The ISO received comments on the topics discussed at the February 28, 2019 stakeholder meeting from the following:

1. American Wind Energy Association of California (AWEA-California)
2. Bay Area Municipal Transmission group (BAMx)
3. Cal Energy Development Company LLC (CEDC)
4. California Public Utilities Commission – Staff (CPUC – Staff)
5. EDF Renewables
6. First Solar
7. GridLiance
8. LS Power (LSP)
9. North Gila Imperial Valley #2, LLC (NGIV2)
10. National Resource Defense Council (NRDC)
11. Public Advocates Office (PAO)
12. The Nevada Hydro Company, Inc (Nevada Hydro)
13. TransWest Express
14. Wellhead Electric Company
15. Westlands Solar Park

Economic Study Requests

E1 GridLiance
E2 Idaho Power
E3 LS Power (LSP)
E4 Next Era Energy Resource (NEER)
E5 Pacific Gas & Electric (PG&E)
E5 The Nevada Hydro Company, Inc (Nevada Hydro)

Copies of the comments and economic study requests submitted are located on the 2019-2020 Transmission Planning Process page at:
http://www.caiso.com/planning/Pages/TransmissionPlanning/2019-2020TransmissionPlanningProcess.aspx

The following are the ISO's responses to the comments and economic study requests.

1. American Wind Energy Association of California (AWEA-California) Submitted by: Caitlin Liotiris		
No	Comment Submitted	CAISO Response
1a	CAISO's 2019-20 TPP Should Include a Full Assessment of Transmission Necessary to Achieve California's Policy Goals Although the CPUC has yet to formally transmit policy-driven portfolios for analysis in the 2019- 20 TPP, some of the cases being considered for transmittal include regional renewable resources (wind in Wyoming and New Mexico) which would require construction of new transmission to deliver the associated output to CAISO. Based on the CPUC's estimates, after paying for the transmission required to deliver these resources to CAISO, these portfolios would save ratepayers $300-$558M, compared to a case that excludes them. The CPUC is considering transmitting "Case C" (which includes 2,250 MW of New Mexico wind that requires new transmission and 2,000 MW of Wyoming wind) to the CAISO for analysis as a "policy-driven sensitivity case" in the 2019-20 TPP. This transmittal provides CAISO an opportunity to analyze transmission solutions to these wind resources, with no obligation to recommend approval of any transmission investments as part of the analysis. CAISO has an opportunity to take a leadership role in this regard, supporting, through study work and information provision, cost-effective achievement of California's clean energy goals. A thorough and complete assessment of Case C in the 2019-20 TPP provides a path for CAISO to further the collective understanding of transmission solutions and delivery of these resources, without forcing CAISO to commit to any further steps to approving transmission. This type of information would be valuable to the CPUC, LSEs, and other stakeholders as they do their part to support achievement of California's policy goals. Unfortunately, it appears CAISO is does not want to take the opportunity to lead on this issue. During the stakeholder meeting on the 2019-20 TPP, CAISO indicated that if it received portfolios of resources which include out-of-state wind requiring new transmission (as policy driven sensitivities from the CPUC) CAISO would ***not*** conduct <u>meaningful</u> transmission planning to these new resources. Rather, CAISO indicated it would only analyze delivery of those resources from CAISO's existing boundaries to CAISO load, effectively assuming the remaining transmission should not be analyzed in the TPP. While	The ISO does not agree that a refresh of existing information on out-of-state developments associated with bringing higher levels of out-of-state wind resources to California is necessary at this time, nor expected by the CPUC in supplying a high out-of-state wind sensitivity to the ISO. Such analysis is an extensive effort requiring commitment of resources from state agencies and other western planning regions, that have committed considerable resources in making the current body of study work available.

No	Comment Submitted	CAISO Response
	this type of study is a useful starting point, the proposed analysis is incomplete and does not provide the CPUC and others with the transmission planning information that CAISO, as the transmission planner, should provide. It is noteworthy that CAISO already studied the ability to integrate 2,000 MW of Wyoming wind and 2,250 MW of New Mexico wind as part of the Interregional Transmission Project and 50% RPS Out-of-State Special Study. In that analysis, CAISO found there was sufficient Maximum Import Capability (MIC) for renewable delivery to the CAISO system at major delivery points in the northwest and the southwest. Recreating that assessment in the 2019-20 TPP, with a modified portfolio of resources inside the CAISO footprint, is one step in analyzing the renewable portfolios provided by the CPUC, but it does not provide a sufficient level of information for additional actions to be taken by the CPUC in the IRP and does not result in a full analysis of the policy base case and sensitivity portfolios expected to be transmitted by the CPUC. It is CAISO's responsibility to conduct a comprehensive assessment of the transmission resources necessary to fully deliver the resources to CAISO load. CAISO must assess the transmission necessary to move these resources from their approximate locations to CAISO's boundaries in the 2019-20 TPP. This assessment should include review of current transmission solutions that are being explored and any other, new solutions CAISO may offer for consideration. To reiterate, this assessment would not obligate CAISO to recommend approval of any transmission solutions that are analyzed to deliver these resources, but would result in a study which might identify the best/most cost-effective transmission solutions to deliver those resources and provides other useful information on expect transmission costs and delivery options. Of course, AWEA-California acknowledges that the assessment of resources that are not, currently, connected to CAISO's system is somewhat unique. But CAISO has previously assessed (and even approved) transmission projects to extend its own boundaries beyond the historical footprint and there is no reason for different treatment in this case. If CAISO fails to conduct complete transmission planning on Case C, or other portfolios that include regional resources on new transmission, CAISO will deprive the CPUC of the information and analysis that is presumably sought through this expected	The ISO partnered in 2015 and 2016 with the CEC and the CPUC, to conduct the Renewable Energy Transmission Initiative (RETI 2.0). RETI 2.0 was an open, transparent, and science-based process exploring the viability of renewable generation resources in California and throughout the West, considering critical land use and environmental constraints, and identifying potential transmission opportunities that could access and integrate renewable energy with the most environmental, economic, and community benefits. During the 2016-2017 planning cycle the ISO undertook a 50% RPS special study (2016-2017 50% RPS study) to focus on a broader investigation into the feasibility and implication of moving beyond 33% RPS from a transmission system perspective. The intent of the 2016-2017 50% RPS study was to build on the 50% studies performed as part of the ISO's 2015-2016 planning cycle to assess 50 percent California RPS portfolios under full capacity deliverability and energy only arrangements. The 2016-2017 50% RPS study expanded the scope of the initial study effort to acquire general information on system requirements within California that might be needed to import wind resources from Wyoming and New Mexico. The 2016-2017 50% RPS special study accomplished the following objectives – 1. Investigated the impacts of moving beyond 33% RPS on California's transmission system 2. Tested the transmission capability estimates used in RPS calculator v6.2 and where appropriate, provided updates to these transmission capability estimates; and 3. Carried out a preliminary examination of transmission implications of meeting part of California's 50 percent RPS requirement by assuming California's procurement of 2000 MW of wind resources in Wyoming and 2000 MW of wind resources in New Mexico.

No	Comment Submitted	CAISO Response
	transmittal. The transmittal of these portfolios as sensitivities gives CAISO an opportunity to assess necessary transmission to these resources, their costs and the relative strengths and weaknesses of different options without a need to approve transmission projects in the 2019- 20 Transmission Plan. CAISO should seize on this opportunity and conduct a meaningful study to provide relevant and helpful information to the CPUC and to LSEs as they embark on continued IRP and procurement-related activities.	The results of that analysis are documented in Section 6.3 of the ISO 2016-2017 Transmission Plan. In addition, a supplemental report was posted on the ISO website with the following title: "ISO 2016-2017 Transmission Planning Process Interregional Transmission Project (ITP) Evaluation and 50% RPS Out-of-State Portfolio Assessment, January 4, 2018" http://www.caiso.com/Documents/InterregionalTransmissionProjectITPEvaluationand50RPSOut-of-StatePortfolioAssessment.pdf Based on insights gained from 2016-2017 50% RPS special study and consequent stakeholder feedback regarding the out-of-state portfolio assessment, the ISO decided to embark on the supplemental effort to further assess the feasibility of delivering the 50% RPS out-of-state portfolio from Wyoming and New Mexico to corresponding injection points within the ISO Balancing Authority Area (BAA). As part of the interregional coordination efforts, the ISO also embarked on an extensive outreach to the Western Planning Regions (WPRs) to refine assumptions that were crucial to evaluate the out-of-state renewable portfolio. This outreach pointed to significant transmission topology assumption refinements that were warranted for the system outside of California owing to the fact that each Western Planning Region (WPR) assesses the 'firmness' of planned transmission projects using different criteria. The ISO decided to leverage this work being done on the out-of-state portfolio modeling to test the framework to compare effectiveness of ITPs that were submitted as part of the 2016 ITP request window. The ISO also received feedback from stakeholders that production cost simulations and power flow analyses do not entirely capture the challenges with procuring adequate transmission service in order to be able to "count on" out-of-state renewable resources. This prompted an investigation into Available Transmission Capacity (ATC) along the representative paths from Wyoming to California and from New Mexico to California.

No	Comment Submitted	CAISO Response
		In summary, the ISO considers that the above work adequately informs resource planning discussions within the CPUC's IRP process, and that the out-of-state transmission development that ultimately proceeds will be based on contractual arrangements with generators that are managing their own access – and the related costs - to the California border.
1b	<u>Stakeholders Require Information on Where the Additional Stakeholder Process on the Generation Deliverability Methodology Will Take Place</u> During the 2018-19 TPP, CAISO proposed modifications to the Generation Deliverability Assessment Methodology to better align this methodology with evolving system conditions and generation deliverability needs. AWEA-California supported implementation of the new methodology on the condition that CAISO open up another stakeholder process to address other CAISO processes and procedures that may be affected by the change. Other stakeholders raised similar issues related to affected processes and impacts, as a result, CAISO elected to delay implementation of the new methodology until Q1 2020. In the market notice announcing this decision, CAISO indicated additional stakeholder engagement on this topic was planned for the second quarter of 2019. However, it is unclear what venue this additional stakeholder engagement will occur in, when it might occur, and what exactly CAISO might review through upcoming stakeholder engagement. CAISO should provide clarity to stakeholders on future stakeholder engagement opportunities and work to develop a scope that addresses the concerns originally raised by stakeholders. AWEA-California thought that additional stakeholder process on the deliverability assessment methodology might occur under the umbrella of the 2019-20 TPP. However, the Draft Study Plan for the 2019-20 TPP does not address this topic. Additionally, CAISO's Draft 2020 Policy Initiatives Catalog does not include descriptions of potential stakeholder processes that would address the issues raised in comments on the new generation deliverability methodology.	The CAISO is currently working on an issue paper to provide background on the revisions needed to the deliverability methodology, a summary of stakeholder comments, options for addressing these comments, and a preliminary timeline. Once the paper is completed in Q2. a stakeholder meeting or call will be scheduled during the May/June timeframe to review the paper and solicit additional stakeholder feedback.

No	Comment Submitted	CAISO Response
	As quickly as possible, CAISO should provide clarification on the venue for discussions on this topic and outline the expected scope of the upcoming stakeholder engagement. As stated in previous comments, AWEA-California suggests that the stakeholder engagement process include evaluations of whether the changes to the deliverability assessment methodology necessitates changes to CAISO's current TPP practices, especially economic assessments conducted under the CAISO's Transmission Economic Assessment Methodology (TEAM). AWEA-California supports an assessment of TEAM's ability to accurately quantify economic benefits of potential transmission solutions given portfolios with high renewable resource penetration (such as the 32 MMT case, or sensitivity Cases C and D, being contemplated for transmittal to the CAISO for policy-driven sensitivity analysis) and little new transmission investment resulting from the interconnection process or the reliability-based assessment in the TPP. One or more "test cases" would be highly valuable to review with stakeholders in the coming months. AWEA-California encourages CAISO to talk with stakeholders to establish the questions that need to be answered and the approach that can be taken in order to conduct a stakeholder process that provides greater comfort in moving forward with the new generation deliverability assessment methodology.	These comments can be addressed in the stakeholder process described above.

2. Bay Area Municipal Transmission Group (BAMx) Submitted by: Moisés Melgoza		
No	Comment Submitted	CAISO Response
2a	<u>Previously Approved Projects</u> BAMx applauds the significant progress that the CAISO made in the prior four planning cycles in evaluating previously approved transmission projects. However, some projects like the North of Mesa project still remain on hold. In addition to further assessment of the conversion of one of the 500kV lines from Midway to Diablo to 230kV as part of the North of Mesa project, we request the CAISO to further assess the reliability need for the North of Mesa Project in the 2019-2020 transmission planning cycle. While much work has been done to evaluate previously approved projects as a one-time effort, part of the Study Plan should include a formal process to continually monitor such previously approved projects. During the February 28th stakeholder meeting, the CAISO indicated that they would do such an assessment on a case by case basis in the 2019-2020 cycle. We recommend that this monitoring should include at least two aspects. First, until the project starts construction it would be monitored as to whether there have been changes that would impact the project necessity and scope. While all approved projects should be monitored, special emphasis should be targeted for those that have been delayed beyond their initially proposed on-line dates as well as those with on-line dates during the second half of the planning horizon. Second, stakeholders are seeing tremendous and chronic cost escalation after a transmission project is approved by the CAISO, at times up to 900%. Further, this historic escalation appears to have had nothing to do with the mitigation of the risk of transmission lines causing wildfires. Such cost increases can materially impact the selection of the preferred alternative or overall scope of work. During the post-approval transmission project monitoring, BAMx recommends that the CAISO monitor cost escalation for both (a) scope creep in the event that work eventually deemed unnecessary to the project objectives may be kept out of, or removed from, the project, and (b) whether any such cost increase should trigger a project review as has been performed by the CAISO for the past several planning cycles. BAMx encourages the CAISO to monitor the projects in all the PTO's service territories for potential cost escalation followed by a review in the scope of the project if a significant cost escalation	In the 2018-2019 transmission planning process the CAISO reassessed and presented the need for the North of Mesa project and recommended that it remain on hold due to uncertainty and the need for further assessment of converting one of the 500 kV transmission lines from Midway to Diablo after the DCPP retires to 230 kV. The CAISO will continue to assess the needs in the area and the in the 2019-2020 transmission planning process. As a part of the planning process, the CAISO assumes that the previously approved transmission projects will be in-service based upon the most recent in-service data. In assessing the planning area needs, on a case by case basis the CAISO may review the transmission project depending the specifics of the situation.

No	Comment Submitted	CAISO Response
	has been identified. The results of such monitoring activities should be included in the annual Transmission Plan. The significant increases in costs that are occurring after the CAISO approves a project makes some type of process - such as the one we suggest - extremely important. A major issue the State faces is paying for the past costs of wildfires. As we know, the State has even developed a new commission to deal with wildfire mitigation risks. And even more importantly for the CAISO, extensive mitigation measures, from aggressive vegetation management to insulated conductors to even undergrounding of existing overhead transmission lines, are being discussed. Also, a potential reorganization of the Pacific Gas and Electric Company (PG&E) would be a major issue of Statewide concern. Clearly, major transmission expenditures that involve insulated open conductors and/or undergrounding should be explored as other cost-effective alternatives are investigated. It is important for the CAISO, as the entity responsible for the operation and planning of the transmission system, to engage stakeholders in how these issues should affect the CAISO's decision-making process.	The CAISO continues to monitor the activities identified, and expects stakeholders to participate in these discussions through the transmission planning process.
1b	<u>Local Capacity Requirement (LCR) Studies</u> BAMx appreciates the CAISO's significant efforts on the LCR Reduction studies performed in the 2018-2019 transmission planning cycle. It appears the effort that was put into those studies was extraordinary. BAMx finds these informational studies to be very helpful in reviewing the options to maintain local reliability. We endorse the CAISO's comprehensive approach that not only considers (i) the reliability benefits of competing mitigation solutions including transmission and storage resources, but also assesses (ii) the production benefits and (iii) the local capacity benefits. BAMx supports the CAISO plan to perform an assessment of the remaining local capacity areas and sub-areas in the 2019-2020 planning cycle as a continuation of the 2018-2019 planning cycle.	The comment has been noted.
1c	<u>Need for Additional Coordination Between CPUC IRP and CAISO TPP and Stakeholder Review</u> The CAISO 2018-2019 policy-driven assessment found the need for some major transmission upgrades and generation dropping Remedial Action Schemes (RAS) in the Eldorado-Mountain Pass-Southern NV area to mitigate a large amount of congestion and transmission overloads. It was explained during	

No	Comment Submitted	CAISO Response
	the February 28th stakeholder meeting that this need was a consequence of (a) modeling a large amount of solar and wind resources in these areas, (b) such resources being mapped to transmission constrained locations, and (c) such resources modeled at high production levels based upon the CAISO's existing deliverability assessment methodology. BAMx appreciates the CAISO's due diligence in providing updated transmission capability amounts as well as renewable resource location selection (or, resource mapping), which would avoid artificial transmission congestion/overload issues in the 2019-20 TPP and also in future years. However, BAMx is concerned about the lack of transparency into the resource mapping aspect of the feedback loop between the CPUC IRP and the CAISO TPP. We believe that the stakeholders need to have an adequate opportunity to review and provide input into the resource mapping process. BAMx expects several resource mapping issues would be discovered as the CAISO and the stakeholders alike have the opportunity to review and assess the implications of the TPP renewable portfolios for the base and sensitivity cases. Therefore, BAMx urges the CAISO to engage the stakeholders in the process of modeling these renewable portfolios in the 2019-2020 transmission planning power flow and production cost modeling cases.	Regarding (b), the transmission capability limitations in the VEA/Gridliance area that were causing large amounts of congestion were provided to the CPUC by the CAISO in the previous IRP process approximately one year ago, and were included in the posted version of the Resolve model. However, Resolve was unable to accommodate nested constraints and this was the reason that this previously provided transmission information was not incorporated in the portfolio development. This issue has been addressed. The updates provided were for other areas and were based on generation coming online that utilized available transmission capability. Other updates were based on new information that became available from recent transmission interconnection studies which are posted on the CAISO Market Participant Portal. Regarding the mapping process, the ISO encourages stakeholders to participate in the CPUC and CEC processes.

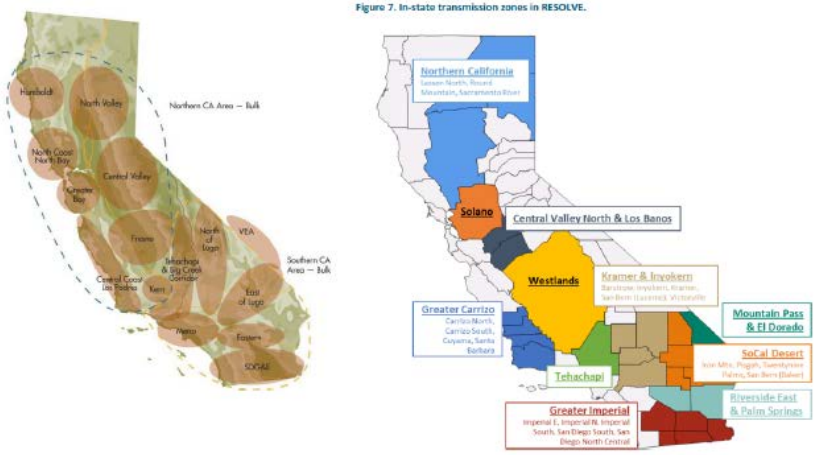
3. Cal Energy Development Company LLC (CEDC) Submitted by: Mary Walicki		
No	Comment Submitted	CAISO Response
3a	Gas-fired generation retirements – We support ISO's assumptions in Section 3.7.5 to assume retirement and model offline resources age 40 years or more. Further, we suggest ISO include scenarios wherein the gas-fired generation operation complies with California state policy and laws (60% RPS by 2030, 100% carbon free by 2045 and aggressive MMT targets). We believe that CTP can be an economic solution for maintaining grid reliability while supporting the State's policy objectives. CTP's proposed HVDC transmission system will be fully controllable and dispatchable by the ISO and will add a total of 2000 MW of capacity between Northern California (PG&E) and Southern California connecting at Diablo Canyon, Ormond Beach and Redondo Beach. The power transferred may be sourced by (1) generation from 2,000 MW of offshore windfarms off the central California Coast, (2) power transfers from the 500 kV or 230 kV AC systems at Diablo Canyon Power Plant (DCPP), Ormond and Redondo Beach, or (3) any combination of the two.	The comment has been noted.
3b	Local Capacity Areas – The 2019-2020 study plan will continue its comprehensive review of alternatives to reduce or eliminate local capacity area requirements for gas-fired generation for the remaining local capacity areas and sub-areas not studied in the previous cycle. We request that ISO consider the CTP as a potential solution for reducing LCR needs in the Big Creek/Ventura as well as update the value of CTP's quantified benefit for the LA Basin. We observed from the 2018-2019 Transmission Planning results that a conservative valuation methodology was used to determine benefits for LCR reduction provided by transmission solutions. We suggest the ISO update its valuation methodology to instead value LCR benefits based on the cost of replacing new gas-fired generation or similar long-term local capacity prices that are currently observed for long-term contracts. We believe this will better reflect the cost-effectiveness of potential transmission solutions throughout its asset life.	The CAISO will study the Western LA Basin and the Big Creek/Ventura LCR areas in its review of alternatives to reduce or eliminate local capacity area requirements for gas-fired generation in this planning cycle and will consider the CTP for both areas. The CAISO plans to utilize the same methodology for evaluating the benefit of eliminating the need for local gas-fired resources until new information becomes available through the IRP process.
3c	Public policy objectives – The ISO notes in Section 4.1 that it will receive updated renewable portfolios from the CPUC to be analyzed for policy-driven assessment. As CPUC finalizes its recommended portfolios, we understand that new legislation (AB 1371) has been filed requiring the CPUC to evaluate 2000-4000 MWs of offshore wind and directing the ISO to also evaluate the	The comment has been noted.

No	Comment Submitted	CAISO Response
	required transmission to assist in bringing the energy to the terrestrial ISO grid. As provided in our January 17, 2019 submittal, the CTPs unique location off shore offers California an option to interconnect and deliver up to 2,000 MW of economic wind energy as well as support delivery of renewable energy between northern and southern California.	
3d	Other reliability benefits – As a modern HVDC transmission cable with voltage sourced converters, CTP provides unique benefits, especially to the grid in load pockets such as the LA Basin that have historically relied on gas fired generation as a critical component of reliable service to customers. Specifically, the CTP's undersea HVDC cable connection at the switchyard of a retiring coastal power plant can provide ramping capability, voltage support, frequency support, short circuit capacity, etc. Essentially a HVDC connection can match or exceed the local reliability support benefits of local gas fired generation MW for MW. We encourage the ISO to consider these benefits in their reliability assessments for the 2019-2020 study plan, and as ISO suggests in Section 3.8 CEDC also intends to submit the project into the 2019-2020 "Request Window" to be studied as a reliability solution.	The comment has been noted.

4. California Public Utilities Commission – Staff (CPUC – Staff) Submitted by: Karolina Maslanka		
No	Comment Submitted	CAISO Response
4a	1. CPUC staff requests that the CAISO coordinate with the CPUC to revisit the manner in which CPUC resource portfolios are framed and used in the CAISO TPP process. The 2019-2020 TPP Draft Study Plan includes the CPUC IRP resource portfolios under section 3.7.2 "Renewable Generation" (p. 24/95), which coincides with the legacy LTPP structure under which the CPUC only transmitted renewable resource information. Since the Integrated Resource Planning process is more comprehensive in nature and may include information regarding other resource types, CPUC Staff requests that the CAISO and the CPUC revisit this assumption moving forward. Additionally, CPUC Staff requests clarification on the manner in which renewable generation information received from the CPUC will be used in the 2-5 year planning cases (Section 3.7.1 of the Study Plan). The CAISO states "Contracted renewable generation with all permitting and necessary transmission approved and expected to be in-service within 5 years may (emphasis added) also be modeled in the relevant cases." Is it uncertain whether the above renewable generation will be modeled? If so, why?	In addition to renewable generation portfolios, the CAISO is also using information from the CPUC's IRP proceedings in coming up with list of resources older than 40 years to be retired in the tenth year case. Only the resources that are under construction and have a planned in-service-date within the timeframe are modeled in the 2-5-year planning cases. Other resources from the contracted list may be modeled if they are needed to balance the load and resources.
4b	2. CPUC Staff requests that the CAISO clearly document in the TPP process how the CPUC transmitted "Unified Inputs and Assumptions" are used. CPUC Staff transmits annually to the CAISO a "Unified Inputs and Assumptions" document to accompany the resource portfolios resulting from the IRP process. CPUC Staff understands that the CAISO uses numerous sources as input to the TPP and the CAISO has the discretion to choose which inputs and assumptions are ultimately used for modeling. To improve the transparency of the TPP process CPUC Staff requests that the CAISO clearly document how the CPUC transmitted Unified Inputs and Assumptions are used. Which components are used directly, which components are used but modified, what information is not used, and the rationale for the modification or exclusion of specific components. Due to the fast-moving timeline of the TPP process and the relatively short timeframe that stakeholders receive to review long TPP materials, CPUC staff requests that this information be communicated in one	Typically, for reliability assessments, demand and demand-side resources and load modifier information are taken from CEC's demand forecast. Inputs for supply-side resources, like renewable generation, demand response and energy storage facilities are taken from the "Unified Inputs and Assumption" document provided by the CPUC and are referenced in the Study Plan accordingly. The ISO's planning PCM used the same assumptions for transmission, load, and resource as in the ISO's reliability assessment. The load forecast used is the CEC forecast. The operating characteristics of load and resources, including the shapes of hourly resources and thermal generator parameters, etc., are consistent with the Anchor Data Set

No	Comment Submitted	CAISO Response
	central location such as a table or an attachment. CPUC Staff acknowledges that this year the CPUC Unified Inputs and Assumptions is being delivered to the CAISO after the resource portfolios resulting from the IRP process were posted and after the CAISO's posting of the Draft TPP Study Plan. If it is impossible to include this information in the Final Study Plan than at a minimum this summary of what Unified Inputs and Assumptions were and were not used should be included in the TPP draft study results.	(ADS) PCM that is the WECC-wide common PCM dataset. The ancillary services and operating reserves including the Frequency Response Requirements are consistent with the ISO's system studies. Any material variation from the Unified Inputs and Assumptions will be specifically noted in the Final Study Plan.
4c	3. CPUC Staff appreciates the addition of the table summarizing the study scenarios, which improves the accessibility of the information for all stakeholders. CPUC Staff appreciates the addition of the table summarizing the "Study Scenarios" found on slide (32/52) of the 2/28/2019 CAISO Stakeholder Meeting slide deck. The table will help stakeholders better understand how the starting cases are created and how they compare to one another.	The comment has been noted.
4d	4. CPUC staff believes that increased process alignment is necessary to improve the timeliness of information transmittal. This includes both the transmittal of TPP results to the CPUC in a timely manner thus allowing for effective incorporation of the information into the IRP process, as well as the CPUC's transmittal of portfolios to the CAISO each February for the TPP process. CPUC Staff greatly appreciates the coordination with the CAISO that has allowed TPP outputs to inform the IRP process in the past. CPUC Staff look forward to further refining this coordination so that the TPP process and IRP process align in such a way that allows for the most efficient and effective utilization of newly available information developed in both processes. The need for the increased process alignment became apparent in late 2018/early 2019 as the overlap in the completion of the first IRP cycle and the start of the 19-20 TPP cycle surfaced challenges. According to comments provided by the CAISO on the January 11, 2019 Ruling Seeking Comment on Proposed Preferred System Portfolio and Transmission Planning Process Recommendations, the CAISO stated that "the CAISO needs to receive portfolios by end of February in order to be considered in the upcoming TPP cycle. After February, it will not be possible to make changes as model set up and development will be underway.	The CAISO will continue to coordinate with the CPUC to look for ways to improve the transfer of information to best meet the timelines.

No	Comment Submitted	CAISO Response
	Meeting the February deadline under the current framework may not be sustainable without improvements in processes. In accordance with the TPP process timeline, CPUC Staff did not receive updated transmission capability information from the CAISO until early 2019. After receipt of this information it was necessary for CPUC staff to update IRP portfolios to reflect the new information and pass the updated portfolios to the CEC for substation-level mapping. The best available IRP portfolios were posted on the IRP website by staff on 2/28/2019, barely meeting the CAISO's deadline for inclusion of the information into the upcoming 19-20 TPP cycle. To improve coordination at the end of the 19-20 TPP cycle, CPUC Staff requests that the CAISO and CPUC coordinate to formalize the provision of "Transmission Capability Estimates and Upgrade Costs" so that CPUC's IRP receives updated data at the same time each year in a manner that works well for the timeline for both processes. This includes, if possible, public posting of data in a manner that allows for full utilization of the data produced in both planning processes with the ability to cite a publicly available data source.	
4e	5 CPUC Staff would like to acknowledge the need for coordination with the CAISO on the definition of study areas to allow for a more effective use of inputs and outputs across the planning processes. CPUC Staff wants to better understand how the 16 areas that will be studied under the reliability assessment compare to the "Transmission Capability Estimates and Costs CAISO Data (2019-2020 TPP)" document and how CPUC Staff can better plan for modeling nested transmission constraints in IRP. The CAISO does not speak in the Study Plan to the specific study areas used for the deliverability assessment. CPUC Staff requests that the CAISO please provide additional information in the Final Study Plan so that CPUC Staff can plan accordingly and determine whether it's possible to adjust the RESOLVE model in a way that will allow for easier integration of nested transmission constraints. Both plans are included below for reference.	The comment is noted. The reliability study areas described in the study plan do not exactly correspond to the areas considered for transmission capability estimates that are provided as an input into the RESOLVE model. This is so because the TPP reliability studies are geared towards testing the compliance with NERC reliability standards and not towards testing the ability of the transmission system to accommodate new generation. One important source of information for transmission capability estimates is the generation interconnection studies performed under GIDAP. The purpose of these studies is very different from the reliability studies performed in TPP. So the study areas tend to differ on the account of differing constraints. Transmission capability is

No	Comment Submitted	CAISO Response
	TPP Study Areas RESOLVE Transmission Zones  	estimated based on constraints that limit the ability of new generation to interconnect or deliver to the rest of the ISO BA. The ISO will coordinate with the CPUC and provide any additional information needed for refining the RESOLVE model.
4f	6. CPUC Staff requests that the CAISO include in the Study Plan a description of the plan for conducting deliverability assessments in the 19-20 TPP cycle. A key objective of the 2018-19 TPP policy-driven assessments was to test deliverability of FCDS resources in the portfolio. To accomplish this the CAISO initiated the transition to a new deliverability methodology under which the dispatch assumptions modeled solar PV at lower dispatch levels compared to the dispatch levels under the existing deliverability methodology (Slide 22 – Economic Presentation 2018-2019 TPP). The results indicated that lower dispatch assumptions may translate into FCDS for more resources but the new assumptions could also result in higher renewable curtailment. Although the same objective was maintained in the February 28, 2019 stakeholder meeting presentation (pdf slide 42/52), the CAISO did not speak to this objective in the actual Study Plan. Furthermore, the 2019-20 Study Plan did not include any mention or description of the deliverability methodologies that would be considered or used this TPP cycle. Under Chapter 3, Reliability Assessments: Sensitivity Scenario Definitions and Renewable Generation Dispatch, Table 3.11-4 states that a 20% exceedance level will be used for the scenarios with summer peak with renewable output and minimum gas	Please refer to the response to 1b.

No	Comment Submitted	CAISO Response
	generation commitment. However, beyond this one mention, the Study Plan does not speak directly to the plan for the deliverability assessment work that will be conducted later this year. CPUC Staff request that the CAISO share more information regarding the deliverability assessment methodology since the outputs produced directly inform the IRP process.	
4g	7. CPUC Staff asks that the CAISO clarify whether the remaining LCR areas and sub-areas will be studied as part of the economic assessment and whether this is considered to be part of the long-term local capacity requirement assessment. The Study Plan states "The long-time LCR study was performed in the 2018-2019 Transmission Plan and therefore the 2019-2020 transmission planning process will not include a 10 year out study. The ISO undertook in the 2018-2019 transmission planning process a comprehensive review of alternatives to reduce or eliminate local capacity area requirements for gas-fired generation in 22 areas and sub-areas. The assessment of the remaining local capacity areas and sub-areas will be completed as a continuation of the 2018-2019 planning cycle" (p. 58/95). CPUC Staff wants to better understand whether the economic assessment LCR work is considered to be part of the Long-Term Local Capacity Requirement Assessment.	The ISO will be studying alternatives to reduce or eliminate gas-fired generation to meet the local capacity requirement in the areas and sub-areas that were not assessed in the 2018-2019 transmission plan as a continuation of the 2018-2019 transmission planning process. As in the 2018-2019 transmission process, the CAISO will undertake a detailed economic assessment where warranted based upon the initial assessment results.
4h	8. CPUC Staff requests that the CAISO model new pumped hydro storage and new battery storage incremental to the 1,325 MW target. CPUC Staff also looks forward to coordination with the CAISO on the question of allocation of energy storage resources, but hope that the CAISO can include, at a minimum, language in the Final Study Plan regarding the modeling of new energy storage. The CAISO indicated in its February 28, 2019 stakeholder meeting presentation that the 2019-20 Study Plan will not include storage resources in its starting cases unless the resources have been procured by LSEs as part of the CPUC's long-term procurement plan (LTPP) process. In that case, the CAISO will rely on locational information provided by the CPUC. Effective busses will be identified using the residual capacity for potential development after reliability concerns have been identified. CPUC Staff agrees with this and appreciates the CAISO's inclusion of Table 3.8-3 in the Study Plan.	

No	Comment Submitted	CAISO Response
	However, CPUC Staff believes that the total energy storage resources considered in the TPP study cases should include existing pumped hydro storage, existing battery storage, committed battery storage to ensure achievement of the CPUC 1,325 MW storage target by 2024, and new battery storage by 2030 that is beyond the 1,325 MW target and new pumped hydro storage (i.e., selected by RESOLVE). Currently, the Study Plan does not speak to whether the CAISO plans to model energy storage incremental to the already existing storage. The remaining battery storage resources needed to achieve the 1,325 MW target and new battery storage resources beyond the target are generic and need to be sited to transmission substations to facilitate network reliability studies. It is unknown whether this generic storage will be used primarily for renewables integration or to meet local capacity requirements. CPUC Staff will coordinate with the CAISO and its 2019-20 TPP study process to jointly develop a framework for siting generic storage to locations that provide the highest value to resolving renewables integration and/or local capacity reliability issues. This process can reveal more valuable locations and use cases for storage that can inform market participants where projects should be interconnected. The development of a framework for siting the remaining battery storage resources will rely on 19-20 draft TPP results that will not be available until early fall, 2019. CPUC Staff that this work will allow for inclusion of the total energy storage resources in the final study cases that the CAISO runs in the 19-20 TPP process.	The CAISO looks forward to working with the CPUC on developing a framework for siting generic storage to locations that provide the highest value to resolving renewables integration and/or local capacity reliability issues.
4i	9. CPUC Staff encourages the CAISO to facilitate the inclusion of duration estimates for each traditional and non-wires reliability projects identified throughout the TPP processes. One of the barriers to considering energy storage as a transmission asset has been the difficulty of pinning down an acceptable duration (megawatt hours). Duration is a key cost consideration and can also be a significant siting consideration. The starting duration assumption is often 4 hours, which reflects the approach adopted for Resource Adequacy planning. CPUC Staff notes, however, that while the CAISO has made great progress with the integration of energy storage into its TPPs, duration has frequently been absent from the storage projects listed in the 2017-2018 and 2018-2019 TPPs. Going forward,	In the 2018-2019 TPP the CAISO studied various alternatives for reducing reliance on gas generation in LCR areas, and provided load profile information for each of the LCR areas studied. This information can be utilized to ascertain duration estimates for energy and use limited resources proposed to meet the LCR need in each area.

No	Comment Submitted	CAISO Response
	CPUC Staff encourages the CAISO to facilitate the inclusion of duration estimates for each traditional and non-wires reliability projects identified throughout the TPP processes. Duration estimates should be communicated to stakeholders in the earliest possible TPP phases. In this way, storage durations to meet reliability needs can be commented on by all stakeholders, which would improve the accuracy of duration estimates and overall quality of energy storage proposals (e.g., improved cost, siting, and project footprint assumptions).	However, 4 hour resources can be bundled together to meet the need in each area by operating the resources sequentially.
4j	10. CPUC Staff requests that the CAISO identify an energy storage duration (or range, low and high) estimated to be sufficient for addressing the N-1 (P1) contingency and (separately) the N-1-1 (P6) contingency associated with the transmission needs identified for the Estrella Project. The Estrella Substation and Paso Robles Area Reinforcement Project (2013-2014 TPP) is currently under CEQA review at the CPUC. CPUC Staff is considering battery storage alternatives. As a case study, we request that the CAISO identify an energy storage duration (or range, low and high) estimated to be sufficient for addressing the N-1 (P1) contingency and (separately) the N-1-1 (P6) contingency associated with the transmission needs identified for the Estrella Project. CPUC Staff assumes that a battery of sufficient duration to address the P6 event could also address the P1 event (assuming the P1 and P6 events do not overlap). CPUC Staff would also like to understand what the CAISO estimates to be a sufficient lesser duration for addressing the P1 event alone.	As the request relates to an ongoing proceeding at the CPUC, and the ISO's annual transmission planning process focuses on needs beyond already approved transmission projects, the ISO considers the data request process to be the more appropriate channel for the requested information.
4k	11. CPUC Staff maintains its position from the 18-19 TPP cycle that the CAISO's approach of only counting capacity from demand response programs with a response time of 30 minutes or less, as described in the Draft 19-20 Study Plan, does not correspond with current CPUC resource adequacy policy. CPUC Staff maintains its position from the 18-19 TPP cycle that the CAISO's approach of only counting capacity from demand response programs with a response time of 30 minutes or less, as described in the Draft 19-20 Study Plan, does not correspond with current CPUC resource adequacy policy, which does not place a response time requirement on local RA resource. The CPUC	The draft Study Plan was consistent with prior ISO commitments to leave the study process unchanged, but to refrain from exercising backstop capacity procurement where slow response demand

<table>
<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>Resource Adequacy proceeding will ultimately determine what types of DR programs can count for local RA and meet local capacity needs.

Furthermore, CPUC Staff would like for the CAISO to clarify exactly what data source was used for Table 3.8-1. The source may need to be updated as CPUC Staff has found at least two values that need to be corrected. The DRAM total across all IOUs in 2019 should be 403.8 MW rather than 205 MW. This includes the planning reserve margin adder (351.19 MW*115%). Additionally, the assumed market of the SCE LCR RFO is PDR and the correct amount is 76 MW for 2019.

Table 3.8-1: Existing DR Capacity Range for Each IOU Load Serving Entities within ISO BA
<table>
<tr><th>Supply-side DR (MW):</th><th></th><th>PG&E</th><th>SCE</th><th>SDG&E</th><th>All IOUs</th><th>Assumed Market</th><th>Assumed 30 minute responsive</th></tr>
<tr><td colspan="8">Load Impact Report, 1-in-2 weather year condition portfolio-adjusted August 2027 ex-ante DR impacts at CAISO peak</td></tr>
<tr><td colspan="2">BIP</td><td>300</td><td>610[35]</td><td>6.74</td><td>917</td><td>RDRR</td><td>Yes</td></tr>
<tr><td colspan="2">AP-I</td><td></td><td>50[36]</td><td>0.0</td><td>50</td><td>RDRR</td><td>Yes</td></tr>
<tr><td colspan="2">AC Cycling Res[37]</td><td>61</td><td>56</td><td>7.18</td><td>124</td><td>PDR</td><td>Yes</td></tr>
<tr><td colspan="2">AC Cycling Non-Res</td><td>0</td><td>20[38]</td><td>1.79</td><td>22</td><td>PDR</td><td>Yes</td></tr>
<tr><td colspan="2">CBP</td><td>103[39]</td><td>143[40]</td><td>8.44</td><td>254</td><td>PDR</td><td>No</td></tr>
<tr><td colspan="8">Other procurement program DR</td></tr>
<tr><td colspan="2">SCE LCR RFO,[41] post 2018</td><td></td><td>5.0</td><td></td><td>5</td><td>RDRR</td><td>Yes</td></tr>
<tr><td rowspan="3">DRAM[42]</td><td>2017</td><td>56.4</td><td>56.2</td><td>12</td><td>125</td><td>PDR[43]</td><td rowspan="3">No</td></tr>
<tr><td>2018</td><td>79.5</td><td>88.5</td><td>13.9</td><td>182</td><td></td></tr>
<tr><td>2019</td><td>90.1</td><td>99.2</td><td>15.7</td><td>205</td><td></td></tr>
</table></td><td>response was available. The ISO has updated the final study plan, however, to reflect the revised approach being adopted through its Resource Adequacy Enhancement initiative that will enable PDR resources capable of responding within 52.5 minutes to be employed.

The information in Table 3.8-1 was carried over from the 2018-2019 TPP study plan based on information provided by the CPUC in the last planning cycle. This information has been updated in the final study plan.</td></tr>
<tr><td>4l</td><td>12. CPUC Staff acknowledges that the data source used for preferred resource assumptions are outdated. CPUC Staff will coordinate with the CAISO to update these sources for future TPP cycles.
The Draft 19-20 Study Plan states “As in the 2018-2019 planning cycle, reliability assessments in the current planning cycle will consider a range of existing demand response amounts as potential mitigations to transmission constraints. The reliability studies will also incorporate the incremental</td><td></td></tr>
</table>

No	Comment Submitted	CAISO Response
	uncommitted energy efficiency amounts as projected by the CEC, distributed generation based on the CPUC Default RPS Portfolio and a mix of preferred resources including energy storage based on the CPUC LTPP 2012 local capacity authorization. These incremental preferred resource amounts are in addition to the base amounts of energy efficiency, demand response and "behind the meter" distributed or self-generation. CPUC Staff suggests a few revisions to the Study Plan text included above. First, the CAISO should include storage alternatives as a potential mitigation to transmission constraints. Furthermore, rather than using outdated CPUC LTPP 2012 data, CPUC Staff recommend approved procurement authorizations as a data source. Additionally, the term "incremental uncommitted energy efficiency" may need to be updated to "Additional Achievable EE." Finally, CPUC Staff suggest the last sentence read as follows, "These incremental preferred resource amounts are in addition to the base amounts of energy efficiency, demand response and "behind the meter" distributed or self-generation forecasted in the baseline forecast by the CEC in the IEPR."	Regarding the "first" comment, the quoted section has been taken out of context. The following paragraph goes on to state: "If reliability concerns are identified in the initial assessment, additional rounds of assessments will be performed using potentially available demand response and energy storage to determine whether these resources are a potential solution." [emphasis added] Regarding the "furthermore" comment, the final study plan has been updated.
4m	13. CPUC Staff want to highlight that the IRP resource portfolios and Unified I&A document that will be transmitted to the CAISO for the 2019-20 TPP cycle contain assumptions regarding generation retirement. CPUC Staff suggest that the CAISO do a crosswalk between the specific CPUC and CAISO retirement assumptions. All portfolios that the CPUC recommends for study in the 2019-20 TPP include planned or announced retirements from existing units (such as Diablo Canyon Power Plant and other once-through-cooled units), plus an incremental 40-year age retirement assumption to approximate additional potential for existing fossil units to retire within the IRP planning horizon. Specifically, existing fossil units older than 40-years age and without an existing contract in the year being studied are assumed retired. The CAISO's TPP should study the transmission implications of up to this level of retirement to inform the question of how much	Resources to be older than 40 year by the tenth year of the study horizon are considered retired in the ten-year cases to study the implications of these resources being unavailable.

No	Comment Submitted	CAISO Response
	existing generation may need to be retained to cost-effectively maintain not just system but also local reliability standards.	

5. EDF Renewables Submitted by: Justin Radl		
No	Comment Submitted	CAISO Response
5a	1. Can the CAISO explain why the 2000MW net export limit is needed? From a review of the 2018-19 GridView model it appears to significantly distort the LMP prices between the CAISO and the neighboring BA's (i.e. NEVP, AZPS, PACE, PAUT, etc.) a. If a 2000MW net export limit is applied in the PCM, can the CAISO confirm the CPUC RESOLVE model also applies this limit when solving for the capacity expansion?	The 2000 MW export is not a physical transmission capability limit, but rather an estimate of the practical ability of systems outside of the ISO footprint to manage and accommodate higher levels of import from the ISO. The current maximum net export limit of 2000 MW was established through the established by the CPUC through its 2016 Long Term Procurement Planning proceeding and set out in its "Assumptions and Scenarios for the ISO 2016-17 TPP". It represents a reasonable maximum that promotes a consistent consideration this issue and their commensurate study results which the ISO documents in its transmission plans as well as in submissions to the CPUC's IRP process. In reality, actual exports from the ISO to its neighboring systems has never been limited by "wires" or "rating" limits and where the historical maximum that has been reached is somewhere near 500 MW. The ISO's PCM model utilizes a zonal setup where it enforces transmission constraints on the paths among the zones. It also can enforce an ISO maximum net export limit that can be identified in the California ISO's PCM model of the California network. Since the 2016-2017 transmission planning process the ISO has consistently utilized a 2,000 MW net export limit as part of its baseline economic assessments it performs each planning cycle. While in the transmission planning process, the ISO has performed sensitivities with the export limit relaxed, it is not because the ISO considers those sensitivities to be viable study cases representative of achievable operation. Rather, the sensitivities are performed to allow an assessment of curtailment due to intra-ISO constraints and separate those amounts from the larger amount of ISO system-wide and local curtailment that is comingled when the export limit is Enforced. This limit has been a topic of discussion in CPUC's Integrated Resource Planning processes, and the ISO intends to continue to

No	Comment Submitted	CAISO Response
		participate in that forum. The ISO expects to incorporate in the transmission planning process any change in this assumption resulting from consideration of assumptions in the IRP process. .
5b	2. Can the CAISO explain how the EIM is accounted for in the Production Cost model? It appears wheeling rates between EIM entities are being enforced in the SCED PCM analysis, can the CAISO comment whether the PCM is reflective of the DA or RT market?	The EIM is not modeled in the ISO's planning PCM. The production cost simulations in planning studies simulate the physical capability and constraints of generators, transmission, and load, with consideration of necessary market requirements such as ancillary services.
5c	3. Is the minimum bid floor in CAISO -$150 or -$300? Can the CAISO clarify if -$300 will be used as the minimum dispatch cost for Hourly Resources (Wind/Solar) in the 2019-2020 Production Cost Model? Is the CAISO assuming all hourly resources to be Self Scheduled in the PCM?	The minimum dispatch cost is -$300/MWh. All grid-connected wind and solar units are modeled as resources with hourly profiles, and can be curtailed.
5d	4. Incremental Heat Rates for the Combined Cycle units (CC's) and Combustion Turbines (CT's) used in the 2018-19 GridView model appear to be much lower than industry standard values. A preliminary spot check of several CT's show they are modeled much lower than the values listed on the CEC website, as well as calculated rates from 3rd party data. Can the CAISO review and correct the unit heat rates for the 2019-2020 models? Example : Feather River is modeled with a 7.4 mmBtu/MW incremental heat rate but the CEC site lists it as 12.015.	The heat rates in the ISO's planning PCM are consistent with the WECC-wide ADS PCM.

6. First Solar Submitted by: Vladimir Chaliev		
No	Comment Submitted	CAISO Response
6a	1. Deliverability study methodology First Solar was one of the parties urging the CAISO to hold further workshops to discuss the implications of applying the revised methodology for assessing deliverability and were pleased to see that the CAISO responded to stakeholder feedback to delay implementation for purposes of the allocating transmission plan deliverability to Q1 of 2020. However, as CAISO has already deployed the revised methodology in the 2018-19 Transmission Plan to assess reliable deliverability of renewable generation portfolios, we believe the work should continue now to examine the study assumptions and results and evaluate the implications for the renewable generation fleet in California. We have a number of questions that we believe would benefit from a workshop-style format engagement. First, we are not clear how this new methodology is aligned with the methodology used by the CPUC to calculate the effective load carrying capability of variable energy resources, or why developing a separate paradigm for evaluating capacity is required. Rather than developing a new methodology for valuing capacity on the system, the focus should be to test the transmission system for where it could support new renewable development using sensitivity analyses and plan for category 1 or 2 transmission upgrades. LSA provided valuable comments on this point in its November 30, 2018 submittal. Second, CAISO mentions incorporating LDNU/ADNU information from the GIP studies in its work on RA and NQC development (see, e.g., Slide 24/page 35 of the November 16, 2018). First Solar would like to understand how the CAISO considers this information to inform its policy review of transmission that may be needed to support additional renewable development. Developers see the results only in their GIP study reports, available to a limited number of interconnection customers and not transparent in the broader study results for California. The LDNUs and ADNUs triggered by generator interconnection requests could be pulled in as portfolio mitigations to deliverability of generation in the sensitivity studies.	Please see response to 1b. Please refer to the CAISO's responses to LSA's comments. The GIP study reports (Area Reports) are posted on the CAISO's Market Participant Portal and are available to all interconnection customers that have signed an NDA.

No	Comment Submitted	CAISO Response
	Some areas in the CPUC-provided portfolios are not representative of pending interconnection requests being assessed under the CAISO's GIP study process, and it is not clear whether the CPUC is evaluating transmission costs that may allow an increase in generation deliverability. We believe that stakeholders would benefit from greater transparency and understanding of the interchange of information between the CPUC and CAISO and how costs and options are taken into account in driving portfolio definition. Finally, we note the comment on page 204 of the draft 2018-19 plan that CAISO plans to "refine the existing transmission capability estimates and provide updated estimates as an input in support of the ongoing IRP process." First Solar believes the stakeholders would benefit from a better understanding of this process and results.	All relevant delivery network transmission costs and existing transmission capability information from CAISO interconnection studies are provided to the CPUC for use in the portfolio development, and the information is posted by the CPUC for stakeholder comment.
6b	2) Including frequency response capabilities of utility-scale solar, wind and PVS Solar and wind resources are capable of providing primary frequency response. Inverter-based resources should be included in the CAISO's transmission plan assessment of frequency response and overgeneration issues. Recent developments in reporting requirements under FERC Order 845 and NERC standards means that data is available to allow inclusion of these resources in CAISO's transmission plan studies. For the last couple of years, NERC has requested validation of dynamic models based on field tests to show the capability of non-synchronous generation in responding to voltage and frequency changes at the point of interconnection. CAISO should request these results, certified by WECC for MOD 26 and MOD 27 NERC compliance, as inputs to its assessment of frequency response capabilities. With the megawatts of utility-scale solar serving California load and supporting compliance with RPS standards continuing to grow, these resources need to be evaluated for the additional services they provide. If consideration is needed for compensation methods or contract revisions to support better integration of these resources into the fleet of generators capable of providing essential reliability services, we also urge CAISO to consider a parallel path of investigating needed policy changes.	The models of existing generators used in the ISO planning studies are based upon the models provided by the generators. As a part of the CAISO transmission planning process Business Practice Manual (BPM), the CAISO has recently included a requirement and schedule for generators to provided update models and validation based upon the size and type of interconnection. This was identified as being required as a part of the frequency response study effort in past planning cycles. The CAISO will continue to conduct frequency response studies in the transmission planning process with the updated models as the CAISO receives them.

No	Comment Submitted	CAISO Response
6c	3) Policy studies & energy only assumptions A number of parties have raised the concern that assuming large amounts of energy-only supply is inconsistent with the reality of contracted-for utility-scale solar generation in California. Parties have commented that load serving entities remain focused on procuring resources with deliverability. Assuming 40% energy-only seems unrealistic and detrimental comprehensive planning given the current course. First Solar has noted CAISO's response in its 2018-19 Transmission Plan to these concerns, like the statement on page 8 where CAISO indicates that the assumptions are provided by the CPUC and that CAISO is continuing to coordinate with CPUC staff and referring stakeholders to the CPUC. It seems that CAISO's independent obligation to plan for a transmission grid that can support planned renewable generation development to meet California policy goals should give it the flexibility to enhance the assumptions about development to reflect reality. Similar to our questions about assumptions regarding export limits, we would like to better understand the implications for assuming that such a large percentage of new renewable development will materialize as energy-only. First Solar suggests that as part of the 2019-2020 transmission planning process the CAISO take a holistic look at the impacts to achieving state policy where the transmission infrastructure being planned is not keeping up with the desire by LSEs for deliverable resources.	The ISO believes that the appropriate forum to voice this concern regarding the deliverability classification of resources selected in the CPUC's portfolios is the IRP proceeding. The ISO also believes that LSEs' preferences and input regarding resource procurement are and should be accounted for in the IRP proceeding, not in the TPP. In conjunction with the policy-driven assessment in TPP, the ISO studies each renewable project that intends to connect to the ISO BAA grid through the GIDAP process. The TPP and GIDAP together address the ISO's obligation to plan for a transmission grid that can support planned renewable development.
6d	4) Expanding beyond CPUC portfolios for identifying areas of actual or likely renewable development to support California policy The CAISO should consider areas being proposed by renewable development in its generator interconnection queues, particularly where interconnection customers have received deliverability, are current on postings under their generator interconnection agreements and proceeding towards commercial operation. CAISO should also consider areas evaluated by the California Energy Commission as environmentally conducive to renewable development and providing preferred resource development locations, rather than exclusively relying on the output of the RESOLVE model. At a minimum, we believe a	The ISO believes that the TPP-GIDAP integration designed as part of the ISO's infrastructure planning takes into account the renewable development reflected in the ISO's interconnection queue. Studies performed as part of GIDAP identify upgrades required to interconnect and deliver generation that is active in the ISO's interconnection queue. The input provided to the CPUC as part of IRP incorporates the insights gained from the latest interconnection studies, which among other

No	Comment Submitted	CAISO Response
	comparison of assumptions behind development locations for variable energy resources should be included in the transmission plan. As CAISO notes, its studies are inputs to the CPUC's processes and vice versa, so there's potential for a circular process that has odd results creating challenges for renewable development. The process of relying on the CPUC portfolios does not seem to be working to adequately plan for transmission infrastructure that supports actual development underway to serve California's ambitious climate goals. We are concerned that the grid is not being planned to support real development in areas where interconnections customers have spent tens of millions of dollars on projects and where network upgrade costs might be mitigated with better least-cost, nested transmission solutions.	things reflect the amount of generation in the interconnection queue that has met the required milestones (such as being current on posting and proceeding towards commercial operation) to remain active in the queue.
6e	5) Treatment of export limits CAISO has received a variety of comments on its production cost simulation study methodology and assumptions regarding export limits. While we appreciate that studying the scenario of no export limit provides a good approximation of renewable curtailment related to transmission constraints within California, we believe that CAISO should include a scenario where it does not assume the ability to export and test the congestion that results. Given that California is a net importer much of the time, it isn't clear to us why the transmission plan shouldn't study the scenario where exports are constrained further to produce results about possible transmission solutions that could relieve congestion and avoid curtailments.	Clarification on the 2000 MW export limit being utilized in the ISO's planning process is provided in the response to question 5c.

7. GridLiance Submitted by: Jody Holland		
No	Comment Submitted	CAISO Response
7a	1. Request for Clarification of Generation Assumptions in Base Cases Under Section 3.7, Generation Assumptions, of the 2019-2020 Draft Study Plan, in the "2-5-year Planning Cases", CAISO describes the base cases to be used for the TPP study. Additionally, the CPUC portfolio that was recently released shows the increase in renewable generation starting in 2022. Regarding generation assumptions, the draft study plan (page 23) states: Contracted renewable generation with all permitting and necessary transmission approved and expected to be in-service within 5-years may also be modeled in the relevant cases. The CPUC's Reliability Base Portfolio and ISO's interconnection agreement status will be utilized as criteria for modeling specific generation. For 2024, generation from the CPUC Default Portfolio described below will be used, *as necessary*. Given the data availability, generic dynamic data may be used for this future generation. GridLiance West requests that CAISO confirm whether it will model the CPUC's portfolio generation in the 2024 (year 5) base case as well as the 2029 (year 10) base case. GridLiance West believes this would be beneficial and strongly encourages CAISO to do so. If CAISO does not intend to include the portfolio in the 2024 case, GridLiance West requests an explanation why CAISO has declined to do so.	Only the resources that are under construction and have planned in-service dates within the timeframe are modeled in the 2-5-year planning cases. Other resources from the contracted list may be modeled if they are needed to balance the load and resources. The CAISO doesn't intend to model the entire portfolio in the 2024 case.
7b	2. Request for Clarification Regarding the 2019 Portfolio Allocations to Substations The most recent CPUC portfolio being considered for study in the CAISO's 2019-2020 TPP indicates there are only 702 MW mapped to GLW's 230 kV system. In the previous year's CPUC portfolio, the 3,006 MW that was mapped to Southern NV had 2,680 MW of generation mapped to the VEA/GLW service territory and 326 MW mapped to Eldorado. In this year's CPUC portfolio, most of the Southern Nevada portfolio is mapped to Eldorado (specifically, 2,304 MW). According to the 2019 IRP Portfolio Allocations to Substations, the CPUC	The substation level mapping of portfolio resources was performed by the CEC staff. One reason for a reduction in resources mapped in the GLW area is the incorporation of the nested constraints in this region which were not reflected in the previous year's mapping. The 702 MW in GLW is in addition to the already contracted resources in GLW-VEA area. The limitation is based on the constraint information available from GIDAP studies which are posted to the Market Participant Portal.

No	Comment Submitted	CAISO Response
	has indicated that the 2,304 MW allocation "likely exceeds the amount of solar development that would occur near El Dorado." The spreadsheet also mentions that there are approximately 42,260 acres of land designated as Variance Areas by the BLM potentially for solar development and approximately 5,950 MW of solar photovoltaic that could be developed on this land. The subject 42,260 acres of land falls in GLW/VEA territory along the 230 kV system. GridLiance West has also conducted modeling in the CPUC's Integrated Resource Planning (IRP) proceeding showing that siting these resources in the GLW/VEA service territory is cost-effective and actually saves ratepayers money after accounting for production cost benefits and capital cost savings to offset the increased congestion and cost of transmission system upgrades. In light of these modeling results, GridLiance West requests further background and explanation regarding why CAISO mapped 2,304 MW to the Eldorado Substation and not to the GLW/VEA 230 kV system. GridLiance West also requests that CAISO identify any specific analyses upon which the 700 MW transmission capability for the VEA/GLW area was based. CAISO has generally suggested that these capabilities come from sources such as interconnection studies. GridLiance West is not aware of any particular study that supports this limitation. Having access to the study or studies upon which this limit is based will assist GridLiance WEst and other stakeholders in understanding the limitation(s) and will aid in discussions with the CEC and CPUC as they pertain to future IRP cycles. Additionally, in the "2019 IRP Portfolio Allocations to Substations" spreadsheet, there is indication that the incremental upgrade cost for the additional 350 MW FCDS capacity would be $275MM. GridLiance West believes that it could construct related upgrades at a lower cost. Please explain how the incremental upgrade cost was derived.	Prior cluster study reports and cost estimates from the PTOs were used to provide the incremental upgrade cost. The ISO has noted GLW's comment that GLW's costs may differ from the ones used in the current RESOLVE model.
7c	3. Request for Information on Stakeholder Input Process GridLiance West recently identified concerns regarding the lack of adequate coordination between CAISO, the CPUC, and the CEC in comments submitted March 5 in the IRP proceeding. GridLiance West encourages CAISO to actively seek solutions to these concerns to ensure that stakeholders are not unintentionally prejudiced or disadvantaged throughout each agency's various processes. To that end, GridLiance West requests CAISO identify opportunities	As required by the CAISO tariff, the CAISO performs generation interconnection studies with the participating transmission owners. Relevant delivery network and existing transmission capability information from these studies provided to the CPUC for use in the portfolio development process. The CPUC posts this information for stakeholder comments. In addition, study results obtained from the

No	Comment Submitted	CAISO Response
	to engage its stakeholders on these issues and to allow stakeholders to submit feedback on CAISO's recommended approaches and outcomes. For example, as mentioned above, GridLiance West is aware of certain limited transmission system upgrades that produce meaningful production cost savings—in fact, far more in savings than the cost of the upgrades. These upgrades also allow a generation portfolio consistent with the CPUC's work in identifying low cost resources. With respect to the mapping with the CEC, GridLiance West wishes to understand the process that ensures that transmission buildout tradeoffs are considered in conjunction with renewable buildout choices such that the solution is optimal, as opposed to, for example, strictly and artificially limiting resource development in certain areas by not "mapping" resources to such areas without consideration to other IRP-related buildout attributes.	TPP after studying the portfolios provided are also provided to the CPUC for use in the portfolio development process. However, information from the 2018-2019 TPP studies was not available in time to be incorporated in the portfolio development process for the 2019-2020 TPP.
7d	4. Encouragement to Consider Land Constraints and Physical Congestion at Eldorado 500 kV CAISO staff has indicated that mapping projects to the Eldorado 500 kV station instead of the GLW/VEA system will not only result in less congestion but will also result in less transmission being needed. GridLiance West believes that this conclusion is incorrect, and that further research and study by CAISO is needed before this assumption can be made. The fact is, there are significant land availability limitations and physical constraints that severely limit how much generation can be sited in that area and, therefore, economically interconnected to the Eldorado 500 kV substation. For one, much of the BLM land outside Boulder City has been designated by the BLM as either solar exclusion or solar variance by the BLM pursuant to the Solar Programmatic Environmental Impact Statement (PEIS). This land is either unavailable for solar development or, if available, would only be so following a lengthy, costly and uncertain permitting process. The CPUC has placed resources in Southern Nevada because it has correctly identified those resources as low cost. By siting too much at Eldorado, CAISO is moving away from the fundamental assumptions that underpin the CPUC's plan. In contrast to the Eldorado solution, there are cost and permitting advantages at Sloan Canyon Switchyard. From a cost perspective, there is better accessibility and the physical construction of the located adjacent to the BLM corridor and any interconnections routed from the North will reduce distances by at least 3	The ISO appreciates GLW's comments about potential land availability limitations, issues regarding permitting, costs and constructability. The ISO encourages GLW to provide this input to the CPUC and CEC as part of the IRP proceeding.

No	Comment Submitted	CAISO Response
	miles and require significantly fewer transmission corridor crossings. Therefore, obtaining permits for this construction will reduce both time and cost for a Sloan Canyon solution as compared with Eldorado. Within Boulder City, lands remaining for solar development are extremely limited, owing in large part to the Clark County administered Boulder City Conservation Easement, a vast swath of land set aside for the preservation of desert tortoise. Only one 1,100-acre parcel of Boulder City-owned land has been identified for near-term future solar development, and that project area lies approximately one mile from the Sloan Canyon Switchyard, significantly closer than the project area is to any of the other interconnection point in the Eldorado Valley. Boulder City has indicated that it will give preference in the RFP for the new 1,100 acre solar facility to developers that indicated that they will interconnect through Sloan Canyon Switchyard, because of the ease, proximity and reduced contribution to congestion that will result from interconnection at Sloan over any other substation in the Eldorado Valley. The fact is that significantly more public and private land is available in Nye County – proximate to GridLiance West's transmission lines – for solar development than is available in the Southern Eldorado Valley and throughout Clark County, the area best suited to interconnection at the Eldorado Substation. Further, there are constructability problems for new transmission (including generation interconnection facilities) near the Eldorado Substation. There are many high voltage transmission lines running across the Eldorado Valley. Any new construction would require potentially dozens of line crossings—this increases costs and raises other concerns that should be considered. Constructing long transmission lines in the corridors to reach the Eldorado 500 kV Substation from areas where land is available will significantly increase the cost of generation and ultimately the cost of renewable resources to serve California ratepayers. Unless CAISO considers this, GridLiance West fears California will lose a clear opportunity to access the low-cost renewable resources available in the other parts of Southern Nevada. Given the location of the Sloan Switchyard, it is not similarly impacted by these constraints as is the Eldorado Substation.	

8. LS Power Submitted by: Sandeep Arora		
No	Comment Submitted	CAISO Response
8a	Proposed Policy & Inter Regional Studies CAISO will conduct its policy-driven transmission assessment using base and sensitivity portfolios provided by the CPUC. The base portfolio will correspond to a statewide electric sector GHG reduction target of 42 MMT by 2030, while the sensitivity will correspond to a 32 MMT. At the Stakeholder meeting for the Draft Study Plan, CAISO stated that while the CPUC portfolios may contain out-of-state resources, the CAISO will not assess the need for out-of-state transmission nor will it reassess the previously submitted interregional transmission projects. CAISO proposes that it will only study the impact of out-of-state (OOS) resources by assuming injection points at CAISO boundary stations and only analyzing the impact of these injections to in-state CAISO transmission system. LS Power strongly disagrees with this CAISO proposal. We believe this approach is at odds with the expectation of CPUC's IRP process and will only provide limited insights to stakeholders, if any. CPUC's 2017-18 IRP study showed significant benefits of out of state transmission which is why CPUC recommended inclusion of OOS transmission as a Policy Sensitivity study in CAISO's 2019/20 Transmission Plan. If CAISO's policy studies only look at in-state impacts of OOS renewables then a critical piece will be missed to determine how OOS renewables get delivered to CAISO boundaries. We recommend that CAISO's policy studies include a comparison of active OOS transmission projects and make recommendations on viability and benefits of each project. A few attributes we offer here for consideration for comparing OOS transmission projects are: (1) Earliest possible In Service Date, (2) Capital Cost on a $/MW basis, (3) Permitting status, (4) Ability to bring renewables into California from one or more OOS locations. In addition, any Economic and/or Reliability benefits these projects can bring to CAISO should also be considered. We recommend that this exercise be done in conjunction with CPUC's 2019-20 IRP proceeding. This analysis will help stakeholders understand merits of OOS renewables with new transmission and will help guide policy makers at CAISO and CPUC make important decisions on OOS transmission. Any transmission projects that standout as part of this analysis as	Please see response to 1a.

No	Comment Submitted	CAISO Response
	candidates that can provide multiple benefits should be considered as "least regrets" transmission solutions. Investment decisions for these least regrets transmission solutions should be made in a timely manner to ensure projects can be built to meet state policy goals.	

9. North Gila Imperial Valley #2, LLC (NGIV2) Submitted by: Brenda Prokop		
No	Comment Submitted	CAISO Response
9a	Comments on Draft TPP Study Plan NGIV2, LLC has previously expressed concerns that applying the 2000 MW net export limit from California in the CAISO's economic analysis results in unrealistic dispatch scenarios in the production cost models. This mismatch limits the usefulness of the economic studies in quantifying potential project benefits under likely system and operational conditions, and calls their results into question. As discussed further below, the economic study request we are submitting requests that the CAISO eliminate the net export limit in its economic analysis of the NGIV2 project. However, we respectfully suggest that the CAISO reconsider application of the net export limit within its economic studies more generally. The CAISO's stated focus for the 2019-20 Transmission Plan will be the internal California transmission system, and as such, the CAISO has indicated that it does not plan to perform any interregional transmission system analyses. However, NGIV2, LLC respectfully requests that the CAISO consider performing an evaluation of the neighboring systems east and northeast of the West of River Path to assess the feasibility of delivering the output of renewable resources from the rest of the western U.S. to the CAISO region. In the Southern CA portfolio reliability assessment performed as part of the Policy-Driven Need Assessment in the 2018-19 Transmission Plan, severe transmission constraints were observed in the Southern Nevada, Eldorado and Mountain Pass areas and additional constraints further east are likely. The evaluation recommended herein, which would complement the study performed for the Northwest area in the 2018-19 TPP, could identify needs and appropriate solutions that may be placed in service in time to enable renewable resources to contribute to meeting California's increasing RPS requirements at a lower cost than limiting the amount of exports in order to prioritize in-state resources. Benefits from increased California access to non-California renewable resources could also result in direct savings to participants in the Western Energy Imbalance Market.	Clarification on the 2000 MW export limit being utilized in the ISO's planning process is provided in the response to question 5c. The southern Nevada, Eldorado and Mountain Pass areas will be studied in the 2019-2020 TPP. Regarding out of state analysis, please refer to the response to 1a.

10. Natural Resources Defense Council (NRDC) Submitted by: Julia Prochnik		
No	Comment Submitted	CAISO Response
10a	NRDC would like the CAISO to explore the 2000 MW net export limit. At the recent FERC Order 1000 Interregional meeting in Salt Lake City, there was discussion among stakeholders on how the CAISO and other FERC 1000 regions modeled export limits. CAISO has a 2000 MW restriction, while the other regions did not place this limit and discovered different findings. NRDC would like to see the CAISO dig into the data and model limitations. This limitation could be reducing benefits and driving up renewable curtailment in the region. Eliminating the export limit can result in a reduction in renewable resource curtailment and possible decreases in congestion in the CAISO footprint, which will create economic, reliability and public policy benefits to California. NRDC looks forward to working with CAISO and CPUC to re-evaluate the export limitations.	Clarification on the 2000 MW export limit being utilized in the ISO's planning process is provided in response to question 5c. This clarification has also been posted on the ISO's Interregional Transmission Coordination web page.

11. Public Advocate Office Submitted by: Kanya Dorland		
No	Comment Submitted	CAISO Response
11a	1. <u>The CAISO Should Provide the General Assumptions for Energy Storage for the TPP Study Plan</u> In the Draft 2019-2020 TPP Unified Planning Assumptions and Study Plan (TPP Study Plan), the CAISO provides information on assumed resource adequacy capacity and charging speed for energy storage in its discussion on energy storage.1 However, the CAISO did not provide information on the assumptions it will use to determine energy storage costs; and it did not identify the specific performance characteristics it will employ to evaluate energy storage for grid reliability solutions in this 2019-2020 TPP cycle. In its comments on the 2018-2019 CAISO Transmission Plan, the Public Advocates Office recommended that the CAISO provide, at the beginning of a given TPP cycle, the energy storage assumptions that the CAISO will use to evaluate options to mitigate grid reliability issues. Specifically, the Public Advocates Office requested that the CAISO provide its assumptions on "capital and maintenance costs, discharging capacity, charging speed, applicable storage technologies, anticipated charging source(s) and lifecycle time frame"2 for energy storage. Therefore, the Public Advocates Office recommends that the CAISO provide its assumptions for determining energy storage costs and performance in comparison to wire solutions for grid reliability for the 2019-2020 TPP cycle and in the 2019-2020 TPP Study Plan. These assumptions should illustrate the method that will be used to compare solutions with different life expectancies as energy storage can have a different life expectancy based on the energy storage technology selected3 than a transmission wire solution.	The CAISO evaluated several storage alternatives in the 2018-2019 TPP report and documented the assumptions in the section for each of the alternatives in Chapter 4 of the report. This documented information will be considered in the analysis of any storage alternatives in the 2019-2020 TPP analysis.
11b	2. <u>The CAISO Should Provide the Operating Assumptions for Energy Storage Reliability Solutions</u> The Public Advocates Office recommends that when the CAISO identifies energy storage as a possible solution for mitigating grid reliability issues and/or for replacing gas fired generation, the CAISO provide information on the assumed energy storage operator, charging source, energy storage operation, and likely energy storage lifecycle. This additional information would assist with facilitating comparisons of energy storage solutions with other proposed solutions.	Please refer to the response to 11a.

No	Comment Submitted	CAISO Response
11c	3. <u>The CAISO Should Provide the Valuation Assumptions for Energy Storage</u> The CAISO should clarify if the potential to repurpose or refurbish lithium-ion battery energy storage after its expected 10-plus year life for reuse is considered in CAISO's energy storage valuation analysis.	As shown in the 2018-2019 TPP analysis described above, the ISO utilized levelized fixed cost data which included costs such as "periodic upgrades needed to maintain DC equipment capacity, amortized as a time series of equipment upgrade expenses needed to maintain the original energy storage capacity for the lifetime of the project"

12. The Nevada Hydro Company, Inc. (Nevada Hydro) Submitted by: David Kates		
No	Comment Submitted	CAISO Response
12a	1.0. The CAISO Tariff requires that LEAPS be treated as a transmission asset The Tariff § 24.3.3(a) provides an opportunity for stakeholder comment on the draft Plan to address three things: (1) demand response programs for inclusion in the base case, (2) generation and other non-transmission alternatives for consideration, and (3) Federal, state and local public policy requirements to be included in the plan. Tariff § 24.3.2 identify that the minimum requirements for the Plan include: (1) a description of the computer models, assumptions and criteria to be used in technical studies, (2) a list of each technical study to be performed, and (3) a description of the modifications to the planning data and assumptions to be included in the Plan. Importantly, Tariff §§ 24.3.1(g) and 24.3.2(i) identify that the Plan must address "[p]olicy requirements and directives, as appropriate, including programs initiated by state, federal, municipal and county regulatory agencies." As explained herein, to satisfy the Federal policy compliance requirement in the Tariff, CAISO's Plan must address the Federal policy implemented through an act of Congress to treat pumped hydroelectric storage as an "advanced transmission technology" under the Energy Policy Act of 2005, and must comply with the Federal Energy Regulatory Commission's ("FERC") policy directive providing for the treatment of electric storage as wholesale transmission facilities for planning and cost recovery purposes under the Tariff. CAISO should include a sensitivity case in its Plan that treats electric storage as an "alternative" to electric transmission for non-pumped hydroelectric storage facilities and projects that do not otherwise seek to qualify as wholesale transmission under FERC's storage policy. The CAISO's planning assumptions, inputs to the Plan and quantifications of benefits should build upon the CAISO's studies and study sensitivities conducted as part of the 2016-2017 transmission planning cycle by applying a complete Transmission Economic Assessment Methodology (TEAM) analysis to electric storage included as a transmission or transmission alternative.1 CAISO must apply all five TEAM cost-benefit categories and quantify the benefits of each. The Plan should further adapt the "CAISO Planning Standards" (as defined in the Tariff) to address the serious grid reliability and resiliency challenges that CAISO has identified in prior	FERC has recognized that storage facilities can be transmission facilities. Storage facilities can also be treated as generation or non-transmission alternatives. As indicated above, FERC has recognized that storage facilities can be transmission facilities. The CAISO has studied, and does study, storage facilities as transmission facilities in the transmission planning process. All provisions of CAISO tariff section 24 would apply to the LEAPS project. Consistent with Order No. 1000 and the CAISO tariff, for the CAISO to approve a transmission solution in the annual transmission plan, it must be the more cost-effective or efficient solution to meet a tariff-specified need identified by the CAISO in the planning process. Under the CAISO tariff, approved regional transmission solutions that are not upgrades to existing facilities are subject to the CAISO's competitive solicitation process.

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	transmission planning studies and its recent comments to FERC in the Grid Resiliency docket (AD18-7-000) respecting the growing prevalence of non-dispatchable renewable energy resources under California's 50% renewable portfolio standard ("RPS"), coupled with retirements and curtailments of baseload nuclear generating plants and fast-ramping natural gas fired generating resources due to retirements and natural gas supply constraints. Finally, to comply with the Federal Power Act's prohibition against unduly discriminatory rates, terms and conditions, and FERC's implementation of that law through FERC Order 1000's transparency and comparability standards and the CAISO's Tariff (e.g., Tariff § 24.3.3(e)), CAISO must provide a complete explanation to support the planning criteria and assumptions that it adopts in the Plan, and must provide a complete explanation of all the reasons for the selection or rejection of particular transmission solutions or transmission alternatives at the conclusion of the study process (e.g., one that addresses each element of the TEAM analysis or other selection methodology such as NERC reliability criteria violations and "least regrets" planning for policy upgrades). The CAISO has advised the CPUC through both letters and pleadings that large scale pumped storage is needed to protect California from the potential harm that could result from the existing impacts of the current 50% RPS requirement. And, the CAISO recently informed FERC in its comments on grid resiliency that California's RPS requirement is "likely" to increase. The CAISO planning assumptions must address LEAPS ability to address the existing need for large scale pumped storage as well as the likely future need.	
	2.0. The LEAPS Project LEAPS is identical in size, operating characteristics and location to the large scale pumped storage facility that CAISO has studied over the last several years. It is a proposed $2 billion pumped hydroelectric storage transmission infrastructure facility with a planned power production capacity of 500 MW and a pumping capacity of 600 MW. It will be located in Riverside County California at Lake Elsinore, which will serve as the lower reservoir for the LEAPS facility. It will include two new 500 kV interconnecting transmission lines, two new 500 kV substations, three new 500/230 kV transformers, three new phase shifting transformers, and one new 230 kV transmission line. These facilities will be	Please refer to the above comments.

No	Comment Submitted	CAISO Response
	located approximately midway between Los Angeles and San Diego at Lake Elsinore, California, and will link the transmission systems of San Diego Gas & Electric Company ("SDG&E") and Southern California Edison Company ("SCE"), thereby helping to relieve two of the largest transmission bottlenecks in California. The total energy storage available will be approximately 6,000 MWh per day, potentially allowing for 12 hours of generation at the full plant generating capacity of 500 MW. Nevada Hydro has filed a hydroelectric license application with the Federal Energy Regulatory Commission ("FERC") for LEAPS that is currently pending in Docket No. P-14227-003. The CAISO has recognized in its own analyses the potential benefits of adding 500 MW of pumped storage hydroelectric capability to southern California, a number of grid support services a facility identical to LEAPS can provide. These services include reactive power (i.e., VAR) support, load and generation balancing services (i.e., regulation-up and regulation-down services), moment-to-moment load following service, spinning reserve service and black start service. LEAPS will be able to switch from providing one service to another almost instantaneously. Other grid support services that CAISO has recognized pumped storage facilities like LEAPS can provide include: • Renewable generation integration (i.e., balancing variability and over-generation) Frequency regulation • Power system stability • Load following • Contingency reserves • Inertial response • Cycling and ramping protection of thermal generation • Relieving transmission congestion These services are all becoming increasingly critical as California continues to transition to its ambitious 50% (or more) renewable energy goal while at the same time retiring fossil-fueled and nuclear generating resources historically relied upon to maintain a harmoniously functioning power grid. LEAPS is designed to: (1) be used by the CAISO to resolve transmission and system reliability issues when the system is under over-generation conditions,	

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	(2) maintain reliability when other transmission facilities are out of service for maintenance, and (3) provide grid resiliencies as the grid is relying more and more on intermittent resources. In such situations, LEAPS would automatically come on-line and would prevent NERC reliability violations, or any interruption of electricity service to customers, and LEAPS would be able to provide reliability services throughout the requisite peak hours and during over-generation hours. LEAPS will perform transmission and reliability functions by providing the voltage control support or load reduction needed for the operation of the transmission system when called to do so. In all, LEAPS will provide ten identifiable and quantifiable transmission reliability support services: 1. voltage support, 2. thermal overload protection, 3. frequency regulation, 4. load following, 5. balancing renewable generation, 6. ramping/regulation services, 7. black start service, 8. mitigation of transmission outages/contingency reserves, 9. inertial response, 10. relief of transmission congestion between major load pockets, and cycling/ramping protection of thermal generation. Through these services, LEAPS can be used to mitigate over-generation conditions, overloads, line trips, lines taken off line for maintenance, and voltage dips of affected transmission line segments on the CAISO transmission system.	
12b	3.0. The CAISO Unified Planning Assumptions Must Address Federal Policy to Treat Electric Storage like LEAPS as Transmission Facilities for Planning and Cost Recovery Purposes. Sections 1223 and 1241 of the Energy Policy Act of 20054 identifies pumped hydroelectric storage facilities as an "advanced transmission technology" to be encouraged for transmission reliability and efficiency purposes. FERC has found that LEAPS fits the statutory definition.5	Please refer to the above comments.

No	Comment Submitted	CAISO Response
	Moreover, FERC's Storage Policy Statement6 issued at the outset of CAISO's last transmission planning cycle in early 2017 treats electric storage as "wholesale transmission facilities" for transmission planning and cost recovery purposes, provided certain conditions are met. LEAPS has an application pending before FERC in Docket No. EL18-131-000 requesting a finding that it satisfies the Storage Policy Statement criteria. The Energy Policy Act of 2005 and the Storage Policy Statement establish "Federal policy" on the treatment of pumped hydroelectric storage for transmission planning and cost recovery purposes. Sections 24.3.1(g) and 24.3.2(i) of the CAISO Tariff require CAISO to account for Federal policy in its Plan, and section 24.3.3(e) requires CAISO to explain its reasons for not including any public policy requirement in its Plan. Therefore, to comply with its Tariff, CAISO's Plan must treat pumped hydroelectric storage facilities as electric transmission facilities or explain its reasons for failing to comply with Federal policy.	
12c	4.0. The Plan Should Expand Upon and Integrate the Assumptions and Sensitivities Included in its Prior Studies of Large-Scale Electric Storage During Previous Transmission Planning Cycles. Section 24.3.2 of the Tariff specifies that the Plan must include, among other things, "potential generation capacity additions and retirements, and transmission system modifications," and "[a] description of the computer models, methodology and other criteria used in each technical study performed in the Transmission Planning Process cycle." The 2016-2017 transmission plan included the results of an analysis of benefits of largescale pumped hydroelectric storage facilities.7 That study found that "new pumped storage resources brought significant benefits to the system, including reduced renewable energy curtailment . . . lower CO2 emissions, emission costs and production costs, and the flexibility to provide ancillary services and load-following and to help follow the morning and evening ramping processes." The CAISO performed sensitivities that it published on January 4, 2018, where it confirmed the initial findings.8 The CAISO has represented to the CPUC that its studies of large-scale storage demonstrate that:	Please refer to the above comments.

No	Comment Submitted	CAISO Response
	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 uses the TEAM analysis to assess the costs and benefits of transmission projects for selection in its TPP. TEAM examines five categories of benefits: (1) production cost savings, (2) capacity benefits through increased import capability into the CAISO balancing authority area, increased deliverability within CAISO, or relief of a known transmission constrained area within CAISO, (3) public policy benefits, such as the ability to lower the cost to integrate renewable energy resources, (4) the ability to relieve the over-supply and associated curtailment problems that arise from excess renewable energy production, and (5) reliability benefits and the ability to avoid other costly transmission upgrades. The analysis uses a full network computer simulation model, market prices for energy and ancillary services, an uncertainty analysis to account for the variability of input assumptions such as natural gas prices, and examines alternatives, such as adding generating facilities, to assess whether there are more economic means to achieve objectives. CAISO identified numerous grid benefits from large-scale storage facilities even though it omitted TEAM category 5 (reliability and avoided cost benefits), performed the analysis for just one year's benefits (2026) instead of a life cycle analysis, and having left out quantifications of the benefits for each category of the analysis. The affidavit of Mr. Ziad Alaywan, the President and Chief Executive Officer of transmission consulting firm of ZGlobal Inc., identifies specific assumptions and modeling necessary to complete the analysis of large-scale pumped storage in accordance with the TEAM methodology. In fact, Mr. Alaywan has completed the analysis himself using CAISIO software, assumptions and data inputs. Given that Mr. Alaywan has already completed most of the necessary work, the CAISO might focus on confirming Mr. Alaywan's results. The result of that exercise will demonstrate significantly greater grid benefits from large-scale storage than the CAISO has already found.	

No	Comment Submitted	CAISO Response
	In any event, the Plan must include an analysis of the benefits LEAPS will provide to the CAISO grid using its 2016-2017 studies as a starting point and incorporating the CAISO data inputs and assumptions that Mr. Alaywan has provided, consistent with the TEAM approach.	
12d	5.0. The Plan Should Specifically Evaluate the Grid Reliability and Resiliency Benefits of Large-Scale Pumped Storage 5.1. Reliability Benefits In its Draft 2018-2019 Transmission Planning Process Unified Planning Assumptions and Study Plan ("Study Plan"), the CAISO responded to Nevada Hydro with the suggestion that: *the proponent considers submitting the project in the 2018 Request Window specifying the ISO-identified reliability constraints the project could mitigate. The submission will also be considered as an economic study request.* This is a useful starting point, but Nevada Hydro submits that a narrow focus on relieving a specific reliability constraint is too narrow a definition of grid reliability that excludes reliability benefits that CAISO itself has identified in its large-scale storage studies. We note that section 24.2(a) of the Tariff contemplates that the Plan must maintain grid reliability in accordance with NERC criteria and CAISO Planning Standards, which the Tariff defines as "Reliability Criteria that: (1) address specifics not covered in the NERC and WECC planning standards; (2) provide interpretations of the NERC and WECC planning standards specific to the CAISO Controlled Grid; and (3) identify whether specific criteria should be adopted that are more stringent than the NERC and WECC planning standards." Given the numerous grid management and reliability challenges posed by California's 50% RPS standard, generating plant retirements and natural gas supply constraints identified by CAISO in past planning studies and reports to FERC and the CPUC, Nevada Hydro submits that "CAISO Planning Standards" as defined in the Tariff encompasses the essential service flexibility that only large-scale pumped hydroelectric storage facilities can provide. Moreover, as Mr. Alaywan's affidavit explains, LEAPS will provide other reliability benefits, including the addition of capacity to southern California's	Under tariff section 24.4.6.2, the CAISO determines the need for reliability driven solutions based on whether they are required to ensure System Reliability consistent with all Applicable Reliability Criteria and CAISO Planning Standards. The CAISO approves solutions to ensure satisfaction of CAISO Planning Standards based on the specific standards expressly set forth in the CAISO Planning Standards.

No	Comment Submitted	CAISO Response
	local capacity resource ("LCR") area, increased load following capability, frequency response service, black start service, inertia, and grid resiliency (discussed separately below)—meaning the ability to reduce recovery times from serious grid disturbances that otherwise might lead to blackouts such as that which occurred in September 2011 in Southern California. As LEAPS provides significant local capacity benefits to SDG&E area (as the CAISO's special study last year pointed out) Nevada Hydro suggests that the CAISO evaluate LEAPS as a solution to the SDG&E local capacity issue. This is particularly critical, as SDG&E recently announced that it was seeking roughly 150 MW of new battery storage to help it meet the reliability challenges attributable to the loss of Aliso Canyon. Nevada Hydro believes that the CAISO should include in its analysis the costs and benefits of LEAPS providing these same services in place of SDG&E's proposed battery proposal using its TEAM methodology.	
12e	5.2. Resiliency Benefits CAISO's recent lengthy response to FERC's questions about grid resiliency identify a number of challenges that are the subject of ongoing studies. FERC has proposed to define resiliency as "[t]he ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event." As Mr. Alaywan explains, the inertia provided by large-scale pumped storage resources like LEAPS can serve a critical role in supporting grid resiliency. LEAPS will provide several attributes of resiliency because of its ability to absorb excess energy, rapidly produce energy on demand, steady grid frequency disturbances, and provide black start service to assist with the rapid recovery of the grid from an outage event. The need for flexible fast-ramping resources like LEAPS with substantial mass has become particularly urgent in southern California where the 2,246 MW San Onofre nuclear plant with its massive 150-ton turbines has been taken out of service. Huntington Beach's 452-MVAR synchronous condenser is planned to be offline starting in 2018. Encina will lose 950 MW of gas-fired generation, Morro Bay's 650 MW gas plant was shut down in early 2014, and the Diablo Canyon 2,200 MW nuclear facility is scheduled to retire by 2026. These	Please refer to the above comments.

No	Comment Submitted	CAISO Response
	developments all significantly and adversely affect the frequency response capability of the power grid, thereby posing a threat to grid resiliency and ultimately its reliability. Mr. Alaywan provides several examples that illustrate how the transmission grid can benefit from resources with substantial rotating mass that can also respond quickly in the critical first few moments following a blackout such as the one that occurred in the Southwestern United States on September 8, 2011. In those critical moments the system requires large generating resources with the essential telecommunications and computer equipment coupled with a fast-reacting resource that operates under "automatic generation control" to help restore the grid to the harmony that exists when frequency is at (or very close to) 60 Hertz. Mr. Alaywan explains that "[i]f frequency deviation is not corrected in a few seconds, there is a risk for the grid to become unstable which leads to a catastrophic blackout." LEAPS will provide this essential resiliency service to southern California where the availability of rotating machines equipped with AGC is diminishing and is being replaced mainly by wind and solar (both rooftop and utility scale). Mr. Alaywan illustrates the grid resiliency benefits that LEAPS can provide through three studies. The first study simulated frequency response for a generic 500 MW solar photovoltaic facility located at Lake Elsinore compared to LEAPS during a single large contingency—the loss of the 500 kV Southwest Power Link transmission line, which serves as the major import path for SDG&E. Southwest Power Link is considered by CAISO to be one of the greatest threat contingencies for the area. The September 8, 2011 blackout in Southern California began when that transmission facility tripped off-line. Mr. Alaywan's first study shows that with LEAPS, the frequency would deviate 77% less compared to the system with a new 500 MW solar photovoltaic facility. Mr. Alaywan's second reliability study compared the frequency response pre- and post- LEAPS upon the loss of the same 500 kV Southwest Power Link transmission line for three existing generators in the SDG&E area: (1) a 500 MW solar photovoltaic facility connected to the Drew substation, (2) the 950 MW Encina combined cycle generating facility, and (3) the 45 MW El Cajon peaking gas turbines. As summarized in his Table 12, frequency excursions	

No	Comment Submitted	CAISO Response
	caused by the transmission line outage are 12% to 18% lower with LEAPS in service than without it. Also, with LEAPS, positive frequency deviation is 3% to 26% lower than without LEAPS. Importantly, with LEAPS the frequency settles at a value closer to the initial frequency and reaches the initial steady state more quickly. As a further illustration, Mr. Alaywan shows how LEAPS would help to stabilize the El Cajon power station from the loss of the Southwest Power Link line. His study shows the El Cajon gas turbine frequency dipped by 0.222 Hertz in the pre-LEAPS case, but in the post-LEAPS case its frequency dipped by just 0.192 Hertz or 14% less with LEAPS in-service, and the frequency of the natural gas generating plant stabilized in 8 seconds with LEAPS in service. Without LEAPS, El Cajon would take 20 seconds to stabilize. He found similar benefits for the Drew 500 MW photovoltaic generating station where the frequency dipped by 0.155 Hertz in the pre-LEAPS case, but just 0.136 Hz in the post-LEAPS case—a 12% improvement with 4% improved stabilization time. The frequency impact on the Ocotillo wind generation facility would also be lessened with improved stabilization time. All these examples of grid resiliency benefits underscore the critical relationship to reliability—faster recovery times equal reliability improvements that may avoid future blackouts.	
12f	6.0. CAISO's Plan Must Comply with FERC's Transparency and Comparability Principles. As CAISO is aware, FERC's transmission planning process places a premium on comparability and transparency. California Independent System Operator Corp., 143 FERC ¶ 61,057 (2013) ("The process used to produce the regional transmission plan must satisfy the following Order No. 890 transmission planning principles: (1) coordination; (2) openness; (3) transparency; (4) information exchange; (5) comparability; (6) dispute resolution; and (7) economic planning") (emphasis added). These principles are incorporated in CAISO's Tariff. Accordingly, Nevada Hydro anticipates that CAISO will fully explain its reasons for including, or not including, the Federal policy requirements, modeling methods, assumptions, and studies suggested in these comments. Likewise, CAISO must provide complete explanations giving its reasons for selecting or to	FERC has approved the CAISO's transmission planning process as meeting the requirements of Order Nos. 890 and 1000. That process provides for comparability and transparency.

No	Comment Submitted	CAISO Response
	declining to select LEAPS as offered into the 2018-2019 transmission planning process to address the reliability, public policy and economic transmission needs identified through that process and in this letter.	
12g	7.0. Conclusion The panoply of services LEAPS provides could be associated with a reliability, public policy or economic transmission upgrade. With LEAPS, all these services are provided by a single asset. CAISO's unified planning assumptions should identify reliability and resiliency issues that LEAPS can solve or mitigate, "least regrets" public policy transmission needs that LEAPS can satisfy—including the ability to reduce the amount of renewable generation that California will need to meet its 50% renewables portfolio target—and measure the value of LEAPS between the SDG&E and SCE load pockets to relieve congestion and provide other benefits using the CAISO's "Transmission Economic Assessment Method," or "TEAM" approach. The CAISO should also study the "resiliency" type reliability benefits that LEAPS can provide to address the challenges that CAISO faces as described in its March 9, 2018, report to FERC in its Grid Resiliency Comments.	The CAISO evaluates potential solutions to meet needs identified in the transmission planning process in accordance with the CAISO tariff.

13. TRANSWEST EXPRESS LLC Submitted by: David Smith		
No	Comment Submitted	CAISO Response
13a	Identification of Category 2 Transmission Solutions in the 2019-2020 TPP Transmission planning generally involves both the assessment of needs and the evaluation of transmission (or non-transmission) solutions to meet those needs. The Draft Study Plan should be revised to include a description of the TPP Phase 2 process to evaluate and identify Policy-Driven Category 2 transmission solutions. Section 24.4.6.6 (Policy-Driven Transmission Solutions) of the ISO Open Access Transmission Tariff ("OATT") outlines that "the CAISO shall evaluate transmission solutions needed to meet state … policy requirements or directives as specified in the Study Plan". The OATT also requires the ISO to "identify such policy-driven transmission solutions that that efficiently and effectively meet applicable policies under alternative resource location and integration assumptions and scenarios, while mitigating the risk of stranded investment." These planning steps are critical for both Category 1 and Category 2 transmission solutions. The CPUC's transmittal of Policy-Driven Sensitivity scenarios for the 2019-2018 TPP should result in the identification of the Category 2 (information-only) transmission solution to meet the (conditional) needs determined through analysis of the portfolios. Once identified, these Category 2 solutions can be further refined and the broader resource needs evaluated to potentially be considered as Category 1 solutions. Section 24.4.6.6 of the OATT outlines a number of criteria the ISO needs to consider to re-classify a Category 2 solution as a Category 1 solution. The CPUC and other stakeholders have a role in supporting the ISO either positively or negatively on many of these criteria. The identification of a Category 2 transmission solution would help all stakeholders in supporting the ISO in their consideration of these criteria. The Policy-Driven Sensitivity Case C scenario includes a portfolio with 2,000 MW of Wyoming wind and 2,250 MW of New Mexico wind placed in service by 2026. The CPUC has determined that development of these wind resource areas would require the construction of one or more major multi-state transmission projects, involving hundreds of miles of construction. The	As indicated at the February 28 CAISO stakeholder meeting and reiterated by the CPUC on their IRP call on February 28, the analysis of the out of state sensitivity portfolios will focus on the transmission needs from the point of the interconnection to the CAISO controlled grid to assess the transmission needs within the CAISO system. Please refer to the response to 1a above.

No	Comment Submitted	CAISO Response
	construction of such transmission projects and the construction and integration of this scale of wind energy resources will take four to five years. Backing up the schedule from the 2026 in-service date would require the construction of the transmission to start by 2021. This would require CAISO Board approval of the Category 1 Transmission Solution(s) following the 2020-2021 TPP. Attached to these comments is a Gantt chart schedule outlining the various steps required to realize the Case C scenario. If approval of one or more transmission solutions following the 2020-2021 TPP is required to meet this schedule, it would be prudent to identify the Category 2 transmission in the 2018-2019 TPP. This would allow for thoughtful and well informed consideration of the following items throughout 2020: a. stakeholder review and feedback, b. transmission solution refinement (e.g. staging etc.), c. LSE IRP and procurement planning and potential execution of PPAs d. consideration of alternative transmission models (e.g. capacity/cost allocation with non-ISO transmission owners, etc.), and e. consideration of alternative resource areas (if not feasible or cost effective),	
13b	Potential Transmission Solutions There are a limited number of proposed transmission projects that could be placed in service to meet the 2026 timeline. The 2016 RETI 2.0 Final Report identified six advanced development projects, four that could provide additional transmission capacity to access Wyoming wind resource areas and two that are focused on New Mexico resources. The TWE Project, SWIP-North Project, Gateway South Project and Gateway West Project are the four projects associated with the Wyoming resource area. Both the TWE Project and SWIP-North Projects have been submitted to the ISO, the Northern Tier Transmission Group ("NTTG") and West Connect as Interregional Transmission Project ("ITP") proposals. As outlined previously, the ISO did not evaluate the TWE or SWIP-North Projects in the 2018-2019 TPP. The 2019-2020 TPP Policy-Driven Sensitivity	Please see response to 13a above.

No	Comment Submitted	CAISO Response
	Case C scenario will allow the ISO to proceed with the evaluation of these Projects in the 2019-2020 TPP.	
13c	Interregional Coordination NTTG performed analysis of the TWE and SWIP-North Projects in their 2018-2019 planning cycle. The NTTG 2018-2019 Draft Regional Transmission Plan10 ("NTTG Draft Plan") outlines that none of the ITPs meet NTTG's Regional Needs. Therefore, capacity and cost sharing between NTTG and the ISO on these ITPs is not likely. NTTG's 2018 analysis included various combinations of the Gateway Projects and the ITPs, using power system models the include bus bar allocations and accurate connectivity between the various projects, the existing system and the wind resource developments. The ISO should use this information to inform the 2019-2020 TPP. WestConnect has yet to identify Regional Needs in any of their planning cycles. It is not likely that capacity or cost allocation between the ISO and WestConnect will be facilitated through WestConnect. The ISO may want to consider the plans of an in-state neighbor, the Los Angeles Department of Water and Power ("LADWP"), and how these plans may support the potential transmission solutions to access the Wyoming wind resources. TransWest submitted an alternative TWE AC and DC Project configuration during the 2018-2019 ITP submittal period to the ISO, NTTG, and WestConnect. This alternative configuration of the TWE Project is designed to utilize capacity on the existing 2,400 MW Intermountain Power Project's Southern Transmission System. The TWE AC and DC Project would be the lowest cost transmission solution to meet a portion of the combined needs of the ISO and the LADWP. Alternatively, the CAISO may want to first consider the 730 mile TWE DC Project configuration in the 2019-2020 TPP as a Regional Solution. This would be the lowest cost Regional transmission solution to access Wyoming wind.	Please refer to response to 13a above. The 2019-2020 TPP will utilize the most current version of the 2028 ADS production cost data set as the starting point. While the ISO will update the ISO's system representation to be consistent with its study plan, representation for systems outside of the ISO's system will be as modeled in the ADS. Please refer to response 13a above.

14. Wellhead Electric Company Submitted by: Grant McDaniel		
No	Comment Submitted	CAISO Response
14a	Wellhead Electric Company ("Wellhead") appreciates this opportunity to provide these brief comments on the CAISO's Draft Study Plan for the 2019-2020 Transmission Planning Process. Wellhead would like to take this opportunity to commend the CAISO staff on it's continued evaluation of reliability concerns as the resource fleet evolves towards 2030 and beyond. Key to the reliability studies is the treatment of gas-fired resources – specifically assumptions around retirement. As the CAISO's gas-fired retirement study presented within the 2018-2019 TPP cycle showed, there are concerns regarding capacity shortfalls with the assumption that gas-fired resources will retire at 40 years. Given this reasonable assumption, Wellhead strongly encourages the CAISO to continue its efforts in evaluating reliability issues and providing insightful information as to the most effective resource types that can address the issues while helping the California meet its renewable and GHG goals. Wellhead understands that the CAISO is not planning on conducting any additional special studies within the 2019-2020 TPP other than assessing the remaining LCR areas for alternatives to gas-fired generation. However, Wellhead believes that further elaboration on the 40-year gas fired retirement scenario from the 2018-2019 TPP would be of continued use. The study results note a set of resource types that would not be effective in addressing the capacity shortfalls1, but is not clear on what resource types (or characteristics) would be most effective; thus, Wellhead strongly encourages the CAISO to clearly define what type of resources, or resource characteristics, will be most effective in relieving the capacity shortfalls that occurred in its studies, ideally within this TPP cycle or, at a minimum, another transparent stakeholder process. Lastly, Wellhead also asks that within the LCR assessment studies scheduled to take place within the 2019-202 TPP cycle, the CAISO consider hybridization as an alternative to gas-fired resources. While hybridizing gas-fired resources does not completely replace them, it does make them "greener" by enhancing operating attributes such as operating range, speed, gas burn, and flexibility. Hybrid modifications allow current resources to meet higher reliability requirements while further reducing GHG emissions. Even using just one LCR	The ISO will update the relevant studies again in the 2019-2020 planning process if it aligns with IRP-related analysis. For clarity, the footnote referred to in the draft transmission plan stated *"If 1,077 MW effective capacity of other types of new resources, such as renewable, except solar, storage, demand response, and AAEE are added, all 3,277 MW gas-fired generation resources that are 40 years or older could be retired without causing reliability problems"*. The reference to "except solar" was meant to apply only to renewables. Storage, demand response, and AAEE would all suffice. The footnote perhaps should have been worded ""*If 1,077 MW effective capacity of other types of new resources, such as storage, demand response, AAEE, and renewable generation other than solar are added, all 3,277 MW gas-fired generation resources that are 40 years or older could be retired without causing reliability problems".* The ISO will consider how to explore the benefits of hybridizing gas-fired resources in the transmission planning process.

No	Comment Submitted	CAISO Response
	area would be informative as it may illustrate the potential benefits from a reliability and economic standpoint of using hybridization as a way to effectively and reliably transition towards the states' ambitious GHG and renewable goals. Wellhead looks forward to continuing to engage with the CAISO on this topic and is more than willing to provide additional information necessary to further evaluate hybridizing existing gas-fired resources.	

15. Westlands Solar Park Submitted by: Daniel Kim		
No	Comment Submitted	CAISO Response
15a	The Westlands Solar Park (WSP) appreciates this opportunity to provide these preliminary comments on the California Independent System Operator's (CAISO) Transmission Planning Process (TPP) draft Study Plan (Study Plan). WSP recognizes that the TPP is a critically important and required annual undertaking by the CAISO, not only to meet requirements as a transmission planning authority but also to ensure that the required infrastructure is being identified and planned to meet California's clean energy policy goals. WSP also understands that a significant portion of the key inputs into the Study Plan are supplied to the CAISO by various third party and regulatory bodies such as the demand forecast from the California Energy Commission (CEC), the resource portfolios from the California Public Utilities Commission (CPUC), and various system data from the CAISO's participating transmission owners (PTOs) and neighboring systems. These key inputs are a critical component to the TPP study plan but should not be the only inputs considered by the CAISO. Rather, we strongly encourage the CAISO to also consider and be guided by actual market developments and what is occurring within its own generator interconnection queue. As the CAISO is aware WSP has hundreds of megawatts of active projects in the CAISO queue that are on track to achieve commercial operation in the next two years. WSP is committed to fully developing these projects and we believe that the California energy market will support the successful build-out of our projects along with other renewable projects currently in the CAISO's queue in the San Joaquin Valley and the Westlands competitive renewable energy zone (CREZ). We all recognize that the California energy market is changing dramatically, and the 'old' inputs will not reflect the reality of the future energy market next year let alone in the 10- year planning horizon of the TPP. We are also confident that the CPUC resource portfolio data set will not accurately reflect where and when renewables will be built to serve California consumers. The CPUC's IRP data set(s) have zero or very limited buildout of the Westlands	The ISO does not consider the generation interconnection queue to provide a standalone basis for developing renewable generation portfolios given the large volumes of generation – generally many times the requirement necessary to achieve state policy goals and RPS requirements. Accordingly, the ISO is committed to supporting the portfolio development process conducted by the CPUC and CEC.

No	Comment Submitted	CAISO Response
	CREZ. There are likely several reasons for this, but they do not match with the reality of the market or of what the CAISO knows is occurring via the generator queue and project interconnection process. In fact, WSP is in power purchase agreement (PPA) negotiations with several parties that are within the CAISO balancing authority area (BAA) planning region. These potential PPAs include load serving entities (LSEs) that are required to file integrated resource plans (IRPs) with the CPUC (such as community choice aggregators and direct access provides) as well as LSEs that are not subject to CPUC jurisdiction but are within the CAISO BAA planning region. We believe that it is important that the CAISO consider the potential RPS requirements as required under SB 350 and most recently SB 100 and renewable procurement plans for all LSEs that are within its planning region and not rely exclusively on the data sets from the CPUC. Additionally, there are several new and emerging CCAs that are expected to be operational well within the 10-year planning horizon of the 2019-2020 TPP, that have not yet filed IRPs with the CPUC, or have acknowledged are not final versions. These 'unknowns' coupled with the emerging market of commercial and industrial customers entering into virtual PPAs for renewable supply will support a build-out that could look significantly different than the portfolios provided by the CPUC. While we would not expect the CPUC to necessary speculate where non-jurisdictional entities, emerging CCAs and C&I customers would purchase renewable project from because they lack necessary insights to make certain assumptions, the CAISO has those insights via the generator interconnection queue. In addition to WSP, there are numerous additional projects in the CAISO queue in the San Joaquin Valley. Solar projects in this region are beginning to have commercial success within the California market. Existing and emerging federal, state and local policies support the development of significant renewable projects in the Westlands CREZ. We respectfully request that the CAISO, at a minimum, perform a sensitivity analysis for at least 2000+ MW additional build-out of the Westlands CREZs. Failure to perform this type of a sensitivity analysis would be to neglect an important function that the CAISO as a planning authority should consider and	

No	Comment Submitted	CAISO Response
	evaluate and is not aligned with emerging market realities and evolving federal, California and local policies regarding land use, water use, disadvantaged communities, and renewable development.	

ECONOMIC STUDY REQUESTS

E1 GridLiance Submitted by: Tim Hemig		
No	Comment Submitted	CAISO Response
E1 a	In the 2017-18 CPUC portfolio, the 3,006 MW that was mapped to Southern NV had more generation mapped to the GridLiance (GLW) and Valley Electric Association (VEA) service territory. In this year's CPUC portfolio, most of the Southern Nevada portfolio is mapped to Eldorado (specifically, 2,304 MW). According to the 2019 IRP Portfolio Allocations to Substations, the CPUC has indicated that the 2,304 MW allocation "likely exceeds the amount of solar development that would occur near El Dorado." There are significant land availability limitations and physical constraints that severely limit how much generation can be sited in that area and, therefore, economically interconnected to the Eldorado 500 kV substation. There are constructability problems for new transmission (including generation interconnection facilities) near the Eldorado Substation. There are many high voltage transmission lines traversing the Eldorado Valley. Any new construction would require potentially dozens of line crossings—this increases costs and raises other concerns that should be considered. Constructing long transmission lines in the corridors to reach the Eldorado 500 kV Substation from areas where land is available will significantly increase the cost of generation and ultimately the cost of renewable resources to serve California ratepayers. Based on the presented information, GridLiance requests CAISO to revisit the CPUC renewable portfolio with a greater amount of solar generation allocated to the GLW/VEA service area. GLW fears California will lose a clear opportunity to access the low-cost renewable resources available in the other parts of Southern Nevada. GLW conducted its own analysis with a larger portion of the 3,006 MW solar generation mapped to the GLW/VEA service area in Southern Nevada. GridLiance requests that the CAISO, as part of its 2019-20 TPP, conduct a detailed study of the need for transmission upgrades on its system as a result of the modification to the CPUC's renewable portfolio. There is compelling evidence to suggest that the additional generation added on the GridLiance system in Southern Nevada would trigger the need for significant upgrades.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year. The portfolio development process is administered by the CPUC in an open proceeding. The CAISO TPP process is not the proper forum for changing the renewable portfolios.

No	Comment Submitted	CAISO Response
	Performing transmission upgrades to the system would provide long-term benefits to users of the CAISO system. 2018-19 TPP Analysis using 2017-18 CPUC Portfolio GridLiance West has identified transmission upgrades that, based on the CPUC's renewable portfolios, will (1) enable CAISO-connected renewable generation in Southern Nevada to meet California carbon goals, (2) result in annual savings of $54 million for CAISO customers assuming 1,512 MW mapped as described below, (3) mitigate thermal overloading, (4) improve reliability, and (5) improve the resiliency of the system. Our analysis shows the clear benefits of these projects based on the CPUC's portfolios that include 1,134 MW, 1,512 MW, and 3,006 MW of renewable generation in Southern Nevada. In addition, these solutions are all upgrades to existing facilities—this means significantly lower risk in implementation. GridLiance modeled the renewable portfolios in accordance with the following assumed siting taken from the 2017-18 CPUC renewable portfolio in southern Nevada. The 1,512 MW scenario was interpolated from the 1,134 MW and 3,006 MW portfolios.	

Southern Nevada substations	*MW mapped*	*MW mapped*	*MW mapped*
Innovation 230 kV (GLW)	373	497	989
Desert View 230 kV (GLW)	168	224	445
Eldorado 230 kV (SCE)	123	164	326
Crazy Eyes 230 kV (GLW)	270	360	716
Gamebird 230 kV (GLW)	200	267	530
Total	**1134**	**1512**	**3006**

As CAISO continues the important work of planning for the state's 2030 objectives, we are confident these projects should be a part of reaching the state's goals. We propose the following:

1. Pahrump – Sloan Canyon: Upgrade the existing Pahrump – Sloan Canyon 230 kV line to 926/1195 normal/emergency rating and connect to Carpenter Canyon and Trout Canyon.
2. Innovation – Desert View: Upgrade the existing Innovation – Desert View 230 kV line to 926/1195 normal/emergency rating and add second circuit at same rating.

No	Comment Submitted	CAISO Response
	3. Desert View – Northwest: Add a second 230 kV circuit Desert View – Northwest at 926/1195 normal/emergency rating. 4. Pahrump – Innovation: Upgrade Pahrump – Innovation 230 kV to 926/1195 normal/emergency rating. In its evaluation of the CPUC's various renewable portfolio scenarios in southern Nevada for the 2018-19 TPP, GridLiance also developed a 2030 UPLAN Production Cost Model (PCM) with and without the proposed projects listed above. Our analysis indicates that the solution we propose (estimated to cost approximately $170 million) will provide important cost-effective reliability and economic benefits that address the future needs of the system. Conclusion This transmission solution set will resolve issues and support the development of cost-effective renewable generation for much more than 702 MW in the GLW/VEA area. GridLiance requests CAISO's consideration in studying the economic and policy benefits of the submitted solution in the 2019-20 TPP. We are therefore submitting this Economic Study Request for consideration in the 2019-20 TPP.	

E2 Idaho Power Submitted by: David M. Angell		
No	Comment Submitted	CAISO Response
17a	Idaho Power appreciates the opportunity to submit an economic planning study into the 2019-2020 CAISO Transmission Planning Process. The permitting partners of the Boardman to Hemingway 500 kV transmission project (B2H), Bonneville Power Administration, PacifiCorp, and Idaho Power, have completed extensive study work on the B2H project, and believe the project has potential to provide substantial benefits to the western interconnection. A few of the benefits of interest to CAISO are: 1) Increased COI capacity due to the B2H parallel path, 2) Reduced CAISO reactive burden, specifically reduced need for a Round Mountain SVC, 3) Decrease greenhouse gas emissions, and 4) Additional geographically diverse capacity path between the Pacific Northwest, PacifiCorp, Idaho Power and California. Thus, the permitting partners are submitting this economic planning study request with additional supporting details in the attached overview. Idaho Power, and the B2H permitting partners, look forward to working with the CAISO to further explore these and any other potential benefits.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.

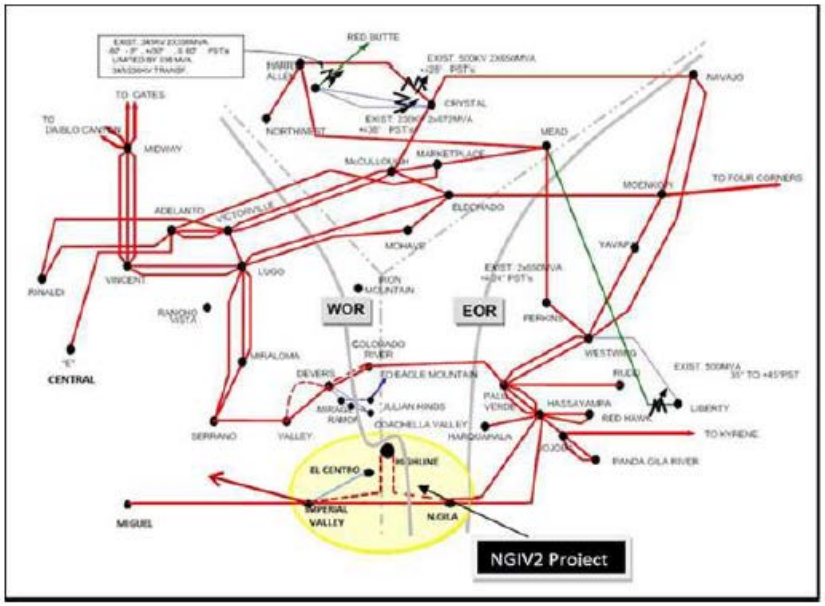
E3 LS Power Submitted by: Sandeep Arora		
No	Comment Submitted	CAISO Response
17a	Economic Study Request & Economic Project Submission LS Power is hereby submitting an economic study request to CAISO for the 2019/20 Transmission Plan. The request is to study Day Ahead scheduling congestion at CAISO's intertie interfaces with the Pacific Northwest, namely the California Oregon Intertie (COI), Pacific AC Intertie (PACI) and Nevada-Oregon Border (NOB). In addition to this request, LS Power is also hereby submitting its Southwest Intertie Project North (SWIP-North) as an Economic project, to be modelled as a 1000 MW path of new transmission capacity between Idaho Power (Midpoint) and CAISO (Harry Allen1), free of any wheeling charges. As a parallel path to existing major CAISO interties; COI, PACI, and NOB, SWIP-North provides an alternate path for economic energy from the Pacific Northwest into California, in addition to providing policy benefits for reducing GHG emissions and accessing out-of-state renewables. For the past four planning cycles, LS Power has registered its concern that CAISO's economic studies performed for the Transmission Planning Process (TPP) consistently fail to capture the tens to hundreds of million $'s in annual congestion costs along the PACI and NOB interfaces, and therefore the TPP consistently fails to identify economic benefits of the SWIP-North project. Since 2011, actual PACI and NOB congestion per CAISO DMM reports has been in the range of $50 mm to $145 mm per year. This contrasts with the less than $1mm of annual congestion predicted in CAISO planning studies for the COI path2. Rather than rehashing our recommendations in detail similar to comments we have previously submitted, we are providing a brief summary of our recommendations on these issues below. Details on these recommendations can be found within comments LS Power previously filed for 2018/19 Draft Study Plan3 and for 2018/19 Draft Transmission Plan.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.
	Rather than rehashing our recommendations in detail similar to comments we have previously submitted, we are providing a brief summary of our recommendations on these issues below. Details on these recommendations	The CAISO has received the economic study request and included in into the 2019-2020 transmission planning process study plan for consideration. The final selection of economic study requests that will

No	Comment Submitted	CAISO Response
	can be found within comments LS Power previously filed for 2018/19 Draft Study Plan3 and for 2018/19 Draft Transmission Plan. (1) CAISO should provide a timeline by when it expects to conclude whether additional transmission capacity on existing PACI, NOB transmission paths can be made available in the Day Ahead market. This work was taken up by CAISO in the 2018/19 TPP; however there is no information on when CAISO expects to complete it. (2) CAISO's congestion analysis for PACI, NOB, COI paths needs to take a completely different approach this year. CAISO should also study and quantify financial congestion on these paths in addition to physical congestion that it has been quantifying over the last few planning cycles. (3) CAISO should investigate whether its Production cost simulation tool is suitable for capturing financial congestion. CAISO should investigate improving its existing tool or should make use of a different tool so it can correctly capture financial congestion. (4) For the SWIP-North economic study, CAISO should calculate all benefits of a 1000 MW transmission capacity from Midpoint to Harry Allen, free of any wheeling charges. In prior planning cycles, CAISO has only quantified production cost savings but in the 2019/20 TPP CAISO should capture these additional benefits to CAISO ratepayers: (a) Financial benefits of improving Day Ahead scheduling capability and thereby alleviating existing Day Ahead financial congestion that is common place for CAISO's PACI, COI, NOB paths (b) GHG reductions and associated savings to CAISO (c) Load Diversity & Flexible Reserve Capacity savings (d) Renewable Capital cost savings. A project such as SWIP-North improves transfer capabilities in/out of CAISO from several neighboring Balancing Authority Areas (BAAs) and hence will provide these benefits. These benefits are typically not captured as part of the TEAM methodology that CAISO uses for its production cost simulation studies. CAISO should conduct separate analyses to quantify these additional benefits. (5) For the SWIP-North economic study CAISO should ensure that the existing transmission path from Robinson Summit to Harry Allen ("ON Line") is limited to 1000 MW in the base case and is increased to 2000 MW only in the case with SWIP-North. As described below, SWIP-North will not only	be evaluated in the 2019-2020 transmission planning cycle will be made later in the year. The comments below will be addressed as we assess the economic study request as a part of the 2019-2020 transmission planning processes based upon the preliminary economic assessment. In regards to the additional transmission capacity on the existing PACI, NOB transmission paths, the CAISO has provided an update in the CAISO response to comments posted on the February 14, 2019 stakeholder meeting on the Draft 2018-2019 Transmission Plan.

No	Comment Submitted	CAISO Response
	create a new 2000 MW path from Midpoint to Robinson Summit but a few terminal upgrades associated with the entire build out of SWIP will also increase transmission capacity of ON Line from 1000 to 2000 MW. A total of 1000 MW of transmission capacity from Midpoint to Harry Allen is offered for CAISO use as part of this economic study request. This will effectively move CAISO's BAA boundary station to Midpoint. (6) LS Power is aware of other out of state transmission projects that are in development. A few of these projects, such as Boardman to Hemingway and Gateway West, compliment benefits of SWIP-North. While CAISO may choose to study a few scenarios that combine SWIP-North with one or more of these projects, this Economic Study requests evaluation of SWIP-North as a standalone project.	

E4 NextEra Energy Resources (NEER) Submitted by: Francis Wang and Jason Schmidt		
No	Comment Submitted	CAISO Response
17a	Study Request NEER is requesting an economic, reliability and public policy study for the 2019/20 Transmission plan cycle. The request is to study a 500 kV transmission line from Mira Loma to Red Bluff. Project Description • New ~140 mile 500 kV transmission line between the Red Bluff 500 kV substation and Mira Loma 500 kV substation (Line ratings: 3,421 MVA Normal, 3,880 MVA Emergency). • 50% Series Compensation with an optimal location in the line to be determined from further studies (Line ratings: 3,291 MVA Summer Normal, 3,949 MVA Summer Emergency). • Estimated capital cost $850 million. Summary of Benefits The Red-Bluff to Mira Loma project is long-term multi-value project which addresses reliability, economic and policy considerations, including the following: • Economic Load and System Production Cost Savings • Capacity Deferral Savings • Relieve Constraints for interconnecting new Renewable Generation and storage resources • Reduces Renewable curtailments • Provides Deliverability to existing generation resources • Provides reliability support of underlying transmission system Conclusion NEER commends CAISO's staff for all of their time and effort put into defining appropriate input assumptions in the 2019-2020 TPP cycle. NEER submits these comments with the goal of enhancing the processes utilized in the evaluation and selection of the least cost, most efficient and effective reliability, economic, and public policy transmission projects in the transmission planning process. NEER appreciates the opportunity to participate in the transmission planning process and to provide these comments.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.

E3 North Gila Imperial Valley #2 (NGIV2) Submitted by: Brenda Prokop		
No	Comment Submitted	CAISO Response
17a	<u>Economic Planning Study Request</u> NGIV2, LLC is hereby submitting this request for the CAISO to study the NGIV2 project as an economic project, while also considering reliability and public policy benefits provided by the project, in the 2019-20 Transmission Planning Process cycle. NGIV2 is comprised of a new 500kV line from North Gila to Dunes 500kV, Dunes 500/230kV, 230kV connection to the existing IID Highline 230kV, and Highline – Imperial Valley 500kV. [Note: the Dunes 500/230kV substation was formerly known as the Highline 500/230kV substation.] Additional details regarding the NGIV2 project were provided in the Interregional Transmission Project submission package for NGIV2 in March 2018. The NGIV2 project will be a major intertie expansion between the southern Arizona area and southern California area. It will become an additional component of the West of Colorado River (WOR) Path, or WECC Path 46, and is expected to reduce congestion on the existing Southwest Power Link (SWPL) under high transfers and contingencies, thereby increasing reliability for loss of the existing SWPL, and increasing the interregional transfer capability between Arizona and load centers in southern California. The project is also anticipated to increase transfer capability on the East of Colorado River (EOR) Path, or WECC Path 49. The Hassayampa- North Gila #2 Project is now in-service but limited to only 500MW of scheduling capability, with an incremental 100MW planned with the addition of the APS Orchard Project. With NGIV2, an incremental 600MW of scheduling capacity could be realized on the EOR Path. The NGIV2 project in relation to the interregional transmission system is shown below.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.

No	Comment Submitted	CAISO Response
	 **NGIV2 in relation to the WOR and EOR inter-regional system** The NGIV2 project will also provide a major interregional transmission export path for renewable energy delivered from the solar and geothermal rich areas of Imperial County, and will create a new CAISO delivery point at the proposed Dunes 500/230kV substation [formerly known as the Highline 500/230kV substation], with an interconnection to the IID Highline 230kV substation. NGIV2, LLC's economic study request is for the CAISO to evaluate the economic benefits of the NGIV2 project – including analyzing congestion relief in the LA Basin and San Diego areas due to improvements in transfer capability between Arizona and Southern California, and assessing Local Capacity Requirement reductions in the Imperial Valley area – while also considering reliability, operational flexibility, and public policy benefits of the project in its analysis. As part of the WECC Three-Phase Rating Process, the NGIV2 project is anticipated to have an Accepted Rating by Q2 2019 (1,250 MW), and to increase the rating of Path 46 (WOR) to 12,450 MW. As such, the CAISO should include this incremental capacity on Path 46, and its associated benefits for relieving constraints, in its economic analysis of the project, and set the	The CAISO has approved projects that are also in the process of increasing the Path 46 non-simultaneous "Accepted Rating". We can consider the benefits of increasing the Path 46 rating due to the NGIV2 project after the benefits of increasing the Path 46 rating from projects already approved by the ISO have been considered.

No	Comment Submitted	CAISO Response
	binding constraint for Path 46 to 12,450 MW for the post-NGIV2 economic case. For its economic study of the NGIV2 project, the CAISO should also revise certain assumptions that are currently included in the base production cost models. First, the CAISO should eliminate the 2000 MW net export limit from California, or at a minimum, include a sensitivity eliminating the net export limit, in order to more accurately simulate market operations based on the expected near- and long-term system conditions in the production cost models. Second, the analysis should revisit the current methodology for determining the hourly dispatch of the HVDC ties in the models; specifically, the Pacific DC Intertie (PDCI) and the Intermountain Power Project DC line (IPPDC), since the CAISO does not have functional control of these lines. The regional economic benefits provided by NGIV2 are significant. Economic benefits of the project have been determined by the CAISO in previous economic assessments to be as high as $279M. The following potential benefits of the NGIV2 project should be considered by the CAISO as part of its economic study of the project: 1) Provides CAISO additional access to export/import from generation resource zones in the Imperial Valley area of southern California, where limited transmission access exists 2) Increases diversity of the interregional energy resource zones 3) Makes efficient use of existing available transmission corridors 4) Provides additional capacity benefit under normal and emergency conditions for the southern portion of the CAISO system 5) Reduces Local Capacity Requirements for the San Diego/Imperial Valley area In addition to the economic benefits that the CAISO calculates from energy savings, congestion reduction, and reduced Local Capacity Requirements, we respectfully request that the CAISO consider other benefits, such as increased operational flexibility, including elimination or reduction in the use of operational procedures under normal or N-1 conditions; ancillary services benefits such as reduced operating reserve requirements and frequency reserve margins, and a lower incidence of scarcity events; and policy-driven benefits.	Clarification on the 2000 MW export limit being utilized in the ISO's planning process is provided in our answer to question 5c.

No	Comment Submitted	CAISO Response
	From a policy perspective, the NGIV2 project is expected to enable additional renewable output to be delivered to regional load, thereby facilitating movement toward California's increasing RPS goals. The project could also substantially improve renewable energy export capability from the Imperial Valley area. By doing so, it has the potential to spark new development in that area, creating economic growth and jobs for a disadvantaged community. In terms of operational flexibility, the NGIV2 project could eliminate a number of existing RAS and operating solutions. In addition, the CAISO's 2018-19 Transmission Plan indicates that increased RPS requirements will adversely impact the financial viability of natural gas-fueled resources that have previously been relied upon for mitigation measures; consequently, the project could also provide an alternative to future operating solutions. Moreover, NGIV2 would substantially lower the risk of reliability issues for the southern WECC area for loss of the existing North Gila to Imperial Valley line, reducing the likelihood of a system event similar to the September 8, 2011 event that left most of San Diego and the surrounding regions without power.	

E4 Pacific Gas & Electric (PG&E) Submitted by: Mike Pezone		
No	Comment Submitted	CAISO Response
17a	PG&E appreciates the CAISO's efforts on the 2019-20 Transmission Planning Process (TPP) study plan and is generally supportive of the draft study plan. Additionally, PG&E requests that the CAISO conduct an economic study to identify solutions to relieve transmission congestion in the Fresno Avenal area that includes lines such as the Gates-Tulare Lake 70kV line and the Gates Substation. Transmission congestion can increase consumer costs because it prevents low cost energy from serving customers. The CAISO should study and identify cost effective transmission solutions that would mitigate congestion in the Fresno Avenal area.	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.

E5 The Nevada Hydro Company, Inc (Nevada Hydro) Submitted by: David Kates		
No	Comment Submitted	CAISO Response
E5 a	2.0. The LEAPS Project LEAPS is identical in size, operating characteristics and location to the large scale pumped storage facility that CAISO has studied over the last several years. It is a proposed $2 billion pumped hydroelectric storage transmission infrastructure facility with a planned power production capacity of 500 MW and a pumping capacity of 600 MW. It will be located in Riverside County California at Lake Elsinore, which will serve as the lower reservoir for the LEAPS facility. It will include two new 500 kV interconnecting transmission lines, two new 500 kV substations, three new 500/230 kV transformers, three new phase shifting transformers, and one new 230 kV transmission line. These facilities will be located approximately midway between Los Angeles and San Diego at Lake Elsinore, California, and will link the transmission systems of San Diego Gas & Electric Company ("SDG&E") and Southern California Edison Company ("SCE"), thereby helping to relieve two of the largest transmission bottlenecks in California. The total energy storage available will be approximately 6,000 MWh per day, potentially allowing for 12 hours of generation at the full plant generating capacity of 500 MW. Nevada Hydro has filed a hydroelectric license application with the Federal Energy Regulatory Commission ("FERC") for LEAPS that is currently pending in Docket No. P-14227-003. The CAISO has recognized in its own analyses the potential benefits of adding 500 MW of pumped storage hydroelectric capability to southern California, a number of grid support services a facility identical to LEAPS can provide. These services include reactive power (i.e., VAR) support, load and generation balancing services (i.e., regulation-up and regulation-down services), moment-to-moment load following service, spinning reserve service and black start service. LEAPS will be able to switch from providing one service to another almost instantaneously. Other grid support services that CAISO has recognized pumped storage facilities like LEAPS can provide include: • Renewable generation integration (i.e., balancing variability and over-generation) Frequency regulation • Power system stability • Load following	The CAISO has received the economic study request and has included it in the Final 2019-2020 transmission planning process Study Plan for consideration. The final selection of economic study requests that will be evaluated in the 2019-2020 transmission planning cycle will be made later in the year.

No	Comment Submitted	CAISO Response
	• Contingency reserves • Inertial response • Cycling and ramping protection of thermal generation • Relieving transmission congestion These services are all becoming increasingly critical as California continues to transition to its ambitious 50% (or more) renewable energy goal while at the same time retiring fossil-fueled and nuclear generating resources historically relied upon to maintain a harmoniously functioning power grid. LEAPS is designed to: (1) be used by the CAISO to resolve transmission and system reliability issues when the system is under over-generation conditions, (2) maintain reliability when other transmission facilities are out of service for maintenance, and (3) provide grid resiliencies as the grid is relying more and more on intermittent resources. In such situations, LEAPS would automatically come on-line and would prevent NERC reliability violations, or any interruption of electricity service to customers, and LEAPS would be able to provide reliability services throughout the requisite peak hours and during over-generation hours. LEAPS will perform transmission and reliability functions by providing the voltage control support or load reduction needed for the operation of the transmission system when called to do so. In all, LEAPS will provide ten identifiable and quantifiable transmission reliability support services: 1. voltage support, 2. thermal overload protection, 3. frequency regulation, 4. load following, 5. balancing renewable generation, 6. ramping/regulation services, 7. black start service, 8. mitigation of transmission outages/contingency reserves, 9. inertial response, 10. relief of transmission congestion between major load pockets, and cycling/ramping protection of thermal generation.	

No	Comment Submitted	CAISO Response
	Through these services, LEAPS can be used to mitigate over-generation conditions, overloads, line trips, lines taken off line for maintenance, and voltage dips of affected transmission line segments on the CAISO transmission system.	