The ISO received comments on the topics discussed at the February 9, 2021 stakeholder call from the following:

1. American Clean Power – California (ACP-California)
2. Bay Area Municipal Transmission (BAMx)
3. California Energy Storage Alliance (CESA)
4. City of Palo Alto Utilities (CPAU)
5. California Public Utilities Commission Staff (CPUC-Staff)
6. GridLiance West, LLC (GridLiance)
7. Long Duration Energy Storage (LDESAC)
8. LS Power Development, LLC (LS Power)
9. Public Advocates Office (PAO)
10. Pacific Gas and Electric (PG&E)
11. San Diego Gas & Electric (SDG&E)
12. Silicon Valley Power (SVP)
13. South Western Power Group (SWPG)
14. Vistra Corp.
15. Western Grid Development, LLC (Western Grid)

Copies of the comments submitted are located on the 2020-2021 Transmission Planning Process page at:
http://www.caiso.com/planning/Pages/TransmissionPlanning/2020-2021TransmissionPlanningProcess.aspx

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

1. American Clean Power – California (ACP-California) Submitted by: Caitlin Liotiris		
No	**Comment Submitted**	**CAISO Response**
1a	There is a Need to Improve the IRP-TPP Interaction to Ensure Transmission is Approved for a Reliable and Clean Grid in the Future: ACP-California continues to believe that revisions are needed to the interaction between the CPUC's IRP process and the TPP, such that the CAISO can begin to consider and approve transmission upgrades that will be needed to move the state closer to its clean energy goals. Unfortunately, the current process has stalled the review and approval of significant new transmission lines that will be needed to achieve the state's goals and to ensure reliability of the system going forward. In a December 2020 whitepaper previously shared with CAISO, ACP-California (then AWEA-California) suggested consideration of a number of reforms to the IRP-TPP processes. In part, we suggested that the CAISO's TPP should look out 10 and 20 years into the future and should aim to identify "least regrets" transmission expansion opportunities and to quickly move forward with their approval and construction. The TPP should include evaluation of a range of potential resource portfolios in the 10- and 20-year time horizon. These portfolios should represent an aggressive transition to clean energy resources, consistent with the state's clean energy goals. The TPP should report the necessary transmission projects and costs for each portfolio that is analyzed. And transmission projects that show up in most of the resource portfolios and time horizons should move toward approval and construction rapidly. Projects that show up in only some instances should be further studied in the IRP and subsequent TPPs and should begin to be permitted and engineered so that construction can start in a timelier manner in the future, should the projects end up being required. This will provide optionality to move forward with needed projects faster if they are determined to be necessary or beneficial. We continue to believe a robust dialog on these types of reforms is necessary and look forward to working with the CAISO and the CPUC to help explore changes that can improve the process going forward.	The comment has been noted.
1b	**Frequency Response Assessment** ACP-California appreciates CAISO's efforts to study primary frequency response on the CAISO system and, especially, to assess the ability of CAISO	The comment has been noted.

No	Comment Submitted	CAISO Response
	to meet primary frequency response obligations solely with inverter-based resources. CAISO's assessment finds that, without primary frequency response from inverter-based resources or with reduced headroom from these resources, the CAISO will be below its frequency response obligation in 2030. The assessment also finds that it is possible to be in compliance with the BAL-003-2 Frequency response standard while having 100% of energy provided by renewable resources, if the new inverter-based resources have frequency response and 10% headroom. This highlights the importance of procuring headroom services from inverter-based resources for California to meet its future reliability and clean energy needs. But the switch to providing headroom from renewables and other inverter-based resources cannot be flipped overnight and will require changes to contracting practices in order to come to fruition. Action on these changes must begin now, to ensure the services are provided in the coming years. CAISO's Draft Transmission Plan discusses how, per FERC Order 842, new inverter-based resources must ***be capable*** of providing primary frequency response. But it is critical to understand that in order for these resources to be willing to ***provide*** those services, they must be compensated (and not penalized) for doing so. To encourage wind and solar to provide flexible services and not always seek to maximize their output, contracting provisions must change. Typical contracting structures today pay these resources based on the amount of energy delivered to the grid and often have provisions that will result in non-payment if energy is curtailed (i.e. headroom is provided). This must be changed in order for these resources to provide headroom type services in the future. If California wants to have these types of headroom services provided by inverter-based resources in place in the 2025-2027 timeframe then the changes must take shape today. If the provision of headroom is valuable to CAISO and enhancing reliability, as this study indicates will be the case in the future, then there must be changes to the contracts for future resources. In its comments and advocacy in other venues (e.g. at the CPUC), CAISO should be clear about the need for provision of headroom services from inverter-based resources. This will help drive the regulatory and contracting changes that will be needed for the future fleet of resources.	

No	Comment Submitted	CAISO Response
	While some contracting reforms will need more time to take effect, CAISO is also poised to consider some operational changes in 2021 initiatives, such as the Dispatch Enhancement Initiative and Frequency Response Initiative. These upcoming stakeholder initiatives should look broadly at the capabilities of variable energy resources and ensure market changes are made with an eye towards the provision of headroom by wind and solar. Finally, in a future TPP, it would also be helpful for CAISO to study whether different levels (other than 10%) of "headroom" from inverter-based resources would be sufficient to meet the CAISO's primary frequency response obligations.	

2. Bay Area Municipal Transmission (BAMx) Submitted by: Paulo Apolinario		
No	**Comment Submitted**	**CAISO Response**
2a	**Wheeler Ridge Junction Project ($250-$300 million)** BAMx supports the CAISO recommended solution to the procurement of a 95MW, 168 MWh energy storage option at Lamont 115kV substation to mitigate the 115 kV issues on the Kern-Lamont 115 kV system. BAMx agrees with the CAISO this was the most cost-effective option relative to the several competing options, including reconductoring of the 115 kV lines. The CAISO's battery storage option evaluation is consistent with the CPUC recommendation of including only the "incremental" interconnection cost4 and not the full capital cost of the energy storage projects that are otherwise needed for system capacity purposes according to the CPUCprovided resource portfolios. BAMx also supports the CAISO's proposed mitigation to rely on operating solutions to address the P6 and P7 issues related to Kern-Magunden-Witco 115kV. Overall, BAMx concurs with the CAISO decision to place the *Wheeler Ridge Junction Station* project on hold pending procurement of the battery on the 115 kV system and until the evaluation of 230 kV options is completed.	The comment has been noted. Please note that there is a need for this storage resource to have a 4-hour energy. As such, the characteristic of the energy storage at Lamont 115 kV will be updated to 95 MW 4-hour in the revised draft Transmission Plan.
2b	**Moraga-Sobrante Reconductoring ($10-$20 million)** The scope of the project is to reconductor the Moraga-Sobrante 115kV circuit with a higher ampacity conductor. The driver for the project, as identified in the CAISO February 9th presentation, is multiple P2 overloads at Sobrante 115kV substation starting in 2030.5 The overloads only appear in 2030, which is a ten-year-out case. Therefore, there is no urgency to mitigate the identified overload. BAMx supports not approving the *Moraga-Sobrante 115kV reconductoring* project and continuing to keep it on hold due to the long-term reliability issues identified in this cycle. Furthermore, if future planning cycles continue to identify a thermal overload on the Moraga-Sobrante 115kV circuit, BAMx recommends that the CAISO consider a more cost-effective alternative, such as a generation redispatch or a smart wire reactive device to mitigate the identified overload. Either is likely to provide a more cost-effective solution to the identified reliability issue.	The comment has been noted.
2c	**North of Mesa Project ($120-$150 million)** BAMx supports the CAISO-recommended procurement of a 50 MW 4-hour BESS at Mesa 115kV substation to obtain sufficient maintenance windows within winter months for facilities in the area. The existing Under Voltage Load Shedding (UVLS) scheme will address P2, P6 and P7 thermal overloads in the	The comment has been noted.

No	Comment Submitted	CAISO Response
	115 kV system supplied from the Mesa substation.6 BAMx agrees with the CAISO that this was the most cost-effective option relative to several competing options, including reconductoring of the 115 kV lines. As noted earlier, the CAISO's battery storage option evaluation is consistent with the CPUC recommendation of including only the incremental interconnection cost and not the full capital cost of the energy storage projects that are otherwise needed for system capacity purposes according to the CPUC-provided resource portfolios. Overall, BAMx concurs with the CAISO decision to place the *North of Mesa* project on hold pending procurement of the battery storage project.	
2d	**Need for Continued Evaluation of the Previously Approved Projects** BAMx applauds the significant progress that the CAISO made in the prior four planning cycles (2015-2019) in evaluating previously approved transmission projects. However, several projects still remain on hold. While much work has been done to evaluate previously approved projects as a one-time effort, part of the next year's Study Plan should include a formal process to continually monitor such previously approved projects. During the February 28th stakeholder meeting in the 2019-2020 TPP, the CAISO had 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 going forward. 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	The comment has been noted. The CAISO continues to review previously approved projects on a case by case basis as needed in the transmission planning process.

No	Comment Submitted	CAISO Response
	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 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.	
2e	**Policy-Driven Assessment** BAMx supports the CAISO's decision of not recommending the approval of any policy-driven projects, where the need for the project is subject to change based upon assumptions that are expected to change. One such example is the revised deliverability assessment methodology that the CAISO Board unanimously approved on November 13, 2019. Under the revised methodology, the on-peak deliverability assessment is expected to result in a much lower level of need for delivery network upgrades to accommodate Full Capacity Deliverability Status (FCDS) resources. The CAISO's February 9th presentation indicates that "1,464 MW of battery storage in Sensitivity 1 and 3,287 MW in Sensitivity 2 was found to be undeliverable without tx upgrades." BAMx notes that simply re-mapping the undeliverable battery capacity would result in having those resources deliverable without triggering the need for transmission upgrades.	The comment has been noted
2f	**Economic Assessment Results** BAMx supports the CAISO's recommendation for not approving any transmission project as an economically driven project in this planning cycle. BAMx applauds the CAISO's battery mapping study for the Sensitivity 2 portfolio. BAMx has been promoting the remapping of battery storage to a highly congested area with high renewable curtailment as this can help to reduce congestion and renewable curtailment. The CAISO's comprehensive battery re-mapping studies have demonstrated not only that transmission congestion and renewable curtailment can be further reduced by remapping or allocating battery to constrained areas, but also that the latter is more effective than the transmission alternatives. This lesson learned is important for studying all resource portfolios and scenarios going forward. In other words, it is pertinent to perform an additional layer of analysis to check whether any	The comment has been noted.

No	Comment Submitted	CAISO Response
	transmission upgrades triggered by a given resource portfolio could be eliminated or scoped differently by remapping the renewable and battery storage resources. We encourage the CAISO to have such processes built-in as it performs the policy-driven and economic assessments in the subsequent planning cycles.	
2g	**Wildfire Impact Assessment** BAMx applauds the CAISO's modeling of the two additional scenarios, i.e., lines de-energized based on October 26, 2019 PSPS event conditions with PG&E's wildfire mitigations (10-26 PSPS-WFM) and based on potential PSPS events corresponding to historical weather conditions, and de-energization of all lines included in 25 potential events (PSPS-HWC-All). We believe the addition of these two plausible scenarios provide important new information. In addition to the transmission-connected load, there may also be a distribution-connected load that will not be served due to distribution facilities also being affected by PSPS or wildfire events. A loss of distribution-connected load may reduce the load that the transmission system needs to supply under that specific condition, which may vary depending on the nature of the specific event. BAMx encourages the CAISO to work with PG&E to also take into account plausible distribution circuit interruptions as it continues to look at likely scenarios for PSPS events.BAMx encourages the CAISO to continue to work with PG&E to investigate 2020 PSPS events that have occurred. We hope that this effort could be undertaken as part of next year's scope.	The comment has been noted. The CAISO will continue to work with PG&E to incorporate the findings from the CAISO's wildfire impact assessment into the utility's overall wildfire mitigation plan. Regarding the reduction of load due to the distribution circuits' interruptions, this mainly impacts the system performance deficiencies, which the CAISO's assessment didn't identify for any area.

3. California Energy Storage Alliance (CESA)
Submitted by: Jin Noh & Pedro Sanchez

No	Comment Submitted	CAISO Response
3a	**Storage as transmission asset** CESA appreciates the ISO's consideration of storage as a viable and more cost-effective alternative to transmission assets, such that the Draft 2020-2021 Transmission Plan includes recommendations to procure appropriately-sited battery storage to replace two previously-approved transmission projects. While the current draft does not include incremental Resource Adequacy (RA) value for storage with durations beyond four hours in the San Diego Area, future Transmission Planning Process (TPP) cycles should incorporate updated RA value assumptions if the California Public Utilities Commission (CPUC) reforms RA rules for such resource capabilities. This issue is especially relevant as the Local Capacity Technical Studies reveal the value of longer duration discharges from storage resources; thus, the assessment methodology should be reevaluated in subsequent TPP cycles. Separately, CESA also encourages the ISO to relaunch the Storage as a Transmission Asset (SATA) Initiative in the near future, which is currently planned roughly for 2022. Other initiatives likely need resolution prior to its restart, and CESA appreciates the ISO's continued consideration of storage as transmission alternatives in the interim when the provision of transmission service does not directly conflict with market activities, broader consideration of storage can be supported with proposals developed in the SATA Initiative.	The comment has been noted.
3b	Storage mapping and resource retirement in policy assessment CESA generally supports the ISO's storage mapping methodology and results in the 2020-2021 TPP cycle, as well as the transmission capability estimates provided. In future cycles, we look forward to improving upon these methodologies that can support reducing or eliminating reliance on gas-fired generation.	The comment has been noted.
3c	**Other Studies – Frequency Response** CESA appreciates the ISO's study on frequency response needs as the CAISO balancing area transitions away from conventional generators with rotating masses providing inertial response, to one where significant portions of the resource mix is composed of inverter-based generators and storage. Energy storage in particular has significant potential to support the ISO's frequency response needs going forward, with its fast active power response and ability to	The comment has been noted.

No	Comment Submitted	CAISO Response
	absorb (charge) and supply (discharge) power. It has the capability to regulate both active and reactive power at the point of connection with the AC grid in providing both synchronous inertia as well as synthetic inertia.	
	While Order No. 842 from the Federal Energy Regulatory Commission (FERC) did not specify headroom requirements and focused instead on requiring frequency response capabilities, CESA encourages the ISO to develop market-based frequency response products as opposed to creating general, across-the-board performance requirements, which would not encourage the most efficient, cost-effective, and highest-performing primary frequency response to be delivered. Rather, a market product for this service would allow certain resources to reserve the headroom required to provide the frequency response capacity, as needed and where the resource is most economically positioned to do so.	The intent of analyzing the scenario with the headroom was to assess a typical spring off peak condition in which the IBRs may have some headroom as they most likely will be curtailed due to oversupply condition.
	In its analysis, the ISO assesses the most stressed conditions in the spring months (*i.e.*, high renewables, low conventional generation, relatively low load) along with the greatest contingency condition (*i.e.*, Palo Verde generating station outage) to determine frequency response sufficiency in the CAISO balancing area. The ISO found that enabling frequency response from all of the new resources coming online between now and 2024 would ensure and improve frequency recovery, as compared to the counterfactual where such capabilities are not enabled. The frequency response coming from a combination of inverter-based resources and battery energy storage systems (BESS) was found to significantly improve the ISO's ability to fulfill its Frequency Response Obligation. However, in practice, rather than enabling these capabilities in this generalizable way in accordance with the study's assumptions, the ISO should explore market products, as contemplated in a forthcoming Frequency Response Measure Initiative. Ensuring headroom from inverter-based resources in this way comes with an opportunity cost, such as in the form of reduced renewable energy credits (RECs).	The TPP studies makes assumptions based on existing and approved policies and practices. The assumption in the studies is not for IBRs to have headroom to provide frequency response. The assumption is that they will be curtailed and therefore would have headroom due to oversupply.
	Furthermore, the analysis assumed certain BESS operational parameters for when their frequency response capabilities are enabled, such as conservative limits to how it can immediately transition from charging to discharging to deliver the needed primary frequency response. In future studies, CESA would	The most up-to-date models provided by generator and BESS owners is used in the studies. CAISO is going through a process based on the Transmission Planning Process BPM to get updated models for all the

No	Comment Submitted	CAISO Response
	like to work with the ISO to potentially update this underlying assumption and provide potentially accurate models for battery storage controls, identifying a representative charge-to-discharge range, as well as other parameters (*e.g.*, reduced rate of charging) that is capable of being provided to support frequency response.	resources. The updated models will then be validated and will be used in future TPP studies.
3d	Finally, though it is understandable for the ISO to focus on BESS in its frequency response study and forthcoming initiative, especially as BESS will representative the vast majority of resource additions in the near term, the ISO should also be aware that several non-BESS technologies (*e.g.*, compressed air and liquid air energy storage) have the capability of providing inertia, as the discharge from such technologies may be delivered from rotating turbines. The amount of inertia on the grid may also impact the relative effectiveness, performance requirements, and total frequency response capacity needed from inverter-based resources and BESS.	The analysis considers all existing resources and the portfolios provided by the CPUC which are predominantly inverter based resources.

4. City of Palo Alto Utilities (CPAU) Submitted by: Tikan Singh		
No	**Comment Submitted**	**CAISO Response**
4a	**Summary** The PG&E system that the City is connected to, and continues to support through our transmission access charges, does not provide adequate reliability for the City and the critical regional facilities that the City serves. It is imperative that these facilities have reliable grid power to perform their daily operating routines without interruption. Although over the years several proposals have been considered by the CAISO, PG&E, and CPAU, the fundamental reliability issues faced by CPAU have remained unaddressed in the Draft Plan. CPAU intends to closely work with PG&E and the CAISO to develop robust transmission solutions to address the CPAU's reliability issues as part of the next transmission planning cycle. The location of the three transmission lines serving Palo Alto in a single corridor does not provide adequate service reliability because a single event can (and has) cause the loss of all three lines. The inadequate reliability is due to having all three-transmission lines that provide power to the City being located in a single corridor that is in close proximity to the end of a runway at a Santa Clara County General Aviation Airport. This corridor has been struck by an airplane twice. The last event occurred on February 17, 2010. The airplane caused **all three** lines to be interrupted and the outage lasted for 10 hours. Stanford Hospital was on the verge of starting to move patients to other hospitals when the power was finally restored. For two days following the aircraft impact, the entire City was served by a single wood pole 115kV line while PG&E crews worked to replace the destroyed double circuit transmission tower. This event had a significant effect on the businesses, hospitals, and residents in the city.	The CAISO looks forward to work closely with the City and PG&E in this matter.
4b	There is an alternative solution that would have addressed both Palo Alto's and Stanford's reliability needs (Connecting City of Palo Alto's 60kV system to SLAC's 230kV substation) is no longer under consideration. As the CAISO is aware, over the last decade, CPAU has been working on developing a solution that would have solved the issues in Palo Alto and	The comment has been noted.

<table>
<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>provide the additional capacity to serve Stanford that was recommended in the Jefferson- Stanford #2 60 kV proposal.2 This alternative solution would have connected the City of Palo Alto's 60kV system to SLAC National Accelerator Laboratory (SLAC)'s 230kV substation and loop through Stanford's Substations. Negotiations between the parties over a number of years did not produce a workable solution; thereby, in the interests of refining reliability for the City, CPAU has decided to pursue other resolutions.</td><td></td></tr>
<tr><td>4c</td><td>The Draft Plan does not address CPAU's fundamental reliability issues. CPAU acknowledges the CAISO and PG&E's efforts expected transmission overloads in the transmission serving the CPAU's load. In particular, the CAISO approved the following three transmission projects that address contingency overloads on the three 115kV lines serving the City load.
1. Cooley Landing 115/60 kV Transformer Capacity Upgrade (operational);
2. Cooley Landing-Palo Alto and Ravenswood-Cooley Landing 115 kV Lines Rerate (EOD: January 2022);3 and
3. Ravenswood – Cooley Landing 115 kV Line Reconductor (EOD: March 2022).4

However, even with the above-mentioned upgrades, the CAISO's reliability assessment conducted as part of the 2020-2021 TPP indicates that there continue to be P2 and P5 issues on the transmission lines serving the CPAU system in the year 2025 as shown in Table 1 below.

Table 1: Overloads on the Ravenswood-Cooley Landing #1 115kV Lines: CAISO Reliability Assessment
<table>
<tr><th>Transmission Element</th><th>Loading in 2025 Summer Peak Case (%)</th><th>Contingency Description</th><th>Contingency Type</th><th>Identified Mitigation</th></tr>
<tr><td>Ravenswood-Cooley Landing #1 115kV Line</td><td>112%</td><td>RVNSWD E 115KV - SECTION 2E & 1E</td><td>P2</td><td>Ravenswood 115 kV bus upgrade</td></tr>
<tr><td>Ravenswood-Cooley Landing #2 115kV Line</td><td>113%</td><td>RAVENSWOOD 115 (FAILURE OF NON-REDUNDANT RELAY)</td><td>P5</td><td>Ravenswood 115 kV bus upgrade</td></tr>
</table>
CPAU investigated the effectiveness of the *Ames to Palo Alto 115kV* transmission project that was submitted by PG&E in the 2012-2013 TPP6 in addressing the NERC and CAISO planning criteria violation for the</td><td>The CAISO will revisit reliability needs and potential mitigation, as needed, in the area in 2021-2022 transmission planning process.</td></tr>
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<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>Ravenswood-Cooley Landing 115kV lines.7 We assumed the Ravenswood-Cooley Landing 115kV lines to be rerated, but not reconductored. The power flow results of this exercise are included in Table 2 below. It appears that the new Ames to Palo Alto 115kV line would be effective in eliminating the P2 overload (133% to 91%) on the Ravenswood-Cooley Landing 115kV lines. Table 2 also shows that there are no longer P1 and P7 overloads on the Ravenswood-Cooley Landing 115kV lines, which were the primary drivers for the original approval of the Ravenswood-Cooley Landing 115kV Reconductoring project in the CAISO 2009 Transmission Plan.8 The new Ames to Palo Alto 115kV line is also effective in lowering these P1 (from 65% to 62%) and P7 (71% to 55%) loadings on the Ravenswood-Cooley Landing 115kV lines. So, the solution to the three lines out event also solves the expected P2 overload on the Ravenswood – Cooley Landing 115kV line.
Table 2: Loadings on the Ravenswood-Cooley Landing #1 115kV Lines: Without and With Ames-Palo Alto 115kV Project
<table>
<tr><th rowspan="2">Transmission Element</th><th rowspan="2">Rating (MVA)</th><th colspan="2">Loading in 2025 Summer Peak Case (%)</th><th rowspan="2">Contingency Type</th><th rowspan="2">Contingency Description</th></tr>
<tr><th>Without Project</th><th>With Project</th></tr>
<tr><td rowspan="3">Ravenswood-Cooley Landing #1 115kV Line</td><td rowspan="3">189</td><td>133%</td><td>91%</td><td>P2</td><td>RVNSWD E 115KV - SECTION 2E & 1E</td></tr>
<tr><td>65%</td><td>62%</td><td>P1</td><td>Ravenswood-Cooley Landing 115kV Circuit #2</td></tr>
<tr><td>71%</td><td>55%</td><td>P7</td><td>Ravenswood-Palo Alto 115kV Circuits #1 and #2</td></tr>
</table>
In summary, there is an urgent need to identify a long-term solution to reliably serve the CPAU load. One such solution could be the Ames to Palo Alto 115kV transmission project. This project would potentially replace the need for the CAISO-approved Ravenswood-Cooley Landing 115kV Reconductoring project and is expected to have similar capital costs (~$10-$20 million). In other words, the Ames-Palo Alto 115kV project not only increases the capacity and reliability of the 115kV system serving Palo Alto, but also provides a 115kV interconnection outside the common corridor near the airport flight path. We, therefore, urge the CAISO to consider evaluating the Ames to Palo Alto 115kV transmission project and revisiting some of the previously approved projects need and scope.</td><td></td></tr>
</table>

5. California Public Utilities Commission Staff (CPUC-Staff) Submitted by: David Withrow		
No	**Comment Submitted**	**CAISO Response**
5a	The Staff of the California Public Utilities Commission (CPUC Staff) appreciates this opportunity to provide comments on the draft 2020-2021 Transmission Plan. These comments follow the February 9, 2021 public meeting to develop and explain results of the analysis underpinning the CAISO's draft plan. For this TPP cycle, the CPUC identified the base case as the updated 2018 Preferred System Portfolio, as well as two sensitivity cases (#1 – 2019 Reference System Portfolio and #2 – 2019 30 MMT Energy Only Portfolio.) The CAISO presents a significant volume of information and findings in this draft transmission plan. CPUC Staff offers these comments and suggestions on certain chapters of the draft plan, including these specific requests:	
	By when should the battery storage resources recommended for these two projects be operational?	The comment has been noted. Please see response to 5d below.
	By when would the CAISO be expected to withdraw the hold on these projects to pursue the alternative process to enable a transmission solution for these two projects, assuming storage resources would not be developed there in time to manage the identified reliability issues?	
	CPUC Staff notes that four of the projects in Table 8.1-1 have "expected in-service dates" in 2020; it would be helpful if the Transmission Plan provided further explanation or updates for these anomalies. We also suggest the CAISO consider ways to ensure that "expected in-service dates" are realistic and reflect reasonably fresh information on the project's development.	The CAISO is reviewing the current status of the projects that are in process of construction consistent representation in the future.
	It would be helpful for the CAISO to consider ways to present these tables on previously approved projects with more information about when projects were first approved, why projects may have been put on hold or in-service dates extended and potential implications for reliability and renewable development.	The CAISO will review the information in the tables and format of information in future planning cycles.
5b	1. **Utilization of Storage Resources to Mitigate Reliability Issues** The CAISO's presentation on February 9, 2021 included an important update to the preliminary results of the reliability assessment provided in September 2020. Specifically, the CAISO highlighted its recommendations (explained in Chapter 2 of the draft transmission report) to utilize battery storage resources at	The comment has been noted

No	Comment Submitted	CAISO Response
	two substations to mitigate reliability needs in the Kern area and the Central Coast and Los Padres areas within PG&E's service area. Thus, the draft transmission plan includes a hold on the Wheeler Ridge Junction project (pending procurement of a 95 MW/168 MWh battery at the Lamont 115 kV substation) and the North of Mesa project (pending procurement of a 50 MW/200 MWh battery at the Mesa 115kV substation.) CPUC Staff commends the CAISO for examining all alternatives for these projects and recommending an approach that would meet reliability standards and serve the best interests of ratepayers.	
5c	CPUC Staff recognizes considerable stakeholder interest was expressed during the February 9th meeting regarding the mechanism by which these proposed storage resources could gain revenues and/or receive cost recovery for their operations. We note that Section 1.3.2.6 of the draft transmission plan provides background on the use of energy storage as a transmission asset and that related issues were discussed as part of the CAISO's "Storage as a Transmission Asset" stakeholder initiative, which was suspended in 2019 pending resolution of a separate initiative. CPUC Staff anticipates further review of these issues as well as opportunities for full understanding of stakeholder views.	The comment has been noted.
5d	CPUC Staff seeks a better understanding of the timeframe by which these storage resources would need to be "in-service" to mitigate the expected reliability need. Chapter 2.3 of the draft transmission plan notes that the CAISO conducted detailed analysis related to the reliability assessment for years 2022, 2025 and 2030. It would be helpful to convey in the Transmission Plan when the reliability issues arise for the Wheeler Ridge Junction and North of Mesa projects. More specifically, CPUC Staff seeks to understand: • • *By when should the battery storage resources recommended for these two projects be operational?* • • *By when would the CAISO be expected to withdraw the hold on these projects to pursue the alternative process to enable a transmission solution for these two projects, assuming storage resources would not be developed there in time to manage the identified reliability issues?*	The reliability issues are identified in Appendix C of the transmission plan. Without the projects in service, the reliability need is identified in 2022. Currently there are interim operational mitigations to address the issues. The CAISO will continue monitor the CAISO queue and the CPUC procurement authorizations to determine if the hold can be released on these projects.
5e	CPUC Staff also notes that the CAISO's recommendation (explained during the February 9th meeting) to utilize these storage resources overlapped the Commission's approval (on February 11th) of D. 21-02-008, which defines the	CAISO staff is coordinating with CPUC staff to move 155 MW of the 9,000+ MW of batteries mapped to specific busbars in the 2021-2022 TPP portfolios to the areas identified in the 2020-2021 draft

No	Comment Submitted	CAISO Response
	portfolios and the methodology for locating planned resources for the CAISO to analyze in the 2021-2022 Transmission Planning Process. To address this overlap between TPP cycles and to highlight the continued coordination between the CPUC and the CAISO, we point to Section 9.1 of the *Modeling Assumptions for the 2021-2022 Transmission Planning Process.* This provides flexibility for CAISO to assume the use of storage resources to mitigate reliability issues in certain locations through the upcoming TPP cycle: **"Additionally, to the extent that storage resources are required for mitigation of transmission issues identified in the CAISO's 2020-2021 Transmission Plan, CPUC staff would expect to coordinate with CAISO to enable small adjustments in the CPUC's mapping of storage resources to allow for the inclusion of this storage in the CAISO's analysis of these 2021-2022 TPP portfolios."** CPUC Staff expects that, based on the CAISO's 2020-2021 reliability assessment, approximately 145 MW of the 9,000+ MW of batteries mapped to specific busbars in the 2021-2022 TPP portfolios may be moved to the two areas identified.	transmission plan consistent with Section 9.1 of the *Modeling Assumptions for the 2021-2022 Transmission Planning Process*.
5f	**2. Projects Approved in Previous Transmission Plans** Chapter 8 of this draft transmission plan identifies 86 previously approved projects under $50 million and 22 previously approved projects over $50 million, including nine projects that were completed presumably over the past year. This compares to the 2019-2020 Transmission Plan that identified 19 completed projects. CPUC Staff monitors the progress of development for these CAISO-approved transmission projects and we appreciate these updates being included in the annual Transmission Plan. *CPUC Staff notes that four of the projects in Table 8.1-1 have "expected in-service dates" in 2020; it would be helpful if the Transmission Plan provided further explanation or updates for these anomalies. We also suggest the CAISO consider ways to ensure that "expected in-service dates" are realistic and reflect reasonably fresh information on the project's development*. Additionally, CPUC Staff notes that the Bellota-Warnerville 230kV reinforcement project now has an estimated 2024 in-service date, which is seven years later than originally planned when CAISO approved this project in	The comment has been noted. The CAISO will assess how the tables may be updated to provide additional information. The CAISO will consider this in the next planning cycle.

No	Comment Submitted	CAISO Response
	the 2012-2013 Transmission Plan. This specific project is now expected to enable several renewable energy projects that are important to the achievement of California's clean energy policy goals although it may have originally been approved as a reliability project. Tables 1.1-1 and 8.1-1 summarize the latest in-service date but provide no mention of the multiple extensions of the in-service date for this important project. *It would be helpful for the CAISO to consider ways to present these tables on previously approved projects with more information about when projects were first approved, why projects may have been put on hold or in-service dates extended and potential implications for reliability and renewable development.* More context on these previously approved projects, especially on significant changes that have occurred since CAISO's approval, would be valued information within Chapter 8 and perhaps other chapters of the Transmission Plan.	
5h	3. **Transmission Capability Estimates** CAISO's presentation on February 9th included an update on the methodology for determining revised transmission capability estimates in renewable zones, which is a key input for the CPUC's development of portfolios that are analyzed within the transmission planning process. CPUC Staff appreciates the CAISO's innovative conceptual approach for dynamic equations to update the transmission capability estimates used in RESOLVE. We are working with CAISO staff to understand this proposed approach better and we anticipate a thorough and transparent vetting of this methodology in the coming weeks.	The comment has been noted.
5i	**4. Renewable curtailment** CPUC Staff appreciates the presentation of results in Tables 3.7-1 and 3.7-2 in the draft transmission plan regarding the impacts of congestion and curtailment for each of the portfolios. These results indicate 15%, 11% and 17% total curtailment for the policy-driven base case, sensitivity #1 and sensitivity #2, respectively. The results of the battery re-mapping study conducted for sensitivity #2 (shown in section 3.8.2) indicates significant reductions in congestion and curtailment. These results will inform future resource mapping exercises as well as the location of actual renewable projects. CPUC Staff observe that the massive	The comment has been noted.

No	Comment Submitted	CAISO Response
	scale of procurement proposed over the next five years in the February 22, 2021 ALJ Ruling (here) in R.20-05-003 may well significantly diminish current levels of curtailment observed within certain CAISO zones.	
5j	**5. Interregional projects** CPUC Staff notes that none of the four proposals seeking further study as interregional transmission projects are moving forward in 2021 within the interregional planning process. This is the same outcome as the last interregional planning cycle; no proposed projects moved forward into the odd year interregional planning assessment in 2019. CPUC Staff appreciates the CAISO's leadership within this coordination process. We encourage the CAISO to seriously consider ways to improve the process in advance of possible federal efforts to accelerate transmission development through Order 1000 modifications or other initiatives.	The comment has been noted
5k	**6. CAISO's Frequency Response Study** CPUC Staff appreciates the engineering expertise and sound judgment that went into the CAISO's assessment of the system's ability to respond to major frequency events. This analysis is critical as the system rapidly adds more inverter-based generation. This kind of technical analysis is a valuable part of the annual transmission planning process.	The comment has been noted.

6. GridLiance West, LLC (Gridliance) Submitted by: Jody Holland		
No	**Comment Submitted**	**CAISO Response**
6b	**IRP Would Greatly Benefit from A Revised Transmission Capabilities Paper** The CAISO produced an Transmission Capabilities White Paper to inform the CPUC's IRP regarding transmission limits in May of 2019, and the information in that white paper has been heavily relied on by the CPUC IRP team and stakeholders since that time. However, the CAISO in many instances has more current information about the transmission capabilities. Some of this information is a result of the transmission capabilities findings resulting from Policy Sensitivity Case 2. While the draft plan reports on instances where there were, or were not, limitations in energy flows from the expanded EO siting, it does not include a concrete summary confirming that the studied EO limits can be met at zero cost in most instances and at the costs of estimated upgrades for the GLW area and the Whirlwind and Westlands areas. Further, the proposed decision transmitting the IRP portfolios and the final decision issued allude to additional information from the CAISO about capabilities – primarily from its GIDAP studies. GridLiance strongly encourages the CAISO to revise the Transmission Capabilities White Paper to provide an unambiguous source for the CPUC's use in the upcoming IRP cycle. As part of this process GridLiance would hope the CAISO would issue such a paper in draft form, host a web meeting to present the information, and seek any questions or comments from stakeholders before finalizing the paper to ensure it is clear and vetted. This will ensure the CAISO's efforts from its 2020-2021 TPP offer the most value in the IRP process and avoid unnecessary controversies during the conduct of that study.	The CAISO will be updating the transmission capability limits this year in time for use by CPUC in developing the portfolios for the 2022-2023 TPP. The CAISO will also be updating the white paper and afford stakeholders the opportunity to provide input.

7. Long Duration Energy Storage Association of California (LDESAC)
Submitted by: Julia Prochnik

No	Comment Submitted	CAISO Response
7a	In Table A below, LDESAC illustrates these diverse technologies and their grid attributes.	The comment has been noted.

Technology Type	Capacity	Avg. Duration	Ancillary Services	Resource Attributes	Avg. Deployment Stage	Avg. Life Cycle
Gravity	40kW-8MW	5-24hrs	resource adequacy, spinning reserve, sub-second response time (but not well suited for freqency response)	scableable, distributed, reuse infrastructure, zero self-discharge	pilot	30 yrs
Zinc Batteries	1-10MW	10 hrs	frequency control	high energy density, 2% discharge rate	pilot	30 yrs
Flow Battery	1-20MW	10-24hrs	frequency control	scalable, power sizing	deployed in market	25 yrs
Flywheel	5-25MW	10-24hrs	rotational energy, fast response time	instant start and load following	deployed in market	35 yrs
Green Hydrogen	1-100MW	10-100hrs	discharge time, response time	refuel and recharge	commerical	*20 yrs*
Liquid Air	25-150MW	8 - 24 hrs	synchronous inertia, frequency control, reserves, voltage support, black start capability	no georgraphical constraints, high energy density, no degradtion	commerical	50 yrs
Concentrating Solar Thermal	50-250MW	10-24 hrs	synchronous generation thus provides spinning reserve, frequency regulation, fast ramping and other ancillary services	high conversion efficiencies	commerical, deployed in market	75 yrs
Pumped Hydro	10-2400MW	8 hrs- 36 hours, can be seasonal, and lose no charge over time	black start, frequency regulation, voltage support, spinning reserves and operating reserves	secure power supply, scalable, zero fuel costs	commerical, deployed in market	100 yrs

We appreciate all the work CAISO has done, and its robust process to elicit stakeholder input. LDESAC understands that this process is close to the final stages and would like to add some key points for consideration now and in the future.

First, CAISO views frequency response as a critical grid service, but may not have adequately valued the potential contribution of long duration energy storage technologies that provide primary frequency response. CAISO has noted that "under off-peak spring conditions (weekend afternoon) there is more solar generation on-line, which historically did not participate in primary frequency response." Long duration energy storage can store the excess solar generation to power the grid when solar or other renewable generation is unavailable or in short supply.

No	Comment Submitted	CAISO Response
	Total installed Inverter-Based Resources (IBR) capacity in the ISO is expected to reach 33 GW by 2030 and long duration energy storage is necessary to ensure grid reliability, as well as meeting California's climate goals by decreasing emissions throughout the state. LDESAC supports the next steps in modeling and would stress the importance of updating these efforts to collect and improve modeling data, including new methods to study long duration energy storage (such as effective load carrying capacity and model run times exceeding three days). We agree with CAISO's view that "other contingencies may also need to be studied, as well as other cases that may be critical for frequency response," including the diverse set of technologies that provide long duration storage. As highlighted in slide 100, "further evaluation will be conducted in a future planning cycle once there is more clarity in the battery storage development picture in the CAISO controlled grid from the CPUC's IRP." LDESAC supports this work and would add other technologies that deliver storage for 10 hours or longer.	

8. LS Power Submitted by: Sandeep Arora & Renae Steichen		
No	**Comment Submitted**	**CAISO Response**
8a	**Economic Study: COI congestion & SWIP-North as an economic project** LS Power thanks CAISO staff for conducting congestion analysis for the COI Corridor and economic analysis for the SWIP-North project. We have the following comments/questions related to this analysis. LS Power recommends that CAISO rerun its economic analysis for SWIP-North taking these comments into account prior to finalizing the Transmission Plan. a) **SWIP-North upgrades should be included** - CAISO should ensure that the existing 500 kV 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. In addition to the new 500 kV transmission line and series capacitors between Midpoint and Robinson Summit, the SWIP-North project also includes key upgrades to existing infrastructure which include the addition of 70% series compensation on ON Line and phase shifting transformers on the existing Robinson Summit-Gonder and Robinson Summit-Falcon 345 kV lines. These upgrades enable increased transfers in the north-to-south (N-S) direction from Midpoint to Harry Allen. It appears CAISO's study did not include these upgrades, resulting in under-utilization of the 2000 MW SWIP-North path in N-S direction (for example, CAISO's study shows line flows not going above 600 MW in the N-S direction). After reviewing CAISO's draft economic study results, LS Power hired Hitachi ABB Power Grids to perform an economic analysis for SWIP-North ("ABB Study") using CAISO's 2020-21 TPP production cost model (posted on CAISO's Market Participant Portal). This study concluded that if the SWIP-North upgrades described above are correctly modelled and operated, interface congestion and flow patterns changes significantly. In particular, the study showed higher flows from Midpoint to Eldorado 500 kV path, greater reductions on COI and PDCI congestion, reduced PG&E-Sierra congestion and increased overall imports into CAISO. Congestion reduction and flow increases led to production cost savings for SWIP-North estimated at $70 million per year, a significant increase compared to the $10 million per year shown in the CAISO study. This study also showed that in addition to modelling SWIP-North upgrades, accurately capturing the initial setting and operation of phase shifters	The SWIP-North project was assessed as an alternative to mitigate COI congestion, and as an ITP project as well, in the CAISO's 2020-2021 transmissin planning process. The project scope that was submitted to the ITP was used in the study. The stakeholder is encouraged to submit economic study request with any updated scope of the project to the CAISO after the stakeholder meeting for 2021-2022 transmission planning process study plan. The CAISO will evaluate the economic study requests as a part of the economic assessment.

No	Comment Submitted	CAISO Response
	at Robinson Summit is also critical, and altering these assumptions can have a bearing on economic benefits. The ABB Study is provided in Appendix A for CAISO review. b) Wheeling charges should be removed - For the SWIP-North economic study, to correctly calculate economic benefits of a 1000 MW transmission path from Midpoint to Harry Allen, CAISO should have modeled this new 1000 MW path free of any wheeling charges. We understand that the standard ADS PCM model has a NVE wheeling charge of $9/MWh and CAISO's study did not remove this charge. This is an inaccurate assumption. Given the FERC-approved Transmission Use and Capacity Exchange Agreement in place between LS Power affiliates & NV Energy, such a wheeling charge does not apply. Including a wheeling charge will create an artificial hurdle across this path which reduces SWIP-North N-S flows and hence underestimates benefits of SWIP-North. c) COI path limits should be correctly enforced for CAISO's share of COI & Day Ahead PACI congestion should be correctly captured - For the COI congestion analysis, it appears CAISO used the full 4800 MW path rating as the limit for the COI path. As noted in our previous comments, CAISO's share of the 4800 MW path is only 3200 MW (limit of PACI scheduling interface1) with the remaining 1600 MW belonging to members of Transmission Agency of Northern California (TANC), an entity outside CAISO. In addition, as CAISO has noted in its prior TPP presentations, 1200 MW out of the 3200 MW PACI scheduling limit comprises of Existing Transfer Capabilities (ETCs) and Transmission Ownership Rights (TORs) that are owned by entities outside CAISO. This leaves only about 2000 MW of the total 4800 MW COI path that is available to CAISO, and this is what CAISO should have used as COI limit for its economic analysis. The other 2800 MW should have been modeled with a large hurdle rate such that it becomes mostly unavailable to the CAISO system. Not correctly capturing these scheduling realties makes 2800 MW on this path available for CAISO with little hurdle, artificially reducing COI N-S congestion. If this constraint is correctly modelled, the CAISO study should show PACI, NOB congestion close to historic levels as noted in CAISO DMM reports2 over last several years.	The wheeling charge rate model in the CAISO's planning PCM is consistent with the WECC ADS PCM, which is a WECC wide collaboration. The CAISO's planning PCM enforced COI path rating and scheduled maintenances with path rating derate, which were provided by facility owners of COI. Critical contingencies identified in reliability assessment for COI were monitored as well. In addition, it is worth noting that COI congestion in the CAISO's PCM study was measured by comparing COI flow, which is the summation of all three 500 kV lines of COI path, and COI rating.

No	Comment Submitted	CAISO Response
	Once CAISO correctly quantifies benefits from item a) above, overall production cost savings from SWIP-North will significantly increase and should more closely match the production cost savings estimated by the ABB Study (Appendix A). It should be noted that the purpose of the ABB Study was simply to replicate the CAISO study with adding the SWIP-North upgrades to determine the impact of the upgrades on economic benefits. The ABB Study did not correct the wheeling charge and Day Ahead PACI/NOB congestion issued noted above.	
8b	Further, once CAISO correctly improves its model to address items in b) and c) above, the production cost savings for SWIP-North are expected to further increase and track closely with the benefits shown in a study recently conducted by The Brattle Group3 ("Brattle Study"). LS Power recently commissioned The Brattle Group to conduct a SWIP-North study evaluating a variety of potential economic, reliability, and public policy benefits. The Brattle Study concluded that the SWIP-North project can provide benefits of up to $105 million annually from Energy Market transfers (aka production cost savings). This study is a good reference for estimating SWIP North economic benefits if items in a), b), and c) above are correctly addressed. In addition to production cost savings, the Brattle Study also estimated additional benefits from the project as described below. d)Additional economic benefits of SWIP-North - In addition to quantifying production cost savings, we recommend that CAISO also capture additional benefits of SWIP North identified by Brattle Study in the report referenced herein. These additional benefits are referenced in Table 4.2-1 of the Draft Transmission Plan and are in line with CAISO's TEAM methodology: 2.5.1 Resource adequacy benefit from incremental importing capability, 2.5.3 Deliverability benefit, 2.5.5 Public-policy benefit, 2.5.6 Renewable integration benefit. LS Power's recommendations on how these benefits should be quantified are provided below. The Brattle Study quantified some of these additional benefits as well, which we recommend CAISO use as guiding points to estimate these benefits.	As stated in the CAISO's 2020-2021 TPP draft report regarding the other benefit of the SWIP-North project To assess capacity benefit of the SWIP-North project requires further clarity of the CPUC's base renewable portfolio assumption for out of state resources. It also requires additional coordination with other planning regions to identify potential impacts of the SWIP-North project on the CAISO's import capability." The stakeholder is encouraged to submitted economic study request with updated scope of the project as described in the stakeholder comment. The CAISO will evaluate the request with considering the new CPUC portfolio for the 2021-2022 transmission planning process.

No	Comment Submitted	CAISO Response
	i. Resource Adequacy (RA) benefit from incremental importing capability SWIP-North provides RA benefits to CAISO since the following four conditions noted in CAISO's TEAM methodology are satisfied simultaneously: • SWIP-North will increase the import capability into the CAISO controlled grid in the study years. Absent SWIP-North, CAISO's import capability with Idaho Power & PacifiCorp East is limited and the import path between NVE-CAISO in the Sierra Region is congested. SWIP-North will enable a new 1000 MW import capability path between various BAAs. • As evident through CAISO's own stack analysis in CPUC proceedings, there is projected insufficient capacity to maintain resource adequacy in the CAISO BAA starting this year in 2021.4 • The existing import capability has been fully utilized to meet RA requirement in the CAISO BAA in the study years. A recent WECC analysis shows that even when all planned internal and import resources are added, Southern California has hours at risk of unserved load.5 • The capacity cost in the CAISO BAA is greater than in other BAAs (Idaho Power, PacifiCorp, NV Energy) to which the new transmission connects. CAISO should estimate the RA/Capacity value of SWIP North based on load diversity (seasonally and hourly) between Idaho and Southern California and capacity cost savings from building new supply in ID vs CA. Recent historical load shapes to determine the reduction in peak requirements should be used for this analysis. Enabling 1000 MW of transmission capacity from CAISO to neighboring regions will allow the flexible ramping requirement for CAISO and the regions to be reduced as they will be able to take advantage of the diversity of resources and shape of the load. These diversity saving benefits should be accounted for. CAISO's Quarterly EIM reports capture these benefits and this is an approach that CAISO Transmission Planning can use as well for this study. The Brattle Group estimates these load diversity benefits to be at least $11 million-$18 million annually. The value of reduction in peak capacity requirements based on prevailing costs of capacity in Southern California and Idaho should also be estimated. Brattle	

No	Comment Submitted	CAISO Response
	Study does not estimate these additional capacity benefits based on the ID and CA capacity cost difference of importing up to 1000 MW of firm capacity. However, CAISO has estimated these capacity benefits for other economic transmission projects in past and we recommend CAISO conduct this analysis for SWIP-North project.	
8c	*ii. Deliverability benefit* SWIP-North will enable deliverability of Out-of-State renewables which are part of Sensitivity portfolio for 2020-21 TPP and will be part of Base and Sensitivity portfolio for 2021-22 TPP. *i*	The comment has been noted.
8d	*ii. Public Policy Benefit* *SWIP-North will increase the firm import capability with a line that flows directly into the CAISO controlled grid. SWIP-North will have access to thousands of megawatts of diverse renewable energy resources that can help reduce the cost of reaching renewable energy targets. As noted in CAISO's TEAM methodology "When there is a lot of curtailment of renewable generation, extra renewable generators will need to be built or procured to meet the goal of renewable portfolio standards (RPS). The cost of meeting the RPS goal will increase because of that. By reducing the curtailment of renewable generation, the cost of meeting the RPS goal will be reduced. This part of cost saving from avoiding over-build is categorized as public-policy benefit". In CAISO's studies, SWIP-North has shown to help reduce renewable curtailments in CAISO footprint by providing a conduit to export surplus renewable energy from California. These capital cost savings should be captured.*	The comment has been noted.
8e	*iv. Renewable Integration benefit* As noted in CAISO's Draft Transmission Plan, Interregional coordination can help mitigate integration problems, such as over-supply and curtailment, by allowing sharing energy and ancillary services (A/S) among multiple BAAs. SWIP-North will increase importing and exporting capability of BAAs (CAISO, NVE, Idaho Power, PacifiCorp) and will facilitate sharing energy among BAAs, so that the potential over-supply and renewable curtailment problems within a single BAA can be relieved by exporting energy to other BAAs, whichever can or need to import energy. SWIP-North will also facilitate sharing A/S Sharing between the areas. The total A/S requirement for the combined areas may	The comment has been noted.

No	Comment Submitted	CAISO Response
	reduce if the areas are allowed to share A/S. This benefit should be captured in CAISO's study.	
8f	*v. GHG reductions and associated savings* GHG reductions in California can be offered by diverse new and existing renewable supply at the other end of SWIP-North.6 The Brattle Group indicates that SWIP-North will enable delivery of diverse out-of-state renewables into California. Their study analyzed the benefits of 1000 MW of Idaho wind delivered to California, which is more available than solar in evening peak hours to offset fossil fuel generation. The study concluded that Idaho wind on average reduced 146% more GHG emissions as compared to in-state solar. This GHG emissions benefit amounts to approximately $9/MWh in cost savings to CAISO ratepayers.	The comment has been noted.
8g	e) Other benefits of SWIP-North: A new transmission line such as SWIP-North, which parallels several existing 500 kV bulk transmission paths connecting the northern area of WECC to the southern area, provides several additional benefits that go beyond traditional economic studies. These benefits should however be quantified so all lead agencies in California and the ratepayers can get a complete picture on the value of such transmission lines. *i. Potential solution to mitigate blackouts during heatwave situations* As witnessed during the August 2020 blackout events, the supply conditions within California and the Desert Southwest were extremely tight, especially during the evening peak hours. As shown by preliminary analysis conducted by WECC7, while the Desert Southwest was experiencing heatwave and supply shortages, the Pacific Northwest was not in such a dire situation. If there was enough N-S transmission capability available, California could have potentially imported energy from the Pacific Northwest. Given this, a natural question that is posed is what value would a new transmission line have provided for days like this. SWIP-North, which provides an alternate 1000 MW path to allow flow from the Pacific Northwest and PacifiCorp East into CAISO, may have prevented load shedding events in California. *ii. Wildfire risk mitigation:* We recommend that CAISO evaluate the wildfire risk mitigation benefits of SWIP-North. It is known that the COI corridor and the 500 kV transmission lines	The comment has been noted.

No	Comment Submitted	CAISO Response
	north of COI corridor fall under high wildfire risk category. An example scenario occurred during the August 2020 heatwave events, where a weather event caused one of the lines in this corridor to de-rate the COI path by 650 MW.8 A new transmission line like SWIP-North, with its physical path from Idaho to Nevada, provides an alternate path for energy to get from the Pacific Northwest into CAISO. This diversification of transmission paths can benefit CAISO ratepayers by allowing energy to be re-directed towards CAISO in the event existing COI corridor is congested or its limit reduced. This benefit should be captured in CAISO's analysis. *ii. Resolving Reliability issues on COI path* LS Power submitted SWIP-North as a transmission solution to address reliability issues for the Bulk system in the Northern California area. In its review, CAISO concluded that "*while SWIP-N project can mitigate the identified overloads that it claims to mitigate, we don't consider that there is a reliability need for such project, since the overloads can be mitigated with substantially lower cost by operating within the COI nomogram or by congestion management reducing generation in the area of overloads."* The CAISO-proposed solutions to mitigate the identified reliability concerns are: • Manage COI flow according to the seasonal nomograms • Implement SPS to bypass series capacitors on both 500 kV transmission lines between Round Mountain and Table Mountain if any of these lines overloads. LS Power recommends that in the next TPP cycle CAISO should look at all benefits a particular transmission project can provide. If a large transmission project such as SWIP-North can help resolve reliability needs, in addition to providing policy and economic benefits, these benefits should be aggregated when evaluating the merits of a project. Any cost savings from deferring the reliability solution should also be attributed to the project.	
8h	(2) Interregional Transmission Projects CAISO noted that it considers SWIP-North to be "an interregional transmission project (ITP) due to the physical interconnections at Robinson Summit, Nevada and Midpoint, Idaho, within the WestConnect and Northern Grid (NG) planning regions, respectively." Additionally, in the Draft Transmission Plan, CAISO said	The comment has been noted.

No	Comment Submitted	CAISO Response
	it considered all ITP proposals in its 2020-2021 TPP and did not identify a CAISO need for the proposed ITPs. LS Power recommends that CAISO continue to evaluate economic, policy and reliability benefits of SWIP-North to CAISO ratepayers as a Regional project. These benefits to CAISO ratepayers should allow CAISO to approve this transmission project without the need for interregional cost allocation. In addition, we would like to remind CAISO that a significant part of the full SWIP corridor has already had interregional cost allocation. The Robinson Summit to Harry Allen portion (ON Line) is a 231 mile portion of the line that began operation in 2014 and is paid for by NV Energy customers. The Midpoint to Robinson Summit portion (SWIP-North) would increase the total capacity on ON Line, creating a 1000 MW corridor from Idaho to CAISO that could be used for the primary benefit of CAISO ratepayers. As noted above, this connection can provide significant economic, reliability, and public policy benefits to CAISO. Therefore, while SWIP-North is a portion of a 506 mile interregional project, the path physically and electrically connects directly at Harry Allen which became a CAISO interface in 2020, and nearly half of the total cost has already been allocated (and placed in service in 2014), so the benefits to CAISO ratepayers and the ability to meet CAISO's regional policy and reliability needs if the remaining SWIP-North portion is completed should continue to be studied under regional framework.	

9. Public Advocates Office at the CPUC (Cal Advocates) Submitted by: Kanya Dorland		
No	**Comment Submitted**	**CAISO Response**
9a	1. **Recommendations for future CAISO TPP Analyses Background** During the 2020-2021 TPP, the CAISO performed its standard reliability, policy, and economic assessments on the California Public Utilities Commission's (CPUC) renewable resource and greenhouse gas (GHG) target portfolios. The policy assessments included onpeak and off-peak deliverability studies and the economic assessments included production cost modeling (PCM) simulations. These assessments are intended to evaluate the grid impacts of meeting higher renewable portfolio standards (RPS) and GHG reduction targets and to determine if new transmission improvements would be needed to accommodate these higher targets. Since the PCM simulation results identify where curtailment and transmission congestion may occur on the CAISO-controlled grid with additional renewables, the CAISO used this information to determine locations where battery storage resources could be located to mitigate identified transmission issues. The CAISO performed this analysis referred to it as "re-mapping batteries," which involved mapping proposed battery resources to transmission substations and locating them in areas where they would be deliverable and address projected high congestion and or curtailment. Given the positive results associated with re-mapping batteries, Cal Advocates supports the CAISO's and CPUC's efforts to locate batteries where they would address identified issues and provide value to ratepayers and the grid. For future TPPs, Cal Advocates recommends additional re-mapping studies of other renewable resources in CPUC-provided portfolios, such as solar to avoid increases in CAISO grid congestion and curtailment, and to avoid unnecessary transmission projects.	The comment has been noted. The CAISO will continue to work with the CPUC on the busbar mapping of the resources provided in the portfolios.
9d	**B. Future Production Cost Model Simulation Study Recommendations** During the February 9, 2021 presentation on the CASIO 2020-2021 Draft Transmission Plan, CAISO staff presented possible mitigations to address curtailment and transmission congestion identified through PCM simulations of CPUC renewable resources and GHG target portfolios.9 These mitigations included special protection systems (SPS),10 reconductoring, and transformer	

No	Comment Submitted	CAISO Response
	upgrades. Cal Advocates requests that the CAISO expand the mitigation measures considered in future TPPs to include non-wire alternatives such as dynamic line rating and power flow control devices where applicable.	
9e	**C. 2020-2021 TPP Wildfire Impact Assessments and Future Assessments** To date the CAISO's impact assessment of wildfire-related de-energization events has focused on the impact on transmission lines. As stated in Cal Advocates' comments submitted on December 1, 2020, this assessment must account for impacts of de-energization events on transmission lines not in isolation and it must specifically assess the impact of distribution-level shutoffs and the resulting load reductions. Cal Advocates is making this request for the following reasons: (1) Any analysis of de-energization events must account for reductions in load on the transmission lines caused by the de-energization of distribution circuits, (2) Typically, electric utilities de-energize far more distribution lines than transmission lines because distribution lines pose a greater risk of igniting wildfires, and (3) As illustrated in prior comments, PG&E's de-energization events have had greater load loss impacts on distribution level circuits than transmission lines. Cal Advocates recommends that the CAISO change its usage of the term "critical facilities" in future TPPs and the 2020-2021 Final Transmission Plan. The CAISO identified transmission lines where a power shutoff could have a large impact in terms of loss of load as critical facilities in its 2020-2021 Draft Transmission Plan. The CPUC's de-energization (Public Safety Power Shutoffs) proceeding has an existing definition of critical facilities, which are facilities that serve the public and are vital for health and safety (such as hospitals or fire stations).14 The CAISO's identification of certain transmission lines as critical facilities creates confusion with the established meaning of the term. Cal Advocates recommends using a different term for transmission lines where a power shutoff could have a large impact in terms of loss of load	The wildfire assessment is focused on the impacts to the transmission system associated with the lines that go through the fire zones as well as have been impacted by PSPS events. The CAISO will continue to work with PG&E to incorporate the findings from the CAISO's wildfire impact assessment into the utility's overall wildfire mitigation plan. Regarding the reduction of load due to the distribution circuits' interruptions, this mainly impacts the system performance deficiencies, which the CAISO's assessment didn't identify for any area. The transmission plan has been updated to reflect this.
9f	**2. CAISO 2020-2021 Draft Transmission Plan** A. Economic Planning Study Requests - Southwest Intertie Project – North The Southwest Intertie Project (SWIP) – North project is a proposed interregional transmission project. It consists of a new 275 mile, 500 kilovolt (kV) single circuit transmission line that would connect the Midpoint 300 kV substation in southern Idaho to the Robinson Summit 500 kV substation in	The comment has been noted.

No	Comment Submitted	CAISO Response
	Nevada. The project objective is to address thermal overloads on the bulk transmission system in Northern California and "during various operating conditions while still allowing high COI North to South flows. "However, not all overloads identified in the 2020-2021 TPP in the area [California/Oregon, Idaho/Nevada] would be mitigated by the SWIP-North project." Per the CAISO's analysis, overloads in the project area can be mitigated with substantially lower cost solutions such as implementing congestion management. For these reasons, Cal Advocates supports the CAISO's recommendation to not undertake a capacity benefits analysis on the SWIP-North project at this time because of the uncertainty on the project's benefits to California ratepayers and future procurement.	
9g	**B. Pacific Gas and Electric Company's (PG&E) Projects Previously On-Hold** Cal Advocates supports the CAISO's decision to consider batteries as preferred low-cost mitigations for the identified issues on the Midway-Wheeler Ridge and Kern lines and Mesa area lines. Cal Advocates supported this recommendation in prior comments on previously proposed solutions for the Wheeler Ridge Junction and North of Mesa projects because batteries are cost effective solutions.	The comment has been noted.

10. Pacific Gas and Electric Company (PGaE) Submitted by: Mike Pezone		
No	**Comment Submitted**	**CAISO Response**
10a	**PG&E North Bulk System Reliability Assessment** In the Draft Transmission Plan, the CAISO recommended to install a new RAS to bypass series capacitor(s) on the Round Mountain-Table Mountain #1 or #2 500 kV Lines to mitigate the overload caused by an outage on one of the two lines. PG&E is supportive of developing a mitigation to the identified potential issues. As the recommended RAS would have impacts on COI operating limits and potentially COI path rating, PG&E will continue working with the CAISO to coordinate with neighboring systems who are COI rights owners and follow appropriate WECC processes to complete the necessary review of the RAS before its implementation.	The comment has been noted and will continue to work with PG&E on this.
10b	PG&E asks the CAISO to modify the representation of benefit to cost ratios in economic transmission projects that include LCR reduction. In the CAISO's process for evaluating Economic Transmission Projects that include LCR reductions, the CAISO has relied on three scenarios to determine whether the transmission project should be compared against the price spread between System and Local RA, the CPM soft offer cap, or compare against an existing Reliability Must Run contract. Typically, the CAISO picks the scenario it believes fits the circumstances of the project and only provides an economic assessment of that scenario. PG&E asks the CAISO to instead provide the results from all three scenarios in the review of each economic project, with the CAISO specifying which scenario it believes applies. This way, stakeholders can provide information and feedback to the CAISO as to the appropriateness of that particular scenario the CAISO selected, and the CAISO will not need to conduct additional analysis during the final approval phase of the process.	The CAISO has conducted the analysis using the CPUC latest public information on the costs of local versus system resources. This is supported by the CPUC current portfolios that have not identified any gas-fired resources retired in the baseline portfolio provided for use in the 2020-2021 transmission planning process.
10c	**Wheeler Ridge Project** In general, PG&E supports the CAISO's recommendation for the Wheeler Ridge Junction Station project to remain on hold pending procurement of battery storage on the 115 kV system and until the evaluation of the 230 kV options are completed. In regard to the battery storage component of the recommendation, PG&E requests the CAISO share additional details on various aspects of the proposal. First, PG&E would like to better understand how the CAISO envisions the battery will be operated. For instance, will it only serve a reliability function or under certain conditions would it also serve a	The CAISO has recommended the procurement of appropriately sited as mitigation for the reliability issues in the area through the CPUC procurement processes. The resources will be operated as needed for reliability, similar to in other local areas to address constraints identified in the operations timeframes.

No	Comment Submitted	CAISO Response
	market function? If it did serve a market function, under what conditions would the battery operate? Also, to ensure least cost for customers, PG&E would also like to better understand the complete economic evaluation for this alternative as well as how the CAISO envisions the procurement process for the storage will take place. PG&E looks forward to working with the CAISO on understanding these components as this project proceeds.	
10d	**North of Mesa Project** In general, PG&E supports the CAISO's recommendation for the North of Mesa project to remain on hold pending procurement of battery storage at Mesa 115 kV substation. Similar, to the Wheeler Ridge Project, PG&E looks forward to working with the CAISO on the various questions regarding economic evaluation, implementation, and storage procurement process. PG&E also has some technical comments on the North of Mesa Project. PG&E suggests updating the description of the alternative 3 related to the RAS to "Utilize upgraded or centralized UVLSs/RASs in the affected area" from "Utilize existing Mesa, Divide and Santa Maria UVLS for peak load conditions." PG&E also notes that the cost of the UVLS/RAS upgrades could be potentially significant depending on the detailed scope identified later during detailed scoping and implementation of the CAISO recommendation. Also, PG&E requests the CAISO to clarify whether the RAS work in the scope of alternative 3 also depends on the procurement of the energy storage at Mesa.	The comment has been noted.
10e	**Policy Driven RAS projects** The CAISO proposed the Fulton RAS project and the Humboldt-Trinity RAS upgrade project to mitigate the local deliverability issues in the policy-driven assessment. After a preliminary review of the proposed RAS scope, PG&E notes that both proposed RAS' could be very costly and could have a long implementation timeline. The reasons for the high cost and long duration include, but are not limited to: the various design requirements to ensure both RAS meet NERC and WECC requirements, the space limitation at the various impacted substations control buildings which may need expansion; communication requirements for these RAS which may lead to significant transmission line work as well as terrain/area construction challenges. Due to the cost concerns to address the identified limitations, PG&E would like to	The comment has been noted and the CAISO will continue work with PG&E on this.

No	Comment Submitted	CAISO Response
	continue working with the CAISO to develop different and potentially more economical alternatives.	

11. San Diego Gas and Electric (SDGE) Submitted by: Alan Soe		
No	**Comment Submitted**	**CAISO Response**
11a	Rearrange TL23013 and TL6959 Project was proposed by SDG&E as a reliability transmission solution to swap Sycamore Canyon–Penasquitos 230 kV (TL23013) with Mira Sorrento-Penasquitos 69 kV (TL6959) so that TL23013 and Old Town-Pensaquitos 230 kV (TL23071) will not share the same structures. The estimated cost of the project is $19 million, and the proposed in-service date is 2026. This project would mitigate the P7 overloads identified on the Friars-Doublet Tap 138 kV line. The CAISO has proposed a new Remedial Action Scheme to trip generation and mitigate the P6 and P7 thermal overloads identified on the Friars-Doublet Tap 138 kV line with an estimated cost of $750k. Due to the shorter permitting and construction time and much lower cost of the RAS alternative, the CAISO has selected the RAS alternative instead of the rearrangement of TL23013 and TL6959.	The comment has been noted.
11b	**Comments from SDG&E.** The proposal from ISO is a complicated RAS which will require remote monitoring of the contingency lines and limiting element, and the tripping of relatively ineffective generation some 45 transmission line miles away from the limiting element. At this time, implementation of such communications may not even be feasible. Furthermore, redundant communications will be required, which will increase the cost for the proposed RAS option. Also, SDG&E Grid Operations is strongly opposed to the ISO-proposed RAS given the complexity, system impact, and the heavy reliance on RAS in lieu of system upgrades. The proposed RAS is non-intuitive for operators as it detects a contingency in the northern territory, monitors a limiting element that is central to our territory and trips generation in the southernmost portion of our territory. From detection to tripping, RAS components would be spread out over 50 transmission line miles across our territory. Furthermore, the N-2 is a credible contingency of the 230kV network, which alone is a large impact to the transmission system. This is not the time to trip in-basin generation (with its associated reserves and dynamic/reactive resources) when the system is already compromised. Finally, SDG&E already has too many RAS for Operators to manage. At present, SDG&E has six BES RAS, one Safety Net, four Limited Impact RAS, six Non-BES RAS, one OLS, and three neighboring RAS to manage. This is 21 different schemes, not to mention the significant amount of future proposals needed to accommodate the influx of interconnection projects. The increased risk of	The comment has been noted. The RAS is identified as a feasible low cost alternative in the interconnection study reports of generation interconnection projects. In addition, the CAISO has applied the guidelines in the ISO Planning Standards in the review of the reliability needs of the area. The CAISO will be undertaking a review of the guidelines in the ISO Planning Standards in 2021 that will include stakeholder consultation.

No	Comment Submitted	CAISO Response
	misoperations due to the complexity of the RAS schemes also needs to be considered. Based on CAISO Planning Standards (ISOPlanningStandards-November22017.pdf), the guidelines do not recommend for complicated RAS proposal. *III. ISO Planning Guidelines* *The ISO Planning Guidelines include the following:* ***1. Special Protection Systems*** ***ISO SPS6*** *The SPS must be simple and manageable. As a general guideline:* *A) There should be no more than 6 local contingencies (single or credible double contingencies) that would trigger the operation of a SPS.* *B) The SPS should not be monitoring more than 4 system elements or variables. A variable can be a combination of related elements, such as a path flow, if it is used as a single variable in the logic equation. Exceptions include: i. The number of elements or variables being monitored may be increased if it results in the elimination of unnecessary actions, for example: generation tripping, line sectionalizing or load shedding. ii. If the new SPS is part of an existing SPS that is triggered by more than 4 local contingencies or that monitors more than 4 system elements or variables, then the new generation cannot materially increase the complexity of the existing SPS scheme. However, additions to an existing SPS using a modular design should be considered as preferable to the addition of a new SPS that deals with the same contingencies covered by an existing SPS.* *C) Generally, the SPS should only monitor facilities that are connected to the plant or to the first point of interconnection with the grid. Monitoring remote facilities may add substantial complexity to system operation and should be avoided.* *D) An SPS should not require real-time operator actions to arm or disarm the SPS or change its set points.*	

No	Comment Submitted	CAISO Response
11c	**Economic/Gridview Study** CAISO has modelled the Otay Mesa/Pio Pico/Gateway Energy Storage gen trip RAS in the reference case. This does not reflect the current system. SDGE recommends that the comparative analysis be performed against a more accurate reference case that does not include this gen trip RAS. Furthermore, if implemented this would result in these resources being offline for 2749 hours (27% of the year) as a baseline scenario. Doublet Tap – Friars congestion - congestion and curtailment results with mitigation **Base case** / **Alternative 1 – Expended SPS** / **Alternative 2 - Reconductoring** / **Alternative 3 – Rearrangement** Congestion | $M | Hours | $M | Hours | $M | Hours | $M | Hours Doublet Tap - Friars 138 kV | 52.74 | 2,749 | 5.47 | 378 | 0 | 0 | 0 | 0 Wind and Solar | Output (GWh) | Curtail (GWh) | Output (GWh) | Curtail (GWh) | Output (GWh) | Curtail (GWh) | Output (GWh) | Curtail (GWh) CAISO Total | 75,051 | 13,595 | 75,072 | 13,575 | 75,072 | 13,575 | 75,066 | 13,581	

12. The City of Santa Clara dba Silicon Valley Power (SVP) Submitted by: Albert Saenz		
No	**Comment Submitted**	**CAISO Response**
12a	The Draft Plan notes multiple Category P1, P2, and P7 overloads on the Los Esteros-Nortech 115 kV line in both the short and long term. To mitigate these overloads, the CAISO has indicated that it is working with PG&E to develop a project which could include reconductoring the 115 kV line. SVP welcomes the coordination between the CAISO and PG&E to upgrade PG&E's south bay area transmission system, which is where SVP load exists. SVP also observes that these overloads on the Los Esteros-Nortech 115 kV line and additional PG&E transmission facilities serving the SVP load are even worse in the *SVP High Load sensitivity* case studied in the 2020-2021 Plan. These PG&E facilities include the Los Esteros-SVP Switching Station 230 kV line, the Newark-Kifer 115kV line, and the Newark-Northern Receiving Station 115kV line as shown in Table 1 below. SVP believes that the results of the *SVP High Load sensitivity* case should be thoroughly considered in developing a plan of service for the area. SVP load growth projections are primarily driven by large-scale data center block loads that result in an SVP average annual load factor of as high as 80%, do not follow traditional load models. As SVP indicated in its comments on the 2020-2021 Transmission Planning Process (TPP) Preliminary Reliability Assessment Results and PTO Request Window Submissions, we have been concerned with SVP's projected load growth not being reflected. **Table 1: Loadings (%) on the Critical Facilities Serving SVP Load Identified by CAISO in 2020-2021 TPP***	With the increase in the SVP area load forecast included in the 2020 CEC load forecast, the CAISO plans to take a closer look at the overall reliability need in the South Bay area within the 2021-2022 transmission planning process due to significant increase in the SVP area load forecast.

No	Comment Submitted	CAISO Response

Overloaded Facility	Contingency	Category	Base Summer Peak 2022	Base Summer Peak 2025	Base Summer Peak 2030	SVP High Load Sensitivity Summer Peak 2030
Los Esteros-Nortech 115 kV Line	SSS-NRS 230 kV same as outage of SVP's PST or NRS T2	P1	100%	98%	102%	125%
Los Esteros-Nortech 115 kV Line	LS ESTRS 230kV - Middle Breaker Bay 8	P2	99%	98%	102%	124%
Los Esteros-Nortech 115 kV Line	Los Esteros - Trimble & Los Esteros - Montague 115 kV	P7	85%	84%	88%	110%
Los Esteros-Silicon Switching Station 230 kV	LOS ESTEROS 115KV BAAH BUS #2 (FAILURE OF NON-REDUNDENT RELAY)	P5	96%	94%	97%	Diverge
Newark-Kifer 115kV Line	LOS ESTEROS 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	58%	68%	76%	101%
Newark-Northern Receiving 115kV Line	LOS ESTEROS 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	83%	97%	103%	131%

*__Source:__ 2020-2021 CAISO Reliability Assessment – Preliminary Study Results, PG&E Greater Bay Area, CAISO 2020-2021 TPP, August 15, 2020.

SVP's load growth includes California Energy Commission (CEC)-approved small generator exemptions granted to hyper-scale data centers in SVP's service territory. SVP has been working with the CEC's Energy Assessments Division on its demand forecast process to ensure that the CEC's forecast accurately captures future demand growth in the SVP area.4 As a result of these efforts, CEC's adopted (on January 25, 2021 at the CEC Business Meeting5) California Energy Demand Update (CEDU) 2020-2030 managed forecast (Demand Forecast 2020), accurately captures SVP's currently expected rapid load growth. In Table 2, we provide a comparison of the 1-in-10 Summer Peak load for SVP modeled in the CAISO 2020-2021 TPP based upon the 2019 IEPR final report (adopted on February 20, 2020) with the CEC's Demand Forecast 2020, which presumably would be used by the CAISO in its 2021-2022 TPP for different study years. For example, the CAISO modeled SVP's 1-in-10 Summer peak load at 657MW (=672MW minus 14.6MW of energy efficiency) in year 2025, whereas the CEC's Demand Forecast 2020 now shows SVP's peak load in 2025 at **1,011MW**, which is even higher than the

<table>
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<tr><td></td><td>SVP peak load of 865 MW that the CAISO modeled under the SVP High Load sensitivity case for the year 2030. This means that the P1 overload of 25% on the Los Esteros-Nortech 115 kV line, that CAISO identified in 2030 in the SVP High Load sensitivity case as shown in Table 1, would be significantly higher than 25% by 2025 itself. This is one example of numerous planning criteria violations that are expected to occur based on the fact that additional overloads were identified by the CAISO, and in some cases the power flow case diverged, in 2030 as shown in Table 1.6 SVP, therefore, expects significant reliability issues will be identified in the 2021-2022 TPP on the transmission network serving the SVP Load as early as 2025-2026.

Table 2: A Comparison of 1-in-10 SVP Summer Peak Load (MW) Modeled in CAISO 2020-2021 TPP Cases Vs. in CEC Adopted Baseline Demand Forecast 2020
<table>
<tr><th>Scenario</th><th>Year</th><th>CAISO 2020-2021 TPP*</th><th>CEC Adopted 2020-2030 CEDU[7]</th></tr>
<tr><td rowspan="3">Base</td><td>2022</td><td>624</td><td>743</td></tr>
<tr><td>2025</td><td>657</td><td>1,011</td></tr>
<tr><td>2030</td><td>670</td><td>1,176</td></tr>
<tr><td>SVP High Load Sensitivity</td><td>2030</td><td>865</td><td></td></tr>
</table>
*Adjusted for energy efficiency amounts

The necessity to plan for projects to alleviate future overloads is critical given the timing of the SVP new loads. In SVP's comments on the 2020-2021 TPP Study Plan, dated February 28, 2020, we provided a table identifying examples of PG&E projects with long implementation lead times in the range of 6 to 15 years. We believe it is important to timely develop and approve a plan to relieve the overloads delineated above. SVP is concerned that even if CAISO had already identified and approved transmission projects, they would not be completed in time to eliminate expected planning criteria violations. Since any</td><td></td></tr>
</table>

No	Comment Submitted	CAISO Response
	reinforcement of the transmission grid in the SVP/San Jose area will probably take significant time to construct, it is critical for CAISO and PG&E to approve mitigation plans based upon the SVP High Load sensitivity study in the current planning cycle itself - before new reliability studies are completed in next transmission planning cycle. SVP expects to work closely with PG&E and the CAISO in such efforts.	

13. South Western Power Group (SWPG) Submitted by: Ravi Sankaran		
No	**Comment Submitted**	**CAISO Response**
13a	SWPG appreciates the opportunity to submit comments in response to the CAISO's 2020-2021 draft Transmission Plan (plan). SWPG's comments pertain primarily to the inter-relationship between the TPP and the CPUC's IRP. SWPG encourages the CAISO to provide as much transparency and stakeholder engagement opportunity as possible for those critical inputs the CAISO provides to the CPUC's IRP – in particular, the transmission limits that constrain build out in desirable locations on the CAISO grid and/or imports from choice renewable sources outside of the CAISO grid. In this regard we offer feedback on two types of analyses/findings from the CAISO's 2020-2021 planning process and draft plan.	The comment has been noted
13b	1) CAISO-Identified Transmission Constraints for IRP Transmission Limits The CAISO's 2020-2021 TPP reliability studies, congestion studies and study of the CPUC's Policy Sensitivity Case 2 all seem to inform the transmission constraints used in IRP. While the CAISO's work seems mostly complete, elements of the transmission limit analysis are still underway; (e.g., footnote 114, page 212 in the draft plan says that some of this work is still underway as part of Cluster 13 assessments.) In the IRP cycle the CPUC just completed, the CPUC - in conjunction with the CAISO and CEC - used the transmission limits provided by the CAISO in 2019, and in some cases they used information derived from the CAISO's 2020-2021 TPP. The use of both the constraint data from 2019 and the new data illustrates the importance of the CAISO offering as much transparency as possible with respect to these constraints and their respective derivation. SWPG strongly encourages the CAISO to prepare a new white paper incorporating new information regarding the transmission constraints. SWPG also requests that the CAISO offer a working group session to discuss the new white paper and that the CAISO take comments and consider any revisions warranted by stakeholders' input and questions. The vetting of this information is critical to a process that works smoothly to ensure that limitations used for analyses are agreed upon by stakeholders'. In development of the most recent CPUC 2021-2022 TPP Base Case portfolios, SWPG experienced first the inclusion of New Mexico wind based on transmission constraints and other economic data in RESOLVE, then the exclusion of New Mexico wind in Round	The comment has been noted. The CAISO will be updating the transmission capability limits this year in time for use by CPUC in developing the portfolios for the 2022-2023 TPP. The CAISO will also be updating the white paper and afford stakeholders the opportunity to provide input.

No	Comment Submitted	CAISO Response
	2 mapping– supposedly based on new transmission constraint information not released publicly, and lastly inclusion again of New Mexico wind after SWPG worked diligently to uncover the intended position of the CAISO regarding the transmission limits at Palo Verde and at Eldorado. The lack of orderly release of the underlying data and analysis influencing the transmission limitations prevents stakeholder engagement and results in outcomes that are unpredictable. This in turn creates regulatory risk that is costly to all Californians whose LSEs are responsible for procuring zero-carbon sources. The CAISO's actions can eliminate, or at a minimum, significantly reduce this regulatory risk by fully sharing underlying constraint bases1 and fully vetting the constraint information the CAISO intends to recommend to the CPUC. In its draft 2020-2021 Transmission Plan, the CAISO can further work to clarify resultant findings with respect to the import constraints. Currently, SWPG has the following questions about the Riverside Palm Springs zone and the greater Southern California and Southern Nevada area. Since in the Southern California and Southern Nevada areas the CAISO found only two areas (Whirlwind and GLW/VEA) that needed transmission upgrades for the Policy Sensitivity Case 2, is it the case that the Riverside Palm Springs transmission capability for Energy Only resources will be increased to the level studied in the Policy Case 2? • For deliverability purposes are the Colorado River and Devers-Red Bluff constraints shown in Table 3.9-1 on page 233 of the draft plan affected by build out in the balance of Southern California and Southern Nevada or only by build out specifically in the Riverside Palm Springs zone? • CPUC and CAISO 2021-2022 TPP Round 2 mapping suggested that it was beneficial in some regard to rebalance by reducing Riverside Palm Springs imports even though the Riverside limit was not exceeded. Is there such a need and if so can the CAISO provide more information about this? • Does the CAISO expect to regularly incorporate GIDAP information into the IRP process at the mapping stage? If so, how can the CAISO do so transparently and with stakeholder engagement?	The comment has been noted. The comment has been noted. The CAISO will develop the transmission capability estimates using a documented methodology taking into account all available information from TPP and GIP studies. It will be premature for the CAISO to comment on the outcome before the results are available. It is worth clarifying that the transmission upgrades in the Whirlwind and GLW/VEA areas were assessed on the Sensitivity 2 Portfolio PCM as alternatives to battery re-mapping. These studies and the results should not be used for other purposes.

No	Comment Submitted	CAISO Response
13c	2) CAISO-Proposed Process for Determining Transmission Plan Deliverability (TPD) Limits The CAISO has articulated a methodology for establishing TPD limits in its February 9 presentation (slides 74-78) and in the draft plan (pp. 232-235). SWPG asks that the examples discussed on February 9 be posted, as the methodology is challenging to discern otherwise from the information provided. More importantly it would seem that such a methodology should be captured in the GIDAP tariff language (Appendix DD) or in the transmission planning or Generation Interconnection BPM rather than just in this 2020-2021 plan report. SWPG encourages the CAISO to consider such an approach to provide policy review at the CAISO and among stakeholders. At a minimum the process should be captured in some policy document and thereby be readily available. SWPG understands that the CAISO prefers that the CPUC incorporate the methodology within RESOLVE such that it solves dynamically with the resource selections that RESOLVE otherwise finds optimal. However, SWPG asks the CAISO to clarify how the TPD assessments will be coordinated with the IRP cycle should the CPUC not be able to embed the methodology within RESOLVE, and requests a mechanism for transparency and stakeholder input in this event.	The comment has been noted. The transmission plan deliverability values that were the subject of slides 74-78 were described as estimates. These values are annually provided in the Transmission Plan report as informational numbers only. Once the updated methodology for obtaining the informational numbers is established it will be documented in an updated white paper posted on the CAISO website. For the purpose of actually allocating transmission plan deliverability to generation interconnection projects, a detailed study is performed on the generators eligible to received deliverability at that point in time.

14. Vistra Corp. **Submitted by: Cathleen Colbert**		
No	**Comment Submitted**	**CAISO Response**
14a	Vistra Corp. respectfully submits these comments in response to the CAISO's 2020-2021 Transmission Planning Process ("TPP") Draft Plan posted on February 1, 2021 and discussed at a public stakeholder call on February 9, 2021. The production cost model simulation ("PCM") that informs both the policy and economic assessments is a critical tool to identify solutions needed to ensure the transmission system can reliably support the development of renewable integration resources (batteries) in areas that have commercial viability. In our prior comments, Vistra detailed specific considerations for improving the modelling inputs or assumptions to better model thermal limits consistent with expected operations or recognize various dispatch assumptions based on how storage assets operate. We look forward to introducing those comments into the new TPP cycle for 2021-2022. In these comments, we would like to confirm our understanding of the role of the battery remapping sensitivity in the PCM: • Please confirm the battery remapping did not resolve any transmission issues that would otherwise have led to a policy-driven transmission need being identified in this plan. • Please confirm commercial viability or economic benefits were not considered in the battery remapping. • Please confirm the CAISO intends for the remapped battery MW in Table 3.8-2 to inform non-transmission alternatives and clarify whether CAISO is considering approving those in future cycles. • Section 3.8 describes the remapping approach as, "the battery storage that was found to be undeliverable in the on-peak deliverability assessment was relocated". We observe "Mosslanding" had all the battery storage at that bus reduced even though Moss Landing – Las Aguilas 230kV line was not included in the on-peak deliverability assessment results. Please clarify how this bus was selected for remapping and why the full amount of batteries was reduced at that bus.	The need to reduce/remap battery storage in certain areas was identified in sensitivity portfolios to avoid deliverability constraints. Sensitivity study results are only informational and do not lead to policy-driven transmission need being identified in the plan. The objective of the battery remapping PCM study was to assess the impact of battery storage location on transmission congestion and renewable curtailment. Economic benefits were not assessed in the battery remapping study. Please see the response above regarding the objective of the study. The Gates-Midway 500kV line constraint, which is described on pages 200-201 of the draft plan, led to the identification of remapping battery storage that was mapped at Mosslanding as a potential mitigation. The comment has been noted.

No	Comment Submitted	CAISO Response
	• Please confirm this battery remapping sensitivity is planned to be included in future TPP cycles.	

15. Western Grid Development LLC (Western Grid) **Submitted by:**		
No	**Comment Submitted**	**CAISO Response**
15a	**PTE LCR Reduction Benefits** We appreciate the CAISO's determination that the PTE will provide net 1,993 MW's of LCR reduction benefits by reducing the LCRs in the LA Basin and, thereby, allowing 1,993 MW's of existing gas plants to close in the West LA Basin and Big Creek/Ventura area. *Draft TPP Report at page 327.* Given the CAISO's analysis, the PTE could also fill the shortage of Resource Adequacy capacity in Southern California because PTE will enable delivery of new Resource Adequacy capacity from outside the region. This need was recently demonstrated on August 14 and 15, 2020 when the region was short of local capacity and drove the marginal cost of energy to skyrocket levels for the entire CAISO. However, the CAISO again applied a very conservative value to the LCR benefits in this planning cycle. In this regard, the CAISO stated that: *While future IRP efforts are expected to provide more guidance and direction regarding expectations for the gas-fired generation fleet at a policy level, without that broader system perspective available at this time, the CAISO has taken a conservative approach in assessing the value of a local capacity reduction benefit when considering a transmission reinforcement or other alternatives that could reduce the need for existing gas-fired generation providing local capacity. In this planning cycle, the CAISO therefore applied the differential between the local capacity price and system capacity price to assess the economic benefits of reducing the need for gas-fired generation when considering both transmission and other alternatives.* Western Grid believes CAISO TPP did not achieve its objective of providing helpful information to state policy makers and regulatory agencies by using conservative values for local capacity and not addressing the host of reliability issues facing the State. A more global perspective and evaluation of transmission benefits for all projects including the PTE is the underlying intent of the TPP. The TPP should evaluate the IRP's base procurement portfolios in the context of providing an overall lower cost solution to ratepayers while addressing ***all*** reliability issues and avoid the piecemeal approach currently in place. Otherwise at best, reliability issues will be resolved incrementally and at	The comments have been noted. The CAISO has conducted the reliability analysis of the transmission system to meet the applicable reliability standards. In addition the CAISO has conducted the policy and economic assessments utilizing the baseline portfolio, along with two sensitivity portfolios of the CPUC portfolios provided to the CAISO for use in the 2020-2021 transmission planning process. With the CPUC baseline portfolio not reflecting any gas-fired generation retirements in the planning horizon of the transmission planning process, the CAISO used the latest publicly available information from the CPUC on the cost of local versus system resources in the economic assessments. The CAISO will continue to coordinate with the CPUC on the portfolios submitted into future planning cycles and continue to assess the reliability, policy and economic needs of the system.

No	Comment Submitted	CAISO Response
	higher cost to ratepayers. For instance, it is widely known that California's Resource Adequacy requirements is inadequate and insufficient to adhere to SB 100, is subject to changes in the Planning Reserve Margin (PRM) and changes to rules for how imports and intermittent resource can fulfill requirements. Western Grid believes that the CAISO TPP valuation is inaccurate and very narrow as the PTE project is not aimed at displacing existing local RA but instead avoiding the construction of new renewables or 4 hour batteries that cannot provide the reliability and the deliverability needed to operate the grid reliability. PTE's objective is a long-term solution that addresses various reliability challenges such as: 1. **Compliance with SB100:** Western Grid requests that CAISO evaluate the PTE as a transmission solution that enables the State to comply with SB 100. There are approximately 3,658 MW's of gas fired plants in the Western LA Basin alone that will need to close by 2045 under the requirements of SB 100. The CAISO and major load serving entities have urged the CPUC to start planning for the shutdown of these gas plants as soon as possible. Therefore, using PTE to allow closure of 1,993 MW's of gas plants in the LA basin by 2027 is an appropriate start on this long overdue and challenging effort. The TPP fails to do this evaluation and narrowly views the PTE as a project that would only displace LCR provided by existing gas-fired generation, where it should be evaluated as a solution that enables the replacement of gas fired plants throughout the State (i.e. – system capacity benefit.) 2. **Resource Adequacy Benefits of PTE:** (1) The increase of the PRM, (2) the changes in resource availability throughout the west combined with the reduced accounting of imports for Resource Adequacy, (3) the updated effective capacity accounting, (4) the updated Demand forecasts and (5) the planned retirement of the Diablo Canyon Nuclear Plant. These rule changes and events all have one commonality; they all will increase the Resource Adequacy capacity need. The PTE is designed to access system resources and make them deliverable to the LA basin., Further, the PTE can take system resources that are classified as "Energy Only"	

No	Comment Submitted	CAISO Response
	and deliver this energy to LA Basin and make these existing and future "Energy Only" resources fully deliverable resource adequacy capacity. **3. Grid Reliability:** The PTE will provide reliability support to the Big Creek/Ventura area of SCE, specifically within the Goleta area. The Goleta area is subject to voltage collapse issues under a double line (N-2) outage of the two 220 kV lines feeding Goleta substation from Santa Clara substation. Western Grid believes that CAISO did not consider in its modeling the full capabilities of PTE's HVDC VSC technology. The proposed PTE will mitigate Goleta's voltage collapse issue by providing up to 500 MW into Goleta in the event of an outage. Further, as noted in the CAISO 2020 Local Capacity Technical Study, page 165, the Elwood generating station "will only be allowed to retire after suitable replacement is in place at or near the same bus (Goleta)". The PTEP is proposed to have a direct connection to Goleta substation and would serve as a viable replacement, several times over, for the Elwood generating station and eliminate the need for Elwood to be under a Reliability Must Run ("RMR") contract. With respect to the "flexibility" of gas fired plants, the PTE with its associated converter stations are far more flexible than gas fired generation. The PTE converters with their grid forming attributes, can respond much faster than the synchronous generators used on gas fired units. The faster response applies both in reaction time and impact for AC voltage control and frequency stabilization while providing effective short circuit capacity and system damping requirements. **4. Wildfire mitigation:** The PTE reduces the risk of another wildfire cutting off electric service to the LA coastal area. The PTE with its associated subsea cables would have enabled CAISO to by-pass the problematic transmission areas interrupted by the wildfires. With PTE, CAISO could have kept the lights on in the LA Basin even without the local gas plants being on-line when service from the terrestrial lines from the east were cut off this past summer. With the vast number of MW's in the CPUC resource portfolio assumed coming from solar and batteries that will be located in the interior part of the State and which will require additional terrestrial transmission to reach the coastal population, it makes good sense to have at least some capacity delivered by subsea cables that do not involve dealing with the same wildfire risks.	

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	5. **Increase Renewable deliverability:** PTE allows otherwise curtailed renewable energy to be delivered to the northern CAISO system or to other Balancing Authority Areas ("BAAs"). We believe this benefit should be included in the BCR calculation for PTE and categorized as a Renewable Integration Benefit which is one of the stated TEAM benefit categories. 6. **Environmental Justice:** PTE will clearly improve air quality, particularly in the LA area where the poorest air quality falls disproportionately on disadvantaged neighborhoods. 7. **Resource Adequacy valuation:** A holistic evaluation of all reliability issues and using realistic values for local capacity would have provided better information for ensuring future policy decisions will evaluate the most cost-effective alternatives especially when considering the benefits of long-lead solutions such as the PTE. However, as the CAISO found, the PTE reduces the need for local capacity in those areas by 1,993 MW's, thereby avoiding the need to purchase that amount of local capacity and thus, saving the cost differential between that local capacity and the lower cost of the PTE. The CAISO's valuation method produced prices in the LA Basin local capacity areas of 15,360/MW-year and for Big Creek-Ventura of $9,720/MW-year. CAISO valuation method is incorrect because PTE's objective is not to displace existing resources but to displace new resources that will be needed to deal with the reliability and policy issues discussed in items 1 to 6 above. We understand that CAISO's position is that these reliability issues are dealt with through the PUC Integrated Resource plan. However, we urge the ISO to address the PTE project as a transmission project that can reduce the procurement cost to ratepayers. The IRP is not suited to analyze the true value of the PTE which includes firming up existing and planned renewables and allowing these renewables to count for 100% qualifying capacity toward the Resource Adequacy. Further, the IRP does not address the value for voltage support, frequency response and inertia that are needed services to preserve the reliability of the Grid. The PTE project provides these critical reliability services in addition to system and local Resource Adequacy.	

<table>
<tr><th>No</th><th>Comment Submitted</th><th>CAISO Response</th></tr>
<tr><td></td><td>A critical failure of the CAISO evaluation is that it undervalues the LCR benefit for PTE and other transmission solutions. Based on the publicly available FERC EQR data reflected in Table 1, the weighted average price of local capacity contracts in the Western LA Basin is about $16.68/kW-month. Even if the contract prices for the three Once Through Cooling (“OTC”) units planned for retirement and shown in Table 2 are included, the average weighted price for gas-fired generation in the Western LA Basin is about $9.80/kW-month (Table 3). This is based on an analysis of the publicly available FERC EQR data for existing LCR contracts totaling roughly 3,313 MW’s of existing gas plants in the LA Basin. By way of comparison, the LCR contract price needed to cover the PTE cost is approximately $7.35/kW-month3. Obviously, the price of LCRs will only rise in the future as the CPUC starts to plan for the retirement of the non-OTC gas units, particularly since there is no clear resource that can replace the reliability and flexibility currently provided by the gas plants other than an HVDC VSC circuit like PTE’s with its associated converter stations.

Table 1. 2020 Average Capacity Cost for Western LA Basin Gas-fired Resources (not including retiring OTC units)

<table>
<tr><th>Western LA Basin Generators (natural gas-fired)</th><th>2020 Avg Capacity Cost ($/kW-Month)</th><th>NQC (MW)</th><th>$/YEAR</th></tr>
<tr><td>El Segundo Energy Center</td><td>19.98</td><td>522.34</td><td>$125,238,602</td></tr>
<tr><td>Malburg power plant</td><td>27.30</td><td>134</td><td>$43,892,611</td></tr>
<tr><td>Walnut Creek Units</td><td>17.08</td><td>478.8</td><td>$98,112,519</td></tr>
<tr><td>Long Beach Peakers (Hinson)</td><td>4.49</td><td>202</td><td>$10,894,800</td></tr>
<tr><td>Harbor</td><td>5.00</td><td>100</td><td>$4,500,00</td></tr>
<tr><td>Total</td><td>14.77</td><td>1437.14</td><td>$282,638,532</td></tr>
<tr><td>Weighted Average Cost</td><td>16.68</td><td></td><td></td></tr>
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No	Comment Submitted	CAISO Response

Table 2. 2020 Average Capacity Cost for Western LA Basin Gas-fired Resources (retiring OTC units)

Retiring OTC Generators in Western LA Basin	2020 Avg Capacity Cost ($/kW-Month)	NQC (MW)	$/YEAR
Alamitos*	12.17	349.75	$51,062,916
Huntington Beach*	3.65	677.4	$9,890,040
Redondo Beach	8.40	Variable	$69,142,230
Total	8.07	1876.15	$106,896,806
Weighted Average Cost	4.82		

Table 3. Summary 2020 Average Capacity Cost for Western LA Basin Gas-fired Resources

	2020 Avg Capacity Cost ($/kW-Month)	NQC (MW)	$/YEAR
Total Table 1 and Table 2	12.26	3313.29	$389,535,338
Weighted Average Cost	9.80		

In terms of the need for system capacity, by its Order issued November 13, 2019, the CPUC has directed LSEs to purchase 3,300 MW's of system capacity to be in service in the 2021-2023 time period (1-3 years from now). To the extent that additional *system* capacity is a concern, certainly an additional 1,993 MW's of system capacity can be acquired by the 2027 in-service date of the PTE (7 years from now). Obviously, system capacity located outside the local capacity areas will be less expensive than capacity located in the local areas. Therefore, system capacity should be located outside the local areas and any such needs are not a basis for keeping gas plants in the local areas in service. Indeed, for this and other reasons, the PTE will be developed and permitted to the maximum extent possible to allow for expansion.