a	**Economic Study Request:** LS Power is hereby submitting an economic study request to CAISO for the 2016/17 Transmission Plan. The request is to study congestion on CAISO's intertie interface with the Pacific Northwest and Path 26, an internal CAISO path, and evaluate the economic benefits of the transmission solution proposed below. CAISO's Transmission Planning studies in several previous cycles have shown congestion on the California Oregon Intertie (COI) interface and Path 26, although not significant. As LS Power has previously noted in comments submitted under last year's cycle, the amount of congestion shown in the CAISO studies is very small as compared to the real time congestion on this path as shown in CAISO's OASIS and Market Update reports 1 . LS Power believes that certain modelling enhancements to the economic study models may be necessary to be able to investigate these discrepancies. Some of the discrepancies may be related to the use of hurdle rates in the TEPPC common case (for transfers from Pacific Northwest into California) that do not reflect economics of flows in real time. These hurdle rates should be examined and corrected, as appropriate. Further, the economic study model may not be able to accurately reflect the dynamic path limit on COI, which CAISO should look into implementing in studies to be done under this year's cycle. LS Power also requests CAISO to study the Southwest Intertie Project - North ("SWIP North") as an economic solution. SWIP North is comprised of a single circuit 500 kV transmission line from Midpoint substation (in Idaho) to Robinson Summit substation (in Nevada). To enhance this economic solution, an LS Power affiliate owns available transmission capacity on a 500 kV transmission line that connects Robinson Summit to Harry Allen ("ON Line"), which could be dedicated to CAISO. In addition, a new 500 kV line between Harry Allen & Eldorado substations was recently approved by the CAISO Board and is to be in service by 2020. Hence, if SWIP North were to be built, CAISO could have access to a complete path from Midpoint to Eldorado. Under the Transmission Use and Capacity Exchange Agreement among affiliates of LS Power and NV	All economic study requests will be evaluated based on ISO's tariff and the congestion analysis results.

No	Comment Submitted	CAISO Response
	Energy, once SWIP North is built there would be an exchange of capacity such that NV Energy would get a share of the capacity between Midpoint and Robinson Summit and LS Power would get a share of capacity between Robinson Summit and Harry Allen, without either party having to pay any additional amount to the other. As a result of this capacity exchange, each party would have bidirectional transmission capacity on the entire path from Midpoint to Harry Allen. Therefore, LS Power's economic study request is that CAISO study the benefits of approximately 1000 MW of bidirectional transmission capacity between Midpoint and Harry Allen, which is what LS Power will have, and will be available to the CAISO market upon completion of construction of SWIP North. In addition to the economic benefits that CAISO calculates from production cost simulation studies, CAISO should also estimate Capacity Benefits from SWIP North. Adding SWIP North relieves certain reliability and economic constraints related to imports across CAISO's California Oregon Intertie (COI) path. This translates into incremental import capability into CAISO that should add to the net benefits attributed to SWIP North. SWIP North also offers policy benefits by allowing out of state renewables (including Wyoming Wind) to meet the new California 50% RPS targets. Benefits of providing California ratepayer access to lower cost Wind energy from out of state through the proposed SWIP North line should be analyzed. In addition to being a lower cost solution for California 50% RPS, as shown in previous studies, out of state wind also provides geographical diversity benefits to California. SWIP North will enable this geographical diversity to the incremental RPS build out which will help reduce locational aspects of congestion caused by over generation. In addition to the economic and policy benefits, SWIP North also brings reliability and grid security benefits to California and the entire WECC region. SWIP North is a major 500 kV WECC path that parallels several major WECC paths in North to South direction. Adding this new path not only relieves loadings on the existing WECC paths but also provide grid security benefits. SWIP North has the potential to reduce (if not eliminate) the impact of triggering WECC NE/SE separation scheme, that breaks WECC into two systems, under	

No	Comment Submitted	CAISO Response
	certain contingency conditions. This can potentially prevent major black out in California, which leads to economic and societal benefits. These benefits are typically not captured for internal CAISO transmission projects, but for a major WECC project such as SWIP North, these benefits should be quantified.	
9b	**Interregional Transmission Projects:** CAISO proposed in the Draft Study Plan that it will review Interregional Transmission Projects (ITP), if any submitted, during the 2016/17 Transmission Plan. We support CAISO in doing so and have the following suggestions to offer on the ITP evaluation process. As currently written in the Draft Study Plan CAISO states that "….if the interregional transmission project could potentially meet a regional need more cost-effectively and efficiently as a regional transmission solution. Based on the ISO's initial assessment of ITP benefits, the ISO will determine whether to further evaluate the project during the next planning cycle…." We recommend that CAISO review all benefits of ITPs, rather than only comparing these projects with regional projects and recommending for further review if these projects are more cost effective and efficient than the regional projects. ITPs, by their nature, connect two or more Planning Regions and typically enhance transfer capability between the regions. Improving transfer capability between regions offers a wide variety of benefits, including but not limited to reliability benefits, economic benefits, policy benefits, geographical diversity benefits and grid security benefits. We believe that all these benefits should be carefully evaluated when reviewing an ITP. While an ITP may not be the most cost effective solution as compared to a small regional transmission solution that solves a localized regional need, the vast array of benefits that an ITP can offers should be diligently considered rather than testing its cost effectiveness and efficiency against a regional solution.	Your comment has been noted.
9c	**Modelling enhancements for 2016/17 cycle:** As noted by CAISO in the Draft 2015/16 Transmission Plan, modelling enhancements to the TEPPC 2026 Common case will likely be needed to correctly account for intertie congestion and the benefits of an ITP such as SWIP North. In particular, here are the areas that we would recommend CAISO to investigate and implement modelling enhancements for the 2016/17 cycle: (1) In the TEPPC 2026 Common Case improve hydro modeling and correctly account for the interaction between North California Hydro, and	Your comment has been noted.

No	Comment Submitted	CAISO Response
	the dynamic real time COI path limit (which is usually below the max 4800 MW N-S limit) (2) Enhance the ABB Grid view model such that it can support contract path modeling to capture the scheduling path the SWIP North project brings – including 1000 MW "hurdle free" scheduling rights from Midpoint to Harry Allen (3) Adjust the wheeling charges between Pacific Northwest and California, as needed , to accurately transactions on COI path (4) Adjust the wheeling charges in the TEPPC 2026 common case such that that no hurdle rates are applied to the 1000 MW bi-directional transfer of energy from Midpoint to Harry Allen from SWIP North.	

No	Comment Submitted	CAISO Response
10	**NextEra Energy Transmission West, LLC** **Submitted by: Edina Bajrektarevic**	
10a	**Reliability Assessments** CAISO Planning Standards, North American Electric Reliability Corporation's ("NERC") Reliability Criteria (TPL 001-4, NUC-001-2.1) and the Western Electricity Coordinating Council's" ("WECC") Regional Criteria serve as the foundation for CAISO's regional transmission plan and provide the minimum transmission system performance standards. Over the last several years, NEET West has valued and appreciated CAISO's efforts in its planning of a high voltage transmission grid while involving very complex and sometimes competing priorities. At the same time, CAISO has considered more than just the minimum reliability criteria by taking into account other complex changes that could impact transmission system reliability and result in savings for customers. For example, CAISO has included studies that are associated with emerging issues, such as the implications of significant displacement of conventional generation with renewable resources that do not have the same inherent fundamental operating characteristics, how low hydro conditions (i.e., Big Creek) impact reliability, or extreme contingency events such as a catastrophic seismic event in the San Francisco area. To aid in CAISO's comprehensive long term transmission planning process evaluation, NEET West respectfully requests that CAISO consider several recommendations explained below to broaden CAISO's study policies and to more comprehensively assess the benefits of all viable reliability-driven transmission alternatives.	The list of potential issues documented in the comments is helpful, and the ISO will look to take these issues into account on a case by case basis going forward. We do not see it feasible to incorporate the extensive analysis recommended in the comments in all cases and without regard for the details of the specific reliability issue being addressed, as the analysis needs to be tailored to address those specifics. We support and encourage stakeholders to identify specific issues that they consider relevant in individual study analysis, on a case by case basis.
10b	**NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the Lugo – Victorville Thermal Overload** NEET West requests that the 2016-2017 TPP evaluation include the reliability assessment of the NEET West proposed new 17-mile 500 kV transmission line project between Lugo 500 kV substation and Adelanto 500 kV substation, which has an estimated in-service date of 6/1/2022. A careful comparison of the NEET West project alternative against other alternatives considered should be performed to determine the most cost effective solution. In addition, the 2016-2017 TPP evaluation should include the following:	Please see responses to Comment 10a above and similar comments to the February 18, 2016 meeting topics on the 2015-2016 Transmission Planning Process.

No	Comment Submitted	CAISO Response
	• Evaluation of the congestion management costs under normal operating conditions, currently estimated at a cost of $43 million since January 2013. o This analysis would need to include the WECC Path 61 rating, and the impact of both projects to this rating. There is a potential that the Lugo-Adelanto alternative will eliminate the operating nomogram completely, while the Lugo-Victorville Upgrade project will not. o This analysis would need to include the impact that 50% Renewable Portfolio Standard ("RPS") will have on the path. The assumption that all renewables over 33% are Energy Only may change in the next planning cycle. The addition of additional Full Capacity Deliverability Status units to this region can easily surpass the capability of the Lugo-Victorville Upgrade Project. • Evaluation of the congestion management costs under construction conditions of the Lugo- Victorville Upgrade project versus the Lugo-Adelanto alternative. As part of the re-evaluation of the Lugo – Adelanto project, NEET West requests that the 2016- 2017 TPP assumptions include details regarding the Los Angeles Department of Water and Power ("LADWP") system and in particular address: 1) Whether or not Intermountain units 1 and 2 should be assumed to be on-line or replaced with alternate/renewable resources. 2) Whether or not LADWP faces any internal basin generation retirements or re- powerings.	
10c	**NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the Pacific Gas &Electric ("PG&E") Oakland Area** In the 2015-2016 TPP, CAISO indicates that they will continue to consider transmission, generation or non-transmission solutions as they revisit the assessment of Oakland area needs in the 2016-2017 TPP cycle. In the near-term, the Oakland area relies on Special Protection Systems ("SPS") with a	The ISO will be conducting the reliability assessment as a part of the 2016-2017 TPP for the Greater Bay Area based upon the assumptions of the 2016-2017 TPP Study Plan. The results will be posted on August 15, 2016 with a stakeholder meeting to review the results and the PTO submissions on September 21-22, 2016. We encourage stakeholders to provide comments and submitting potential alternatives

No	Comment Submitted	CAISO Response
	relatively small amount of load shedding as allowed per the CAISO Planning Standards; however CAISO will consider alternatives for the long-term horizon. To improve the reliability and to mitigate thermal overloads within the Oakland area, NEET West submitted a new transmission solution that consists of a new 230 kV transmission source connecting Sobrante 230 kV substation to a new Oakland C 230 kV substation, with an in-service date of 6/1/2022. • NEET West requests that the CAISO's 2016-2017 TPP include a special assessment of the Oakland/East Bay area and evaluate the NEET West project alternative against alternatives considered to determine the most cost effective solution. Due to its characteristics, long- term planning for the Oakland/East Bay Area should incorporate an approach similar to the San Francisco Peninsula Extreme Event Reliability Assessment previously performed in the CAISO's 2015-2016 TPP. The Oakland East Bay assessment should explore all viable mitigation options that address the special circumstances for this area, including: ○ A high-density urban area consisting of over 400MW of load. ○ Potential retirement due to age of Oakland area combustion turbine ("CT") generation. It should also be noted that previous versions of the CAISO Planning Standards included the Greater Bay Area Generation Outage criterion, which recognized a higher unavailability of these units due to their age and forced outage rates. ○ Elimination of the reliance on SPS or Remedial Action Schemes ("RAS") per the CAISO's new High Density Urban Load Area planning standard, which no longer allows "non-consequential load dropping in high density urban load areas in lieu of expanding transmission or local resource capability" to mitigate NERC TPL standard contingencies and transmission system impacts (for facilities ≥115 kV). NEET West recognizes there are multiple existing Special Protection Systems in the East Bay area. These systems are designed to drop load in order to comply with NERC TPL contingency events.	to be considered as mitigation in the 2016 Request Window based upon the results of the 2016-2017 TPP reliability results.

No	Comment Submitted	CAISO Response
	○ The environmental restrictions and economic impacts of the Oakland combustion turbines (that are Reliability Must Run units) and Northern California Power Agency ("NCPA") combustion turbines in Alameda have on the system and how these restrictions and economics may be impacted with the addition of the NEET West Oakland Project. ○ Exposure and restrictions of transmission system topology. Existing critical overhead transmission sources (Moraga-Claremont, Moraga-Station X, and Moraga Station J 115kV circuits) are confined to multiple-circuit corridors and traverse heavily-wooded areas, foothill ridges and canyons. These conditions limit accessibility, and expose these facilities to causes of common-corridor outages (such as fire). Likewise, downtown Oakland's aging network of 115 kV underground cables (gas-filled pipe-type cables constructed in the 1960's) offer limited access due to heavy urban development, and are also exposed to seismic considerations (proximity and orientation to the Hayward Fault). All these factors complicate the timely restoration and/or reinforcement of existing circuits, and likewise present routing challenges for new facilities. Planning studies should consider the implications of multiple-circuit/extreme outages, and the potential for sustained unavailability of one or more circuits.	
10d	**NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the PG&E Fresno Herndon Area** In the 2015-2016 TPP, CAISO found a need for further evaluation of the Fresno Herndon area. The reliability issues were identified due to transient stability violation for a Bus 2 fault at Herndon 115 kV bus. In addition, thermal overloads on the Pinedale to Bullard 115 kV lines for multiple category contingencies. To improve the reliability and thermal overloads within the Herndon area, NEET West submitted a proposal to construct a new 230 kV transmission system that consists of a new 230/115 kV Transformer at Bullard Substation and a new 230 kV transmission line from Ashlan Ave to Bullard Substations, which has an in-	The ISO will be conducting the reliability assessment as a part of the 2016-2017 TPP for the Fresno area based upon the assumptions of the 2016-2017 TPP Study Plan. The results will be posted on August 15, 2016 with a stakeholder meeting to review the results and the PTO submissions on September 21-22, 2016. We encourage stakeholders to provide comments and submitting potential alternatives to be considered as mitigation in the 2016 Request Window based upon the results of the 2016-2017 TPP reliability results.

No	Comment Submitted	CAISO Response
	service date of 6/1/2021. The NEET West 230 kV transmission line between Ashlan Ave to Bullard removes the identified transient stability issues for a Bus 2 fault at Herndon 115 kV. CAISO reviewed the submission and based upon the reliability assessment found a need for further evaluation in 2016-2017 TPP of potential mitigation to address the category P2 longer term issues identified. NEET West requests that the 2016-2017 TPP evaluate the reliability of the NEET West Herndon project and provide a comparison of the project alternative against alternatives to determine the most cost effective solution.	
10e	**NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the Southern California Edison ("SCE") Big Creek Area** In the 2015-2016 TPP, the 2020 Summer Peak with Low Hydro Reliability Assessment for the SCE Tehachapi and Big Creek Corridor revealed thermal performance concerns (including Magunden – Vestal 230 kV 1 or 2, Rector – Vestal 230 kV 1 or 2, and Magunden – Springville 230 kV 2) under various category P1, P3, and P7 outages. Based on the assessment results, CAISO proposed to manage hydro generation to utilize during peak hours to avoid load arming. Furthermore, the Tehachapi and Big Creek Corridor Baseline and Sensitivity Scenario reliability assessment identified transient stability concerns under Big Creek 1-Big Creek 2 230 kV line (P5) outage. To mitigate this concern, SCE will be installing second (dual) high-speed protection for this line with OD of December 2017. In the interim, for faults at the remote terminal ends of Big Creek 1 - Big Creek 2 and upon loss of the high speed protection, the total output of the Eastwood unit should be maintained below 160 MW. To improve the reliability, thermal overloads, and transient stability concerns in the Big Creek area, NEET West submitted a proposal to construct a new Pittman Hill 230 kV substation project that will tie the following transmission lines together: • Helms – New E1 230 kV #1 & #2 Lines (PG&E) • Big Creek 3 - Rector 230 kV Line #2 (SCE)	As indicated in the 2016-2017 TPP study plan, the ISO will consider drought conditions in the development of base scenario assumptions for the Big Creek area. To the extent that mitigation is needed, the ISO will consider the NEET West Pittman Hill project.

No	Comment Submitted	CAISO Response
	• Big Creek 4 - Springville 230 kV Line (SCE) • Big Creek 1 - Rector 230 kV Line (SCE) This project has an estimated in-service date of June 1, 2021. The 2015-2016 TPP indicated that CAISO will continue to study Sensitivity Scenarios with Low Hydro conditions in future TPP cycles and will consider alternative projects if managing hydro is not sufficient to mitigate the thermal overloads. NEET West requests that CAISO evaluate the following key factors regarding the SCE Big Creek Area in its 2016-2017 TPP: • Evaluate all alternatives, including NEET West Pittman Hill project, for reliability and performance by testing system thermal loading, voltage performance and control, stability performance, short-circuit margins, extreme contingency performance, and interface impacts (internal/external). • Evaluate the Midway 500 kV Substation Extreme Event outage and capture additional reliability benefits that the NEET West Pittman Hill Project has over any other alternatives. • Evaluate potential for less reliance on Helms Pumped-Storage RAS. • Evaluate load dropping RAS at Rector under contingency conditions for all alternatives. • Determine the necessary reliance on Big Creek Generation under contingency conditions. • Quantify benefits for potential increased operational flexibility of the Helms Pumped- Storage Plant.	
10f	**<u>NEET West Recommends CAISO Develop a Long-Term Reliability Transmission Solution for the East Bay Transmission System</u>** The 2015-2016 TPP addressed several P6 and P7 contingency overloads to East Bay transmission system. Specifically, the overloaded facilities identified in the TPP are: ○ Moss Landing-Las Aguilas 230 kV Line	Please see response to Comment #10c.

No	Comment Submitted	CAISO Response
	○ Las Aguilas-Panoche #1 & #2 230 kV Lines ○ Lone Tree-US Wind, Los Esteros-Newark ○ North Dublin-Cayetano 230 kV Lines o Newark 230/115 kV Transformer #11 o Newark-Lockheed Junction #1 ○ Newark-Dixon Landing, Trimble-San Jose B 115 kV Lines ○ North Dublin-Vineyard 230 kV Line The 2015-2016 TPP listed potential mitigation measures to be assessed further in the 2016-2017 TPP. In its 2015-2016 TPP, CAISO considered the following potential mitigation measures: ○ Dispatching all available generation in San Jose ○ Delay retirement of the Moss Landing Power Plants ○ Trip Load in the Moss Landing Area ○ Trip some of the load in San Jose ○ Sectionalizing of the San Jose 230/115 kV transmission system (radializing) NEET West recommends that the 2016-2017 Planning Assumptions eliminate the possibility of load tripping and radializing to resolve overloads in this area, and to follow CAISO's new High Density Urban Load Area planning standard, which no longer allows "non-consequential load dropping in high density urban load areas in lieu of expanding transmission or local resource capability" to mitigate NERC TPL standard contingencies and transmission system impacts (for facilities ≥115 kV).	
10g	**NEET West Recommends the Implementation of a Comprehensive and Consistent Metric System for Evaluating Viable Alternative Reliability Transmission Solutions** NEET West believes that a consistent framework for quantifying important costs and overall reliability benefits should be used to identify the most appropriate and cost effective reliability solutions among multiple competing reliability projects. One such framework for evaluation is CAISO Transmission Economic Assessment Methodology ("TEAM"), which is designed to evaluate both economic and reliability driven projects. NEET West recommends that CAISO apply and share with stakeholders a comprehensive and consistent metric system for evaluating viable competing reliability solutions that includes:	The ISO considers its current framework sufficiently broad to accommodate a reasonable range of specific circumstances, and would not want to be bound by an arbitrary framework that failed to address needs in a specific case. While it is more challenging for the ISO and stakeholders to consider the basis for each planning decision on a case-by-case basis, it is considered necessary to provide the best overall outcome in ratepayer interests.

No	Comment Submitted	CAISO Response
	• Evaluating all alternatives for reliability and performance by testing system thermal loading, voltage performance and control, stability performance, short-circuit margins, extreme contingency performance, and interface impacts (internal/external). • Assessing overall project viability including constructability, environmental impact, rights-of- way impact, in-service dates, outage requirements and impacts. • Determining any long-term project benefits including expansion capabilities, lifetime efficiency and expectancy. • Examining operational and maintenance related issues and costs on a high-level basis to ensure that solutions do not introduce new operational or maintenance related concerns. This component of the evaluation should outline the benefits to "Operational Reliability" or "Operational Flexibility" (more options for maintenance outages, additional flexibility for switching and protection arrangements). • Evaluating the overall costs and benefits (possibly including a net present value analysis) and performance of the viable competing reliability projects to determine which is the most appropriate and cost-effective solution. The cost/benefit evaluation should include items that may impact project selection such as: construction costs, long-term congestion impacts, cost of outages associated with construction, costs associated with operation and maintenance of the assets, cost of losses, local capacity requirement benefits and reductions that otherwise would have to be purchased through reliability-must-run ("RMR") contracts, capacity benefits of the transmission upgrade(s) (potential increases to reserve sharing and firm capacity purchases, and associated decrease to the amount of local area power plants that have to be constructed to meet adequacy requirements), environmental benefits of avoiding local air emissions, etc.	

No	Comment Submitted	CAISO Response
	• Incorporating high voltage transmission aging infrastructure decisions into the ongoing TPP. The aging transmission infrastructure represents a significant element in the operational and long-term planning followed by a risk evaluation aimed at anticipating and mitigating the impact of significant transmission loss events. Similar to efforts performed in other regions, the analysis, as part of the long term transmission plan, should take into account the aging of high voltage transmission elements in the system over CAISO's entire footprint. In addition, the analysis should include stakeholders review and engagement in the development of transmission solutions to mitigate operational, reliability, and market impact of such transmission losses. • Communicating the final results, including appropriate metrics of all tested alternatives to all stakeholders and publishing the results in the CAISO TPP. NEET West recognizes that some of the factors, such as "Operational Reliability" have dimensions that are not easily quantifiable (e.g., the value of avoiding the adverse impact to society of a system- wide blackout). NEET West recommends that some of the factors as described herein are considered as complimentary to the existing reliability studies and detailed cost evaluation and that they are intended to help support differentiation of a particular project in making a final selection.	
10h	**NEET West Requests Additional Stakeholder Engagement and Participation throughout the Project Analysis Phase** NEET West appreciates CAISO's effort to follow its Federal Energy Regulatory Commission ("FERC") approved transmission planning process, which FERC found to be just and reasonable and not unduly discriminatory or preferential. The CAISO has provided for open and transparent access and stakeholder consultation opportunities as set out in that process. NEET West appreciates the current CAISO transmission planning process, which provides for the opportunity to submit needed reliability projects, to participate in stakeholder meetings, and to submit comments throughout the process. In order to have a more meaningful impact upon the CAISO TPP and its objective to determine the most cost-efficient solution, NEET West requests that CAISO allow	Your comments are noted. The ISO encourages participation throughout the planning process, and considers the opportunities offered to be very inclusive.

No	Comment Submitted	CAISO Response
	interested stakeholders to participate in the project analysis phase for specific regions of interest, where competing reliability projects are under evaluation.	
10i	**Low Voltage Sensitivity Study** NEET West recommends the CAISO incorporate a "Low Voltage" Sensitivity study case to be included in the 2016-2017 TPP Study Plan. NEET West appreciates CAISO's effort to improve system modelling and tools and specifically to incorporate detailed composite load models. NEET West proposes that CAISO performs the Special Low Voltage study to be based on the heavy load base cases (which are intended to reflect maximum anticipated load conditions) to better understand interaction between retirements of significant conventional generation in the CAISO service area, combined with integration of significant intermittent renewable generation, and further perplexed with continued increase in system load. The goal of this assessment is to investigate potential reactive deficient areas that are more prone to voltage (steady-state and transient) instability during normal and contingent conditions. Furthermore, the consideration should be given to study various reasonable expected sensitivity conditions that could be impacted by different generation dispatch, load levels, and path flows. The analysis should point out the local area most susceptible to voltage instability and should identify the most efficient solutions inclusive of transmission static and dynamic reactive support solutions.	A sensitivity study with high CEC forecasted load has been identified in the study plan that will be equivalent to the heavy load base cases suggested in this comment.
10j	**Generation Assumptions Study** NEET West recommends that CAISO examine potential reliability impacts, under sensitivity scenarios, due to the sudden and unexpected long term loss of a variety of generation facilities throughout the system. This would simply be a continuation of the existing sensitivity scenarios the CAISO already considers for: Diablo Canyon retirement and OTC retirements. Sudden and unexpected losses of resources can occur for several reasons including improper maintenance, equipment failure, economic factors, environmental and policy changes. NEET West would like to provide several examples of unforeseen power plant shutdowns: • Both SONGS Units 2 and 3 had to be shut down in 2012 due to premature wear of the steam turbines, and in June 2013 SCE announced that the plants would be permanently retired.	The generation retirements section of the study plan describes several categories of assumptions for the retirement of generation. In addition, a special study looking at potential reliability impact due to additional economically driven generation retirements will also be performed.

No	Comment Submitted	CAISO Response
	• In 2005 the Taum Sauk Hydroelectric Power Station sustained a failure of the upper reservoir that resulted in damage that was not repaired until 2010. • PacifiCorp's Hunter Unit No. 1, failure of the stator core. • Danskammer Power Plant, 530 MW coal fired plant was shut down in 2012 after being damaged by superstorm Sandy. Furthermore, NEET West understands that, in comparison to other planning areas, the Greater Bay Area has been subject to a more stringent planning criterion. In light of aging generation, the CAISO considered G-2, N-1 outages as part of their Category B planning standard. In this regard, NEET West recommends that the CAISO should consider adopting this planning standard to the entire CAISO service area (on a local basis), to take into consideration the dependability of older generation and the possibility of early plant retirement.	
	Policy Assessments With FERC's approval of the CAISO's revised TPP in December 2010[6], the revised TPP created a category of transmission additions and upgrades to enable the CAISO to plan for and approve new transmission projects needed to support state or federal public policy requirements and directives. The impetus for the "policy-driven" category was the recognition that California's renewable energy goal would drive the development of substantial amounts of new renewable supply resources over the next decade, which in turn would drive the majority of new transmission needed in the same time frame. NEET West appreciates all of the time and effort put forth by CAISO to improve the current TPP while continuing to support the public policy objectives. Specific to the 2016-2017 TPP planning cycle, the overarching public policy objective is the state's mandate for 33% renewable energy by 2020 that could lead to the identification and approval of policy-driven transmission elements in the CAISO's 2015-2016 TPP.	Your comment has been noted.
	50% Renewable Energy Goal for 2030 During the 2016-2017 TPP planning cycle, the CAISO will perform a special study to provide information regarding the potential need for public policy-driven transmission additions or upgrades to support a state 50% renewable energy goal. NEET West understands that the CAISO is performing	

No	Comment Submitted	CAISO Response
	this study for information purposes only and that the results will not be used to support a need for policy-driven transmission in the 2016-2017 planning cycle. Furthermore, the 2016-2017 Study Plan states that the 50 percent renewable goal is not being considered to determine the need for policy-driven transmission additions or upgrades because "it is not yet a formal state requirement, so in accordance with the CAISO tariff the CAISO cannot use it as a basis for approving policy-driven transmission." NEET West would just note that "Section 24.1"7 of the CAISO tariff provides that the range of public policy objectives to be considered in the TPP are not just related to RPS, but also includes other state, municipal, county and federal policy requirements and directives. For example, California law provides that "a principal goal of electric and natural gas utilities' resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity, and to improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency, development of renewable energy resources, such as wind, solar, biomass, and geothermal energy, and widespread transportation electrification."8 In addition, per Section 24.2 of the CAISO tariff, the TPP process shall at a minimum: *(a) Coordinate and consolidate in a single plan the transmission needs of the CAISO Balancing Authority Area for maintaining the reliability of the CAISO Controlled Grid in accordance with Applicable Reliability Criteria and CAISO Planning Standards, in a manner that promotes the economic efficiency of the CAISO Controlled Grid and considers federal and state environmental and other policies affecting the provision of Energy. …* *d) Identify existing and projected limitations of the CAISO Controlled Grid's physical, economic or operational capability or performance and identify transmission upgrades and additions, including alternatives thereto, deemed needed to address the existing and projected limitations.* *In this regard, NEET West recommends that the 2016-2017 TPP consider a broad range of known objectives that will provide more flexibility in the TPP and*	Please refer to the response to Comment 6a submitted by Duke American Transmission Company.

No	Comment Submitted	CAISO Response
	that will identify a category of transmission upgrades and additions to enable the CAISO to plan for and approve new transmission needed to achieve the policy objectives in future planning cycles. The 2016-2017 TPP should identify transmission system issues that would enable the 50% renewable goal to be realized and planned efficiently and to approve new transmission projects accordingly.	
	Furthermore, NEET West does not agree with the initial assumptions that incremental renewable generation will be energy-only. Given the complexity and challenges associated with the congestion– related curtailment of renewable resources that already exist, combined with California environmental restrictions and Resource Adequacy requirements, NEET West recommends that, in determining the mitigation plan solutions that will be needed to achieve the 50% renewable goal, CAISO considers the full capacity deliverability status needed to serve as RA resources.	The final study plan clarifies that the ISO intends to study both full capacity deliverability status and energy only deliverability status scenarios in moving beyond 33% to 50% RPS.
	Additionally, NEET West encourages the CAISO to assess transmission system reliability and transient stability impacts associated with higher renewables penetration. With the most recent modelling improvements that allows for full composite loads to be incorporated with the CAISO system tools, combined with the input assumptions that takes into account the expected retirement of large amounts of OTC units, especially in Southern California, there is big uncertainty as to the system frequency response and transient stability capability and more importantly system –wide reliability. Transmission system solutions inclusive of not only transmission elements such as lines and transformers, but also flexible AC transmission devices (Static Var Compensators) should also be considered along with their potential cost options. Finally, NEET West would like to request CAISO's input with respect to the following:	
	• *The base cases for the incremental 50% RPS portfolio as utilized in the 2016-2017 TPP. These cases should be made available to stakeholders as soon as applicable. To facilitate understanding of these cases, the resources making up the 33% RPS base portfolio should be distinguished from the incremental resources necessary for the 50% renewable portfolio.*	The base cases will be posted on the market participant portal and the renewable generation in the portfolio will be identifiable.

No	Comment Submitted	CAISO Response
	• The 50% RPS Scenario studies from the 2015-2016 TPP featured various sensitivity levels of possible "exports" (0MW; 2000MW; 8000MW; and unconstrained). NEET West requests that CAISO include in the 2016-2017 TPP assumptions details regarding where (to what areas) the exported power will be being scheduled.	Long-term transmission planning scenarios for the 50% RPS studies are likely to be designed to be more general than specific commercial assumptions that would be suggested by specifying a particular set of bilateral energy schedules for a particular hour.
	• Provide detailed information specific to the assumed amounts of out-of-state resources in the Out-of-State Portfolio in the 2016-2017 TPP. The 2015-2016 TPP report indicated "selected a material but reasonable amount of out-of-state resources", but NEET West would like to request more information regarding assumptions behind export levels.	The base cases will be posted on the market participant portal and the out of state renewable generation in the portfolio will be identifiable.
	• Include the assumptions that will be applied for the Pacific DC Intertie ("PDCI") during the 33% and 50% studies. For exports of 8,000 MWs or unconstrained exports, will the CAISO consider/include south-to-north reversal of the PDCI? California-Oregon Intertie ("COI") flows are limited by the amount of online Northern California Hydro. The total Lassen/Round Mountain/Sacramento River Zones have a capability estimate of 3,404 MW for the in state scenario in the 2015-2016 TPP Report. Much of this new generation will flow into the Round Mountain and Table Mountain systems, similar to Northern California Hydro. Will the CAISO be evaluating how much impact this new renewable generation will have to allowable COI flows, or will the assumption be that all of the Lassen Generation is curtailable?	The ISO is assuming that ISO imports on COI and ISO generation dispatch in northern California will be dispatched by the ISO Market.
	• Beyond the assumptions inherent in the Transmission Expansion Planning Policy Committee ("TEPPC") Production Cost model, will the 2016-2017 TPP assumptions include any other emerging trends (such as coal plant retirements and renewable resources development in Nevada and Arizona)?	The ISO will also work through the interregional coordination process on coordinated assumptions.
	• NEET West requests that the 2016-2017 TPP assumptions	

No	Comment Submitted	CAISO Response
	include a list that details where generation is being interconnected (bus/size) for the 50% RPS portfolio. For example, where is Lassen North Wind Generation being interconnected?	The base cases will be posted on the market participant portal and the assumed generation connectivity details will be available.
	Economic Assessments NEET West recommends that the 2016-2017 Planning Assumptions include a policy to perform economic assessments in areas that have potential mitigation solutions of generation dispatch. In order to properly assess the lowest cost alternative for customers, the plan must economically compare generation dispatch mitigation alternatives against traditional transmission upgrades and additions. In addition, NEET West recommends that CAISO performs both reliability and economic studies with "major paths" simulated with higher flow levels assumptions as defined in the seasonal nomograms. The economic analysis should incorporate production cost simulation studies to better predict the frequency and expected future flows on particular major paths. Finally, if any identified transmission constraints are identified, mitigation plans inclusive of both reliability and economic upgrades should be considered to protect the system in the long run.	Generation economic dispatch has been included in the production cost simulation.

No	Comment Submitted	CAISO Response
11	**Owners Coordinated Operation Agreement** **Submitted by: Brian Griess**	
11a	**Requested Study for Path 66** The Parties are submitting this Economic Study Request for the COI/Path 66 to be performed as part of the 2016-17 Transmission Planning Process, pursuant to the CAISO Tariff Section 24.3.3.d and Section 3.2.2.1 of the CAISO Business Planning Manual for the Transmission Planning Process. Path 66 consists of the combined COTP and PACI facilities, which provide 4,800 MW of import capability from the Pacific Northwest into California (north-south) and 3,750 MW of export capability from California to the Pacific Northwest (south-north). There are several facilities (both north and south of the border) that impact the operating characteristics and import/export capability on COI. Recent economic studies performed by the CAISO indicate limited congestion on COI but these findings may be due to normative assumptions in the studies. It is requested that the 2016-17 TPP study consider a broader range of operating conditions reflecting actual operating issues including expected and unexpected outages. The CAISO may also want to consider using additional analytic tools to quantify the economic benefits attributable to reduced congestion and greater intertie imports. **Binding Constraint** The OCOA Parties identify the Malin 500 intertie, previously known as the PACI, as the relevant binding constraint within the CAISO system. The COI operates under a seasonal nomogram that is impacted by hydro conditions in northern California, and other transmission facilities. Additionally, CAISO Operating Procedure 6010 and 6010A discusses the effects that outages (expected and unexpected) have on COI transfer capabilities. **A History of Congestion** The Malin 500 Intertie has shown consistently high levels of congestion hours in the Day Ahead Market that resulted in congestion charges of tens of millions of dollars annually. The table below [see OCOA's comments for table] shows the annual congestion charges costs and hours of Malin 500 congestion since 2009. Between 2009 and 2015 congestion has apparently cost the	All study requests will be evaluated based on ISO's tariff and the congestion analysis results. If a request is identified as one of the high priority studies, detailed assessments will be conducted, in which different hydro conditions would be considered as sensitivities if applicable.

No	Comment Submitted	CAISO Response
	CAISO an average of $55 million annually, and representing over 21% of the annual hours. **Supporting Studies** There are several recent relevant studies that address the import capability on the COI. The OCOA Parties (in consultation with the CAISO) have recently performed studies regarding near-term and long-term potential modifications and operating characteristics designed to maximize import capability and load serving capability. The CAISO 2015-16 Draft Transmission Plan identified congestion on COI costing $736,000 over 286 hours in 2020 and $255,000 over 97 hours in 2025. Based upon the experience since the implementation of MRTU and the fact that current Operating Procedures result in transfer capability on the COI reaching 4,800 MW (N-S) only 30 to 40 percent of the time (2014-2015), the OCOA parties request this special economic study due to the divergence between actual congestion experienced on the COI and the modeled congestion reflected in the transmission planning process. Mitigation of the Malin 500 congestion could also provide economic benefits for the planned integration of PacifiCorp as a full Participating Transmission Owner (PTO) into the CAISO. The Technical Appendix to the PacifiCorp Benefits Study uses the full 982 MW transfer capability between PacifiCorp into the CAISO utilizing four different interconnection paths between the CAISO and PacifiCorp to estimate the potential benefits of CAISO expansion. To the extent the COI import capability is reduced due to congestion or other system conditions, the expected transactions between the CAISO and PacifiCorp could be impacted, which may negatively affect the expected benefits that have been identified for PacifiCorp's full integration into the CAISO. Additionally, the Benefits Study, on page 2, states that "…coordinated transmission planning could significantly increase transfer capability between an integrated PacifiCorp-CAISO systems, which could increase the level of incremental benefits in this report." On page 8, however, the Benefits Study recognized that "The quantity of capacity savings from peak load diversity depends on three factors [which includes] (2) transfer limits between CAISO and PacifiCorp that constrain the maximum amount of capacity savings…."	

No	Comment Submitted	CAISO Response
	Expected Benefits The OCOA parties believe that an economic study that more effectively captures a historically and operationally accurate level of congestion will be able to identify economically viable solutions to help offset some of the congestion costs that have incurred on the COI, increase the load serving capability in northern California, and allow the customers in the CAISO and PacifiCorp to realize the benefits of the proposed regional expansion.	

No	Comment Submitted	CAISO Response
12	**Pacific Gas & Electric** **Submitted by: Matt Lecar**	
12a	*4.8.2 Demand Response* PG&E notes that the CAISO has proposed a revision to its Reliability Requirements Business Practice Manual (PRR 854) to require a 20-minute dispatch requirement for demand response resources that are not sufficiently available for pre-dispatch. This proposed requirement is unresolved, with PRR 854 under appeal at the CAISO and being litigated at the CPUC in Rulemaking 14-10-010. Furthermore, the Unified Planning Assumptions make no mention of how frequently a DR resource must be dispatchable to be exempt from the CAISO's proposed 20-minute dispatchability requirement. If the CAISO decides to apply a 20-minute dispatch requirement to demand response, it should address whether those demand response programs not counted as "first contingency" in the Unified Planning Assumptions are sufficiently available for pre-dispatch before discounting their value in the TPP.	Refer to the response to CPUC Comment 4o.
12b	*4.9 Major Path Flows and Interchange* For major path flows in the long term horizon, PG&E may not be able to attain a flow of 4000 MW on Path 26 for the summer peak case due to many large units retiring for OTC or other reasons. Diablo Canyon being modeled off-line in the 10th year of the base case will further compound this issue. The CAISO, SCE, and PG&E will need to coordinate to ensure that study assumptions are consistent and minimize any gaps.	Your comment has been noted.
12c	*4.11.2 Sensitivity Studies* The NERC TPL-001-4 reliability standard requires two near term peak sensitivity cases and one near term off-peak sensitivity case. In the Draft Study Plan, the CAISO has selected only one near term sensitivity case and five long term sensitivity cases. PG&E recommends the CAISO move some of the long term sensitivity scenarios to the near term horizon.	The sensitivity studies have been updated to reflect your comment.
12d	<u>Oakland Study</u> PG&E appreciates the CAISO's undertaking, as part of the 2015-2016 TPP cycle, a sensitivity assessment of the reliability needs of the East Bay area as it	Due to the uncertainty of existing local generation and development of non-transmission solutions in the East Bay area, the ISO will continue

No	Comment Submitted	CAISO Response
	relates to reliance on local aging generation. These studies identified a number of issues caused by the absence of the generation and local SPSs, as well as potential options for addressing these issues. PG&E requests the CAISO outline the process and next steps for finalizing the reliability studies for this area as well as the development of a long term solution to address the identified concerns.	to evaluate the extent of long-term reliability needs considering these developments in the 2016-2017 TPP.
12e	*5 Local Capacity Requirement (LCR) Assessment* To the extent that energy storage is considered in meeting LCR needs, PG&E generally supports addressing energy storage charging capability to help mitigate chargeability risks. As PG&E has stated in its comments on the draft 2016 Stakeholder Initiatives Catalog1, PG&E is concerned that the current interconnection study process does not provide sufficient clarity as to the potential restrictions on chargeability. The lack of clarity on the chargeability of the energy storage project presents a significant commercial challenge to PG&E's storage procurement activities. PG&E would appreciate any information the CAISO can provide about potential chargeability limitations in the transmission constrained regions within the CAISO's footprint. If the TPP is not the venue for such a study, PG&E would ask the CAISO to address this concern in the appropriate initiative or setting.	All non-Energy Only (EO) resources are considered in meeting LCR needs, including energy storage. The Generation Interconnection Process (GIP) for energy storage facilities currently includes a study of the storage project in the full charging mode during two load level conditions. A study is performed under off-peak load conditions as well as a second study of either the peak or shoulder peak conditions, depending which is expected to be the most stressed condition. These studies provide a substantial amount of information on the ability for the storage to be able to charge under varying system conditions. If more certainty is needed regarding the ability to charge, the storage facility can submit a load interconnection request to the Participating Transmission Owner.
12f	*6 Policy Driven 33% RPS Transmission Plan Analysis* At this time, PG&E does not take issue with the use of a 33% RPS base case portfolio. However, as stated in prior comments, PG&E does not believe there is a requirement that all generation procured to meet RPS targets needs to be fully deliverable. Partially deliverable and energy only contracts are currently a viable option for some renewable resources. PG&E encourages the CAISO to continue to work closely with the CPUC and the CEC to clarify the intended state policies for the level of deliverability for resources within its portfolios. Additionally, PG&E recommends that the CAISO consider a 43.3 percent RPS2 sensitivity case, not for the purpose of authorizing investment, but as a sensitivity case to provide indicative results, and to begin to lay the groundwork, for future TPP cycles, where transmission investment needed to support the	The CAISO's policy driven transmission analysis and the Commission-developed renewable portfolios for achieving the 33 percent renewable portfolio standard were designed on the basis that renewable generation projects would be able to achieve Full Capacity Deliverability Status. Power purchase agreements approved by the Commission for purposes of meeting RPS goals overwhelmingly require renewable generators to provide resource adequacy capacity, which, in turn, requires Full Capacity Deliverability Status as a prerequisite. As a result, renewable generators have correspondingly requested Full Capacity Deliverability status in the CAISO generation interconnection process. Because virtually all renewable generation procured to meet the 33 percent goal are specified as deliverable and the portfolios have been developed with that expectation, the CAISO

No	Comment Submitted	CAISO Response
	increased Senate Bill (SB) 350 RPS targets will have to be addressed. PG&E notes that this 43.3 percent RPS sensitivity case would allow for consideration of how potential increases in energy only and out of state resources might affect future TPP cycles. Accordingly, PG&E recommends that the CAISO perform indicative deliverability studies (with the appropriate mix of energy only and deliverable resources), as well as reliability studies, for the sensitivity case, consistent with previous TPP cycles.	policy driven transmission analysis ensures that the generation in the Commission-developed renewable portfolios will be deliverable. Since the revised transmission planning process was approved and beginning within the CAISO's 2011/2012 transmission planning cycle, the Commission has communicated its resource planning priorities to the CAISO through delivery of renewable portfolio scenarios that the CAISO uses in each annual transmission plan to identify needs for policy-driven transmission projects consistent with the MOU. The Commission develops these portfolios through the use of the RPS Calculator. *Every* RPS Calculator portfolio submitted by the Commission into the CAISO's transmission planning process for the identification of policy-driven transmission to achieve 33 percent RPS has assumed FCDS for new renewable energy projects. (RPS Calculator User Guide, Version 6.1, p. A-17. ("The RPS Calculator allocates scarce transmission supply to renewable resources to deliver energy to load. In prior versions of the RPS Calculator (v.1.0 – v.6.0), all new renewable resources were assumed to have full capacity deliverability status (FCDS).")). The ISO recognizes that the issue will be considered further in progressing beyond 33% to 50% RPS goals, and has conducted special study work to provide technical foundations for that policy discussion. The ISO does not agree with the value of a 43% sensitivity study at this time, in light of the uncertainty on future resource procurement direction, and recognizing that other study work would need to be deferred.
12g	*7.1 50% Renewable Energy Goal for 2030* PG&E supports the CAISO's undertaking of the 50% Renewable Energy Special Study and believes the Special Study will provide useful information regarding the possible procurement of Energy Only and out-of-state renewables. Last year's Special Study (completed as part of the 2015-2016	Your comment has been noted.

No	Comment Submitted	CAISO Response
	TPP) was a useful first step in evaluating Energy Only resources, but the CASIO should now start to address the practical implications of what Energy Only procurement would mean for the TPP and GIDAP processes. Rather than simply assessing the amount of curtailment and congestion, the Special Study should seek to lay the framework for how mitigations might be identified in future TPP or GIDAP cluster studies that would help alleviate congestion and curtailment. The Special Study should consider how a study process in future studies might identify actual transmission upgrades for approval in either the TPP or GIDAP. For example, the CAISO should consider how they might address the sub-transmission congestion issues identified in last year's study and in particular how upgrades that relieve sub-transmission congestion issues might be identified and approved. Furthermore, based on the information included in the Draft Study Plan it appears that one of the objectives of this study is to estimate the amount of congestion-related curtailment. In order to properly capture the impact of curtailment, PG&E recommends that the economic models used in identifying congestion-related curtailment should be enhanced to include network constraints (normal and under outage conditions) to more accurately replicate potential market constraints.	
12h	*7.2 Frequency Response Assessment* PG&E supports CAISO's continued focus on improving the modelling assumptions to further evaluate the impacts of over-generation and frequency response in the next TPP cycle. As demonstrated in the CAISO 2015-2016 TPP assessments, there is significant interaction between CAISO resources and WECC-wide resources for providing frequency response to the interconnected system. Therefore, given the nature of this issue and the need to work with other WECC entities, PG&E recommends that CAISO work closely with WECC on the next phase of this matter or form a joint study group that includes neighboring Planning Authorities to develop and validate models for use in the frequency response assessment studies. The involvement of the WECC and other entities in this study group will ensure that the assumption about resources in the neighboring systems represents a likely future system condition with higher WECC-wide renewable penetration and the potential of reduction in coal-fired generation.	Your comment has been noted.

No	Comment Submitted	CAISO Response
12i	*7.3 Gas - Electric Reliability* PG&E recommends that the CAISO should clearly identify the criteria used for identifying local areas for Gas-Electric reliability assessment and include the names of the local areas that will be included in the 2016-2017 TPP for Gas-Electric Reliability assessment.	Your comments have been noted.
12j	*7.4 Economic Early Retirement of Gas Generation Assessment* PG&E supports the CAISO's effort to evaluate the potential for economic early retirement of gas generation as a result of increasing levels of renewable generation interconnection to the grid. This assessment is a key aspect of future resource need assessment and should therefore be comprehensive and include: • An economic assessment of the net revenue of individual resources (e.g., projecting the energy, ancillary services, and RA revenues and then netting out variable and fixed costs of operating the plant) • Any impact of early retirement on the ability of the system to meet the NERC/WECC/CAISO planning standards PG&E understands that as a part of the CAISO 2016-2017 TPP, CAISO is planning to develop a methodology for this study and would like to better understand and be part of the process to develop and review input data, assumptions, and methods.	Your comment has been noted.
12k	<u>Additional Special Study Requests</u> *1. Local Area Generation Requirements* Minimum conventional generation requirements for large load centers may be needed to ensure the system has enough frequency response, voltage regulation, VAR support, inertia and other electrical attributes to assure a stable and reliable system. The periods of particular concern are the periods of high renewable penetration and high hydro production when the system is stressed by over-generation conditions and conventional resources may be not be economically dispatched. PG&E would like to recommend studies to evaluate	Your comment has been noted.

No	Comment Submitted	CAISO Response
	any minimum conventional generation requirement for the large load centers, e.g. the San Francisco Bay Area.	
12l	Additionally, PG&E requests two economic studies based on a 33% RPS and a 50% RPS be included as part of the CAISO 2016-2017 TPP: *2. Path 15 Study* PG&E requests that the CAISO conduct an economic assessment of Path 15 based on both a 33% RPS and a 50% RPS. It is proposed that the assessment consider production costs and potential costs to integrate renewable resources that cannot be absorbed within the CAISO- controlled grid without and with Path 15 upgrades. It is suggested that south-to-north studies evaluate dry-year hydro-generation conditions in Northern California and the Northwest. Depending on the assessment results, such upgrades might be designed to achieve a Path 15 rating increase of about 300 MW to 1000 MW. For example, a 300 MW increase might be achieved with the Tesla/Tracy-Los Banos upgrade and relatively minor upgrades in the Gates and Arco areas. And a 1000 MW increase might be achieved with the Tesla/Tracy-Los Banos upgrade and upgrades of the Gates-Midway 500 kV and perhaps the Los Banos-Gates 500 kV.	All study requests will be evaluated based on ISO's tariff and the congestion analysis results. If a request is identified as one of the high priority studies, detailed assessments will be conducted, in which different hydro conditions would be considered as sensitivities if applicable.
12m	*3. Path 26 Study* PG&E requests that the CAISO conduct an economic assessment of Path 26 based on both a 33% RPS and a 50% RPS. It is proposed that the assessment consider production costs and potential costs to integrate renewable resources that cannot be absorbed within the CAISO- controlled grid without and with Path 26 upgrades. It is suggested that the north-to-south assessment evaluate wet-year hydro-generations conditions in Northern California and the Northwest. To the extent Path 26 is congested in this study, PG&E suggests consideration of a Midway- Vincent 500 kV line, a Midway-Vincent 230 kV line, Big Creek-	Please refer to the above comment.

No	Comment Submitted	CAISO Response
	Helms interconnection or other alternatives as indicated by production simulation and power flow studies.	

No	Comment Submitted	CAISO Response
13	**Smart Wires, Inc.** **Submitted by: Todd Ryan**	
13a	**Solutions for Corrective Action Plans** We encourage the CAISO to include advanced power flow control technologies in the analysis of transmission solutions to identified reliability, economic, and policy needs. While current models include traditional power flow control technologies, such as phase-shifting transformers and switched series reactors, there have been new developments in power flow control technology. Newer advanced technologies, such as flexible AC transmission systems (FACTS) and Smart Wires technologies, may not be adequately represented in current models and planning processes. For example, many planning models are not capable of capturing the easily dispatchable nature of advanced power flow control technologies. Such newer technologies can require shorter lead time to implement, can be re-deployable and can greatly reduce the environmental impacts compared to some of the conventional solutions, such as reconductoring of existing lines. It is therefore important that these planning models can appropriately represent advanced power flow control to enable selection of the solutions that can best meet California's future transmission needs.	Your comment has been noted.
13b	Here are a number of initial steps that the CAISO could consider, such as: - **Verify that advanced power flow control can be appropriately modeled in technical and economic studies.** There is a bare minimum amount of information that one needs to model a transmission solution; the CAISO should verify that it has all this information to minimally represent advanced power flow control technologies such as Smart Wires PowerLine Guardian and Tower Router. Additionally, advanced power flow control technologies are more easily dispatched, have greater granularity and accuracy in dispatch, and allow for more intelligent control than traditional power flow control technologies. These details matter when evaluating two similar, but different technologies. We would ask that CAISO verify that these differences can be appropriately represented, or approximated, in models and software.	The ISO encourages Smart Wires, Inc. to submit mitigation plans for needs that will be identified by the ISO on August 15, 2016, as applicable. The mitigation plan submittals should include power system modeling information and project cost information.

No	Comment Submitted	CAISO Response
13c	- **Verify that advanced power flow control is included in the set of transmission solutions,** along with the traditional upgrade options. CAISO is required to "*consider the comparative costs and benefits of viable alternatives to the particular transmission solutions*." We are asking CAISO to consider advanced power flow control in the evaluation and selection of transmission alternatives to best meet California's future transmission needs.	Please see response above.
13d	- **Verify that a full set of long-term societal benefits are included when comparing capital investment and the cost of solution alternatives.** CAISO is required to "*consider the degree to which, if any, the benefits of the transmission solutions outweigh the costs.*" Advanced power flow control technology typically provides a more cost efficient solution than traditional solutions while providing benefits beyond those which are considered today.7 Advanced power flow control technologies can have additional benefits by reducing permitting and environmental impacts; reducing project schedules through quick deployment; increasing investment certainty through incremental deployment on an "as-needed" basis; and increasing investment certainty due to the technology's ability to be re-deployed.	Your comment has been noted.

No	Comment Submitted	CAISO Response
14	**TransCanyon, LLC** **Submitted by: Jason Smith & Bob Smith**	
14a	We encourage the CAISO to continue to monitor the Once Through Cooling ("OTC") generation along with other resource procurements moving forward especially in the context of local capacity requirements ("LCR") and the reliability in the LA Basin and SDG&E areas as a part of the 2016-17 system assessment. TransCanyon understands that system mitigations and existing operating procedures are being heavily relied upon during few outage conditions in the area and that there will be additional transmission opportunities in the region that aid in improving system reliability.	Your comment has been noted.
14b	TransCanyon also appreciates the effort to identify policy-driven transmission additions or upgrades that are necessary in order to achieve the 33% renewable share of annual consumption by 2020 and also to identify the policy driven transmission opportunities that aid in deliverability of resources outside of the ISO balancing area.	Your comment has been noted.
14c	The study plan under the 50% RPS indicates that for going beyond 33%, the ISO will now assume the incremental renewable generation to be energy-only, and on that basis will estimate the expected amount of congestion-related curtailment of renewables. TransCanyon agrees with this approach and would like the ISO to evaluate the cost of the curtailment and how this value could be assigned as a benefit to any policy or economic projects that may be evaluated in the current planning cycle. TransCanyon agrees with the ISO to focus on evaluating the impact of out-of-state renewable resources on the reliability performance and curtailment of renewables.	Your comment has been noted. The final study plan clarifies that the ISO intends to study both full capacity deliverability status and energy only deliverability status scenarios in moving beyond 33% to 50% RPS.